## Chapter 4

# Introduction to Atoms

Name Answer Key

Class Hour:

\*\*Test Date: Friday, November 22, 2013

### **Chapter 4 – Introduction to Atoms Outline Section 1-Development of the Atomic Theory**

The Beginning of the Atomic Theory I.

\*Notes: The word atom is from the Greek word atomos, meaning "not able to be divided".

*Democritus* said that all atoms are small, hard particles.

A. From Aristotle to Modern Science \*Notes-An *atom* is the smallest particle into which an element can be divided or cut.

- II. Dalton's Atomic Theory Based on Experiments
  - A. Not Quite Correct
- III. Thomson's Discovery of Electrons \*Notes-The negatively charged particles of atoms discovered by Thomson are called \_electr<u>ons\_\_\_\_\_</u>
  - A. Like Plums in a Pudding



\* What is a plum pudding? Think of a chocolate chip cookie, with the plums = chocolate chips!

\* In Thomson's "Plum Pudding" model of the atom, the Plums represent <u>electrons</u>

IV. Rutherford's Atomic "Shooting Gallery" A. Surprising Results

V. Where are the Electrons?

A. Far from the Nucleus

- \*Notes-The central region of the atom is called the <u>nucleus</u>
- B. Bohr's Electron Levels
- C. The Modern Atomic Theory

\*Note- The region of the atom where the electrons are most likely to be found is the \_cloud\_

electron

\*Note-Democritus, Dalton, Thomson, Rutherford, and Bohr all have contributed to the development of the \_\_\_\_\_\_.

#### Chapter 4 –Introduction to Atoms Outline Section 2-The Atom

- I. How Small is an Atom?
- II. What is an Atom Made of? \*Notes:



*The	electrons	are negatively charged particles.
*The	protons	are positively charged particles.
*The	neutrons	are particles that have no charge.
*The	nucleus	is the dense center of the atom.

A. The Nucleus

*Notes <u>-</u>	protons	_ are subatomic particles that have a positive charge.
*Notes-The	e unit of mass that descri	bes the mass of an atom or molecules is called
	atomic mass unit	<u>.</u>
*Notes-The	e particles in the center o	f an atom that have no charge are called the
ne	eutrons	-

B. Outside the Nucleus

\*Compared to the protons and the neutrons, the electrons have the <u>least</u> mass.

#### II. How do Atoms of Different Elements Differ?

- A. Starting Simply
- B. Now for Some Neutrons
- C. Building Bigger Atoms
- D. Protons and Atomic Number

III. Isotopes

\*Notes-Atoms that have the same number of protons but different numbers of neutrons are called <u>isotopes</u>.

#### Isotopes

Atoms of the same element can have different numbers of neutrons; the different possible versions of each element are called **isotopes**. For example, the most common isotope of

hydrogen has no neutrons at all; there's also a hydrogen isotope called **deuterium**, with one neutron, and another, **tritium**, with two neutrons.



- A. Properties of Isotopes
- B. Telling Isotopes Apart

\*Notes- The <u>mass number</u> of an atom is the sum of the protons and the neutrons.

\*Notes-An atom of boron has 5 protons, 6 neutrons, and 5 electrons. It mass number will be <u>11</u>. (5 protons + 6 neutrons)

C. Naming Isotopes

\*Notes-The element copper has two isotopes, copper-63 and copper 65. Both isotopes have an *atomic number of 29* because there are *29 protons in the nucleus*.