## Atomic Theory - Review Sheet

You should understand the contribution of each scientist. I don't expect you to memorize dates, but I do want to know what each scientist contributed to the theory.

Democretus - 400 B.C.

- theory that matter is made of atoms

Boyle 1622 -1691

- defined element

Lavoisier 1743-1797

- pioneer of modern chemistry (careful and controlled experiments)

- conservation of mass (understand his experiment and compare to the lab "Does mass change in a chemical reaction?")

Proust 1799

- law of constant composition (or definite proportions)

- understand this law and relate it to the Hydrogen and Oxygen generation lab

Dalton 1808

- Understand the meaning of each part of Dalton's atomic theory.
- You don't have to memorize the five parts, just understand what they mean.
- You should know which parts we now know are not true (according to modern atomic theory).
- black box model of the atom

Crookes 1870

- Crookes tube

- Know how this is constructed (Know how cathode rays are generated and what they are.)

J.J. Thompsen - 1890

- How did he expand on Crookes' experiment?
- discovered the electron
- negative particles in all of matter (all atoms)
- must also be positive parts

Lord Kelvin - near Thompsen's time

- plum pudding model

Henri Becquerel - 1896

- discovered radioactivity of uranium

Marie Curie - 1905

- received Nobel prize (shared with her husband Pierre Curie and Henri Bequerel) for her work in studying radiation.

- Name the three kinds of radiation and describe each type.

Rutheford - 1910

- Understand the gold foil experiment

- How was it set up?

- What did it show?

- Discovered the proton

- new model of atom (positively charged, very dense nucleus)

Niels Bohr - 1913

- Bohr model of the atom

- electrons in specific orbits with specific energies

Modern version of atom - 1950

- similar nucleus (protons + neutrons)

- electrons in orbitals not orbits

Understand isotopes, atomic mass, mass #, atomic #, ions

Nature of light

- wavelength vs. frequency how are they related?
- how is energy related to the above properties?
- How is electromagnetic radiation produced?
- What is emission spectroscopy and how does this help us to identify elements?

## **Additional Practice Questions:**

- 1) Draw a timeline for yourself showing the models of the atom, who did the definitive experiment to give us each new model, and what did that scientist discover to change our view of the atom?
- 2) What is the difference between the Law of Conservation of Mass and the Law of Constant **Composition (or Definite Proportions)?**
- 3) If you measure all the substances used in a reaction before and after the reaction, why should the mass stay the same?
- 4) Draw an example of an atom, and label all its parts. Separately list all the subatomic particles with their charge.
- 5) Which subatomic particle has almost no mass?
- 6) Describe cathode rays and explain why J.J. Thompson thought they were negatively charged.
- 7) What are the three types of nuclear radiation?
- 8) What is the difference between alpha particles and cathode rays? Which one was used in **Rutheford's Goild Foil experiment?**
- 9) Why did Rutheford's Gold Foil test results show a small, dense, positively charged nucleus?
- 10) Explain in your own words what an orbital is.

11) Explain how light is produced. Pretend you are talking to someone who doesn't know anything about atoms or electrons or energy. You need to start from scratch.

- 12)Name at least two ways you can excite and electron.
- 13) What is the difference between where nuclear radiation comes from and how electromagnetic radiation is generated?
- 14)Fill in the tables below:

<u>Isotope</u>	<b>Protons</b>	<u>Neutrons</u>
${}^{33}_{16}S$		
$^{238}_{92}U$		
$^{14}_{6}C$		
Atom F	Protons	<u>Electrons</u>
$\mathbf{P}^{+3}$		
$S^{-2}$		

10) Which of the above atoms listed are ions?