Name: _____ ✳ KEY ✳ _____　　　　　　**FLUIDS AND DYNAMICS**

Blk: ____ Date: _____　　　　　**CHAPTERS 7, 8 & 9**

UNIT III CHEMISTRY Key Terms

These are the vocabulary words that you should know for your final exam.

Chapter 7	**Atomic Theory**	**Periodic Table**
condensation	atom	alkali metals
density	conductivity	alkaline earth metals
displacement	density	atomic mass
evaporation	electron	atomic number
expansion	element	Bohr model
Fluid	mass	chemical symbol
mass	neutron	electron shell
melting	nucleus	halogens
solidification	proton	inert gas
sublimation	subatomic particles	mass number
volume	John Dalton	metal
	J.J. Thompson	metalloid
	Ernest Rutherford	noble gases
	Niels Bohr	non-metal
		reactivity
		valence electron
		valence shell

UNIT III Key Concepts

These are the main ideas from this unit. Fill-in-the-blanks to complete.

Chapter 7: The KMT explains characteristics of solids, liquids and gases

- The ___KMT/PMM___ describes how particles of a solid are closer together than particles of a ___liquid___. Particles of a gas are spread far ___apart___. (7.1)

- The ___KMT.___ describes how adding energy to particles makes them move faster and farther apart. (7.1)

- Addind and removing ___ENERGY___ from matter can cause changes in the state of matter .(7.1)

- Liquids and gases are ___FLUIDS___, forms of matter that can flow. (7.2)

- ___COMPRESSION___ is a way to describe how closely particles are packed together in a solid, liquid or gas. (7.2)

- Density is calculated by dividing ___MASS___ by ___VOLUME___. (7.2)

Atomic Theory

- John Dalton proposed that <u>matter</u> is made of _ATOMS_, which can be part of an <u>element</u> (one kind of atom) or a <u>compound</u> (more than one kind of atom joined together). (1.3)
- Ernest Rutherford discovered the _NUCLEUS_, a tiny, dense region at the centre of an atom. Inside it you will find _PROTONS_ & _NEUTRONS_ (1.3)
- Most of the volume of an atom is occupied by _ELECTRONS_, which exist in specific _"SHELLS"_ first discovered by Niels Bohr. (1.3 (or ENERGY LEVELS))
- <u>Protons</u> have a _POSITIVE_ charge, <u>electrons</u> have a _NEGATIVE_ charge and <u>neutrons</u> are _NEUTRAL_. (no charge)
- Atomic _NUMBER_ is equal to the number of <u>protons</u> of an element.
- Atomic _MASS_ is the number of <u>neutrons</u> and protons. Mass # is the atomic mass rounded.
- _IONS_ are atoms that have <u>lost</u> or <u>gained</u> electrons.

PERIODIC TABLE.

- Each <u>element</u> contains only __1__ kind of atom, and all other forms of matter are made from combinations of these atoms and elements. (2.1)
- The <u>periodic table</u> lists the elements in order of increasing _ATOMIC NUMBER_, arranged into families according to their _PROPERTIES / CHARACTERISTICS_ (2.2)
  - <u>Families</u> (or <u>groups</u>) are arranged _COLUMNS_ & periods are _ROWS_.
  - Families/Groups include:
    - _ALKALI METALS_ ex. Li, Na, K
    - _ALKALINE EARTH METALS_ ex. Be, Mg, Ca
    - _HALOGENS_ ex. F, Cl, Br
    - _NOBLE GASES_ (aka Inert gases) ex. He, Ne, Ar

- In the <u>periodic table</u>, metals are on the _LEFT_ side, non-metals are on the _RIGHT_, and _SEMI-CONDUCTORS_ form a diagonal line near the right side. (2.2) "METALLOIDS"
- Elements in the same <u>chemical family</u> have the same number of _VALENCE_ electrons in their outermost occupied electron shell. (2.3)
- A <u>Bohr model</u> diagram shows the arrangement of _ELECTRONS_ in a specific pattern around the <u>nucleus</u>. (2.3)

Unit 3: CHEMISTRY

Ch. 7 Kinetic Molecular Theory

1. __I__ condensation
2. __A__ density

3. __E__ displacement
4. __H__ evaporation
5. __B__ expansion

6. __C__ fluid
7. __D__ mass
8. __G__ melting
9. __J__ solidification
10. __F__ sublimation
11. __K__ volume

A. the mass of a given volume
B. an increase in volume due to a decrease in internal pressure
C. form of matter that can flow (liquids & gases)
D. the amount of matter in an object
E. the amount of space an object takes up when placed in a fluid
F. change of state from solid to gas
G. change of state from solid to liquid
H. change of state from liquid to gas
I. change of state from gas to liquid
J. change of state from liquid to solid
K. the amount of space an object occupies

12. A student samples an unknown material and finds that 1200ml of the material has a mass of 1080g.

a. What is the density of the material? Show your work (3 steps minimum).

$$D = M \div V$$

$$= 1080g \div 1200 mL$$

$$= \boxed{0.9 \, g/mL} \leftarrow \text{must have units}$$

b. Would this material sink or float in water? Explain.

$$0.9 \, g/mL < 1.00 \, g/mL \rightarrow \text{It would } \boxed{FLOAT} \text{ in water}$$

