

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

I. The Beginning of the Atomic Theory

*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.

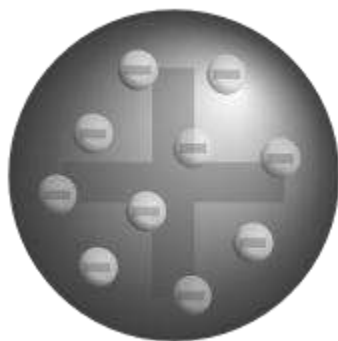
II. Dalton’s Atomic Theory Based on Experiments

A. Not Quite Correct

III. Thomson’s Discovery of Electrons

*Notes-The negatively charged particles of atoms discovered by Thomson are called electrons.

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 electrons.

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 nucleus.

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 electron cloud.

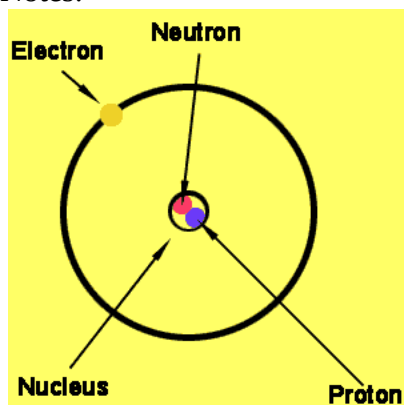
*Note-Democritus, Dalton, Thomson, Rutherford, and Bohr all have contributed to the development of the atomic theory.

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-protons are subatomic particles that have a positive charge.
- *Notes-The unit of mass that describes the mass of an atom or molecules is called atomic mass unit.
- *Notes-The particles in the center of an atom that have no charge are called the neutrons.

B. Outside the Nucleus

- *Compared to the protons and the neutrons, the electrons have the least 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

- *Notes-The number of protons in the nucleus of an atom give the element its atomic number. (also the number of electrons)

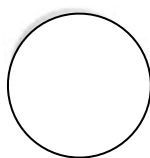
III. Isotopes

*Notes-Atoms that have the same number of protons but different numbers of neutrons are called isotopes.

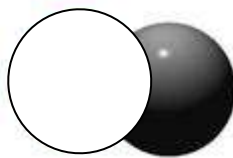
Isotopes



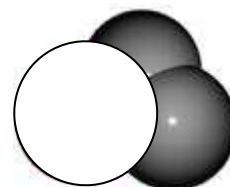
Atoms of the same element can have different numbers of neutrons; the different possible versions of each element are called **isotopes**. For example, the most common isotope of hydrogen has no neutrons at all; there's also a hydrogen isotope called **deuterium**, with one neutron, and another, **tritium**, with two neutrons.



No neutrons
Hydrogen



One neutron
Deuterium



Two neutrons
Tritium

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

*Notes- The mass number 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. Its mass number will be 11. (*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**.