LEARNING AS ONE NATION

Expanded Project

GC1 Q1_4

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-02. Thomson's (1897) and Rutherford's (1910) models**

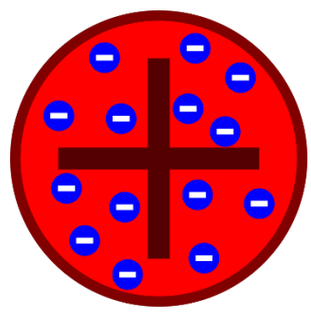
Learning Target: To describe the atom models of Thomson and Rutherford

References: *(Author, Title, Pages)*
Brown et al., Chemistry: The Central Science 12th edition. p. 41-44.
V. Sojo, K. Ranoco, CVIF-DLP Learning Activities

Dalton thought that **atoms** were **indivisible**. However, when **J.J. Thomson** took a glass tube, pumped almost all the air out, and then connected each end of a very strong battery to the two ends of the tube, **negative particles** flew from the negative end of the battery (the "**cathode**") to the positive end (the "**anode**"). This made Thomson realize that atoms of all elements have **negative particles** that are **easy to move**. We now call these particles "**electrons**".

But no matter what Thomson did, he could not get any positive particles to move, so he thought that the positive part of the atom must be static (he knew there had to be a positive part because atoms are electrically neutral).

He therefore imagined that atoms must be made of a big solid positive mass, with negative bits (**electrons**) embedded within, just like chocolate chips in a cookie. That is why we call this the **"plum-pudding"** model. It was very advanced for its time, but it is not entirely right.



Trying to demonstrate that his mentor Thomson was right, Ernest Rutherford shot small "alpha" particles against a very thin sheet of gold. He was expecting that most particles would pass through (with little deflections on their path) after smashing against the solid wall of plum-pudding atoms. Most alpha particles, indeed, went straight through but some of the particles were deflected at larger angles than expected and a few bounced back as if they hit a wall! He concluded that the atom must be mostly empty (that is why most particles went through), with a heavy **positive nucleus** and the **electrons around it like planets to the sun**.

Exercise: Draw Rutherford's planetary model of a Boron atom (5 electrons). Note that in 1910 **Rutherford knew nothing of protons, neutrons or orbitals**. These were discovered later.