13. Use this table to help you answer the following question:

Approximate Densities of Common Substances

Fluid	Density (g/mL)	Solid	Density (g/cm³)
hydrogen	0.00009	Styrofoam™	0.005
helium	0.0002	cork	0.24
air	0.0013	oak	0.70
oxygen	0.0014	sugar	1.59
carbon dioxide	0.002	salt	2.16
ethyl alcohol	0.79	aluminum	2.70
machine oil	0.90	iron	7.87
water	1.00	nickel	8.90
seawater	1.03	copper	8.92
glycerol	1.26	lead	11.34
mercury	13.55	gold	19.32

a. You are given an unidentified object along with a container filled with glycerol. You set the object in the container and it sinks. What do you know about the density of the unidentified object?
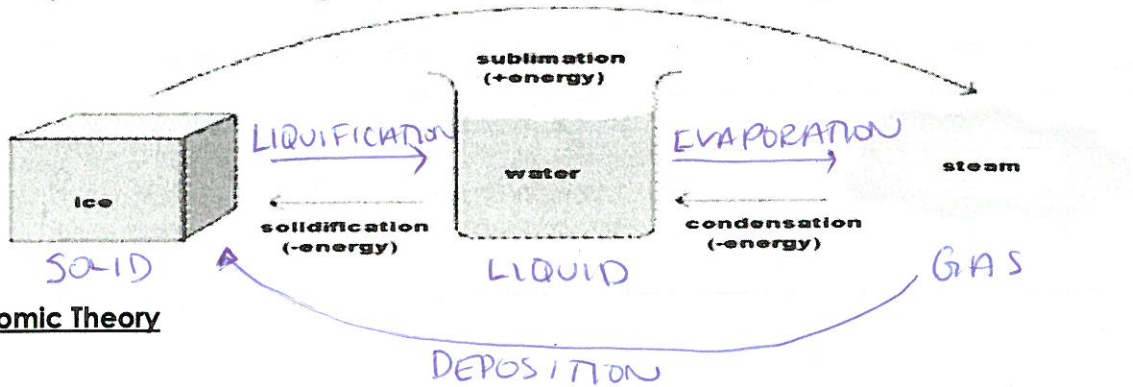
The density is $>$ 1.26 g/mL

/3

b. Liquid mercury has a very high density. Which of the **metals** would float on liquid mercury?

Aluminum, Iron, nickel, copper + lead. (any two)

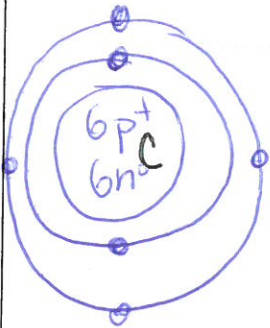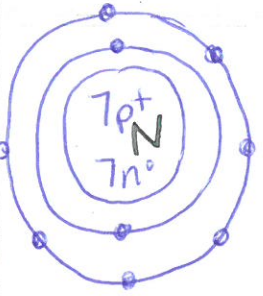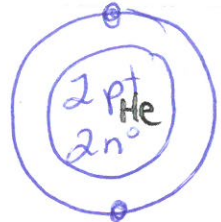14. Correctly name each change of state & identify if energy is being added or released.

LIQUIFICATION

EVAPORATION

sublimation (+energy)

solidification (-energy)

condensation (-energy)

SOLID   LIQUID   GAS
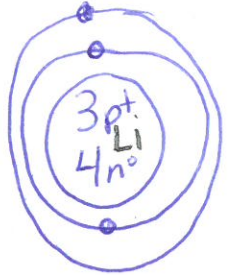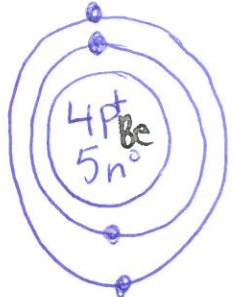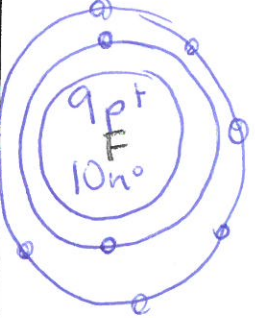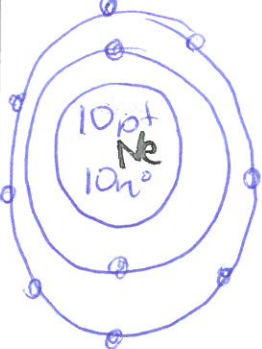
DEPOSITION

Atomic Theory

Draw the following models of the atom and identify the scientist who proposed it:

"Billiard Ball" Model	"Raisin Bun" or Plum Pudding Model	"Planetary" Model
		electrons nucleus
Scientist: John. Dalton	Scientist: JJ. Tompson	Scientist: Ernest Rutheford

Periodic Table:

Draw the Bohr models of the following elements in each box. Be sure to show the number of protons and neutrons in the nucleus. Remember that the first orbit can hold up to 2 electrons, the second and third orbits can have up to 8 electrons, and the rest can hold up to 18 electrons.

Hydrogen	Carbon	Nitrogen	Helium
1p$^+$ H 0n^o	6p$^+$ C 6n^o	7p$^+$ N 7n^o	2p$^+$ He 2n^o

Lithium	Beryllium	Fluorine	Neon
3p$^+$ Li 4n^o	4p$^+$ Be 5n^o	9p$^+$ F 10n^o	10p$^+$ Ne 10n^o

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