

# Early Atomic Theory

## *Discussion Study Sheet*

Chem 192  
Cañada College

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

Date: \_\_\_\_\_

**1.** Fill in the blanks. Write the last or only name of the scientist whose contribution to atomic theory is described.

\_\_\_\_\_ First proposed the theory that all matter is composed of small particles called atoms.

\_\_\_\_\_ First proposed the theory that all matter is made up of fundamental material called elements. He proposed that the fundamental elements were earth, air, water, and fire.

\_\_\_\_\_ Supported the elemental theory of matter over the atomic theory of matter, leading science to base further discovery on elemental theory for the next 2000 years.

\_\_\_\_\_ Refined the atomic theory 2000 years after it was first proposed. Proposed that elements are composed of minute indivisible particles called atoms.

\_\_\_\_\_ Proposed that atoms of the same elements are alike in mass and size. Also proposed that atoms of different elements have different masses and sizes.

\_\_\_\_\_ Proposed that compounds are composed of small particles, that each of the particles making up a compound is the union of atoms from two or more elements. Also proposed that compounds are formed from simple numerical ratios of atoms (one to one, one to three, two to five, etc).

\_\_\_\_\_ Proposed the Law of Definite Composition, that a given compound always contains two or more elements in a definite proportion by mass.

\_\_\_\_\_ Proposed the Law of Multiple Proportions, that atoms of two or more elements can combine in different ratios to produce more than one compound.

\_\_\_\_\_ Discovered that certain substances when dissolved in water conducted current, and named them ions. He discovered ions.

\_\_\_\_\_ Proposed that ions were atoms (or groups of atoms) carrying a positive or negative charge. He explained what an ion was.

\_\_\_\_\_ Discovered the first sub atomic particle, the electron, and demonstrated that it's mass was 1/2000 th of the smallest particle known at that time.

\_\_\_\_\_ Discovered the proton, the second sub atomic particle. This led to the subsequent discovery that atoms contain both positive and negative charges.

\_\_\_\_\_ Discovered the neutron, the third sub atomic particle. This discovery provided the key to making atomic bombs.

\_\_\_\_\_ Proposed a plum-pudding model of the atom, that atoms were positively charged spheres with embedded negatively charged particles (electrons).

\_\_\_\_\_ Demonstrated that atoms have a nucleus, a heavy positively charged center.

\_\_\_\_\_ Proposed the nuclear model of the atom.

**2.** Complete the following sentences (do not use the particle name more than once):

(a) Two atoms that have a different number of protons are different \_\_\_\_\_ .

(b) Two atoms that have the same number of protons and neutrons but differ only in the number of electrons they contain are different \_\_\_\_\_ .

(c) Two atoms that have the same number of protons and electrons but differ only in the number of neutrons they contain are different \_\_\_\_\_ .

**3.** For each particle described in the first column, write the number of each subatomic particle in the before column. Consider the change listed in the middle column and write the new number of each subatomic particle in the after column. Write the correct isotopic notation for the final particle in the last column. (Assume the initial particle has no charge unless otherwise indicated)

Description	Before	Change	After	Isotopic Notation
A particle with the atomic number 35 and a mass of 81.	_____ # of protons _____ # of neutrons _____ # of electrons	Add 1 electron	_____ # of protons _____ # of neutrons _____ # of electrons	
$^{30}_{14}\text{Si}$	_____ # of protons _____ # of neutrons _____ # of electrons	Remove 2 neutrons.	_____ # of protons _____ # of neutrons _____ # of electrons	
Potassium-41	_____ # of protons _____ # of neutrons _____ # of electrons	Remove 2 neutrons and remove 1 electron	_____ # of protons _____ # of neutrons _____ # of electrons	
Deuterium (Hydrogen-2)	_____ # of protons _____ # of neutrons _____ # of electrons	Combine two deuterium atoms into a single particle  (nuclear fusion)	_____ # of protons _____ # of neutrons _____ # of electrons	
Uranium-236	_____ # of protons _____ # of neutrons _____ # of electrons	Remove a particle with 39 p 68 n and 39 e.  (nuclear fission)	_____ # of protons _____ # of neutrons _____ # of electrons	

**4.** The periodic table tells us the average weight of a Rubidium atom is 85.47 AMU. Rubidium has 24 known isotopes, but only two stable isotopes appear in nature. Any given sample of Rubidium is 72.17% Rubidium-85 and 27.83% Rubidium-87.

We know the atomic weight of Rubidium-85 is 84.91 AMU. What is the weight of a single atom of Rubidium-87?