

## SCH4U 1-1E: Rutherford's Gold Foil Experiment Simulator Answer Key

### Part 1: Plum Pudding Atom

- I. Answer the following questions:
  - a) What do the following particles in the simulator represent:  
Purple dot: **Electrons**  
Red dot: **Protons**  
Grey dot: **Neutrons**
  - b) The red and grey particles fired from the gun are called alpha particles, they are made up of 2 protons and 2 neutrons, what is the charge of an alpha particle?  
  
**+2**
  - c) Describe the path of the alpha particles as they pass through the plum pudding atom (click on the "show traces" box on the right to help with this)?

**The alpha particles pass right through the atom in a straight line.**

### Part 2: Rutherford Atom

#### Instructions:

- I. Answer the following questions:
  - a) The ball at the center of the atom represents the nucleus of the atom. What happens to the alpha particles that come closest to the nucleus?  
**The alpha particles that come close to the nucleus are deflected. They do not follow a straight line, instead as they approach the nucleus they are deflected from their initial path.**
  - b) Why do you think the alpha particles react this way as they pass close to the nucleus?

**The alpha particles behave this way because the nucleus of the atom contains the positively charged protons. The alpha particles are also positively charged. Therefore, the positively charged alpha particle is repelled by the positively charged nucleus because like-charges repel each other.**

- c) **Bonus Question:** As you see on the right, the atom we are looking at has 79 protons and 118 neutrons, what element is this atom made of?

**This element is gold (Au). We know this by looking at the periodic table, where the atomic number indicates the number of protons.**