LEARNING AS ONE NATION

Expanded Project

GC1 Q1_6

SHS LEARNING ACTIVITY

Name: _____ **Score/Mark:** _____

Grade and Section: _____ **Date:** _____

Strand: ☑ STEM ☐ ABM ☐ HUMSS ☐ ICT (*TVL Track*)

Subject: *General Chemistry 1*

Type of Activity: ☑ Concept Notes ☐ Skills: Exercise/Drill ☐ Illustration ☐ Performance Task ☐ Essay/Report ☐ Others: _____

Activity Title: **A-04. Subatomic Particles: Protons, Electrons, and Neutrons**

Learning Target: To determine the results when changing the number of protons, neutrons, and electrons in an atom

To note some useful isotopes in the field of medicine

References: *(Author, Title, Pages)*

Use of Radioactive Isotopes. Retrieved from opentextbc.ca

V. Sojo and M.D.A.D. Cadeliña, CVIF-DLP Learning Activities

In the previous activity, you were asked what happens if the number of protons, neutrons, and electrons are changed. Here are the results that you should always remember.

The number of protons is **always the same for each element**. Element $_1H$ has one proton. Proton number is the same as the **atomic number, Z**. Any change in the number of protons results in a **different element**. The element with 2 protons is helium, with 3 protons is lithium, and so on. Atomic number (Z) is always written at the **lower-left corner** of the atomic symbol.

Since protons (p^+) are positive and electrons (e^-) are negative, if their numbers are not the same, the atom will have an electric **charge**. When this happens, we do not normally call it an atom anymore, but an "**ion**" instead. When a neutral atom gains an electron, it becomes an **anion** (negatively charged). Losing electrons produces a **cation** (positively charged). Charges are usually written at the **upper-right corner** of the atomic symbol. If a Hydrogen atom gains an electron, we have anion H^-. The cation Mg^{2+} implies that the magnesium (Mg) atom lost 2 electrons. Their charges determine how much electrons are gained or lost.

Changing the number of neutrons of an atom does not change the element, but it makes varieties of it called **isotopes**. Hydrogen has three isotopes: protium ^1H, deuterium ^2H, and tritium ^3H. The number at the **upper-left corner** of the atomic symbol is called an **isotopic number**, which is the sum of protons and neutrons. Since all these isotopes have the same number of protons (which is 1), **subtracting the number of protons from the isotopic number** will result in the number of neutrons. Therefore, ^1H has 0 neutron, ^2H has 1 neutron, and ^3H has two.

Applications of isotopes are noted in the field of medicine. Some of these are: ^{59}Fe is used in anemia diagnosis, ^{32}P detects and treats cancer, and ^{60}Co is utilized in gamma ray irradiation of tumors.