

# Review Sheet for Chemistry First Semester

Refer to your class notes, worksheets, and the textbook to complete this review sheet.

## Matter: Anything that takes up space and has mass

➤ Physical Changes and Chemical Changes

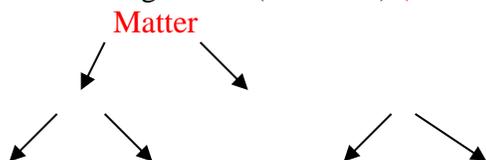
Define each. How can you tell the difference between the two?

Classify the following as physical or chemical changes:

- a. spoiling of milk \_\_\_\_\_
- b. bending wire \_\_\_\_\_
- c. cutting paper \_\_\_\_\_
- d. rusting of a nail \_\_\_\_\_

➤ Put the following into a graphic organizer/flowchart and define each:

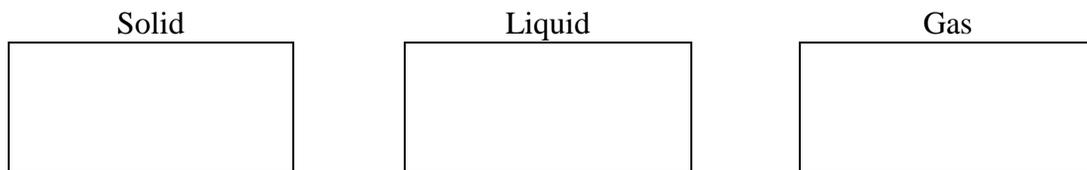
- Matter—
- Pure substances – elements and compounds—
- Mixtures – homogeneous (solutions) ( ) and heterogeneous ( )



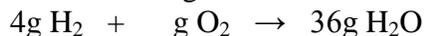
Identify the following as pure substances, homogeneous mixtures or heterogeneous mixtures:

- a. copper \_\_\_\_\_
- b. sweetened tea \_\_\_\_\_
- c. sand and water \_\_\_\_\_
- d. calcium carbonate (CaCO<sub>3</sub>) \_\_\_\_\_

➤ Sketch particles in the three states of matter. How close are the particles and how much do they move?



➤ Calculations using the Law of Conservation of Mass for Reactions



## Atom

➤ For this Carbon-14 isotope, <sup>14</sup><sub>6</sub>C

- Atomic number = \_\_\_\_\_, Mass number = \_\_\_\_\_,
- # of protons = \_\_\_\_\_, # of electrons = \_\_\_\_\_, # of neutrons = \_\_\_\_\_.

➤ Atomic Masses: What is the difference between the mass number for Carbon-14 and carbon's atomic mass of 12.011 amu?

➤ Atomic Models:

Philosophers: Democritus (believed in atoms) and Aristotle (didn't believe in atoms)

Scientists: What was the contribution of each one's atomic model? Draw a model of each.

- John Dalton—

List the four postulates of Dalton's Atomic Theory:

- J.J. Thompson—
- Ernest Rutherford—
- Niels Bohr—
- Quantum mechanical model (Werner Heisenberg):
  - Energy levels ( $n=1, 2, 3, 4, \dots$ ) – represented by periods on the periodic table
  - Sublevels: (s, p, d, f) – represented by blocks on the periodic table
  - Orbitals – region of space where up to 2 electrons may be found

➤ Characteristics of subatomic particles

Particle	Mass	Charge	Location in atom
Proton			
Neutron			
Electron			

**Periodic trends**

➤ Locate or define parts of the periodic table:

- Groups
- Periods
- Transition metals (d & f blocks) vs. Representative Elements (s & p blocks)
- Alkali metals, Alkaline Earth metals, Halogens, Noble Gases

➤ Elements in the same \_\_\_\_\_ have similar physical and chemical characteristics because the  
(group, period)

they have the same number of \_\_\_\_\_.  
(atoms, protons, neutrons, electrons, valence electrons)

Draw an electron Bohr diagram for Be and for N showing the correct number of valence electrons

➤ From their positions on the periodic table, what charges would the ions of Be and N have?

	Gains or loses electrons?	Symbol for ion		Gains or loses electrons?	Symbol for ion
Be			N		

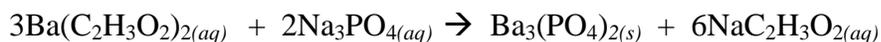
➤ Properties of Metals vs. Nonmetals vs. Metalloids

	Metals	Nonmetals	Metalloids
Luster?			
Malleable vs. Brittle			
Conducts electricity & heat?			
Typical state(s) at room temperature			

### Chemical Reactions

➤ Define what is meant by the term *chemical reaction*.

➤ In the following chemical equation, identify the **reactants** and the **products**.



- In the above chemical equation, what do the symbols *(aq)* and *(s)* stand for? What would the symbols *(l)* and *(g)* stand for in a chemical equation?

Element	Atomic number	Mass number	Protons	neutrons	electrons	Isotope, ion, or neutral atom
Al	13	27			13	Neutral atom
Br			35	45	36	
C	6		6	6		
C	6	14			6	
He	2	4				Neutral atom
H	1		1			Neutral atom
H	1	1				+ ion
Li	3	7			2	
N		14				neutral
O		18			6	
O	8	16				

What is an isotope? \_\_\_\_\_

What does the number next to isotopes signify? \_\_\_\_\_

How can you tell isotopes of the same element apart? \_\_\_\_\_

What is the isotopic notation for Carbon 14?

What is a cation?

What is an anion?