

Entry 19

12/12

### Investigation 4 - Activity 4.3 Wrap Up Notes

The Gold Foil Experiment (1911)

Ernest Rutherford tested the plum pudding model by shooting positively charged alpha particles at a thin sheet of gold foil. The alpha particles should have passed straight through. However, some alpha particles were deflected or bounced back, providing evidence for a new model of the atom. Evidence from his experiment showed there is a high concentration of positive particles near the center of the atom which was later called the nucleus.

Nuclear Model of the Atom (1911)

Given the results of the gold foil experiment, the atom was thought to have a small, dense, positive nucleus with electrons located somewhere around it. Under the direction of Rutherford, both the proton (a positive particle in the nucleus) and neutron (a neutral particle in the nucleus) were discovered. Through additional experiments, scientists determined the neutrons have about the same mass as protons.

While the discovery of the neutrons did explain the extra mass in atoms, it still seemed that the positive protons would repel each other. It was suggested that the neutral particles (neutrons) could act as a "buffer" but in such a small space, the repulsion between the protons *should be* really strong.

**So why don't the positively charged NEUTRONS in the NUCLEUS repel each other?**

It turns out that a special type of force, which is called the strong nuclear force exists between protons and neutrons in the nucleus. This force is about 100 X stronger than the electric force. It also only acts over very short distances.

**FLIP FOR DRAWING OF NUCLEAR MODEL**

# Rutherford's Model

