

Name _____

Date _____

Rutherford Scattering—Building the Model of the Atom

Go to <https://phet.colorado.edu/en/simulation/rutherford-scattering>

Step 1: Click the RUN NOW button to load the simulation.

Step 2: Before you begin the simulation, make sure the following are selected:

1-The tab at the top that is selected is the RUTHERFORD MODEL

2-Alpha Particle Properties:

- ✓ ENERGY of the alpha particles is half-way between MIN and MAX
- ✓ SHOW TRACES box is checked off

3-Atomic Properties:

- ✓ Number of PROTONS is 79
- ✓ Number of NEUTRONS is 118

Step 3: TURN ON the Alpha Particle beam by clicking on it and observe what happens when the alpha particles are fired at the atom's nucleus. Answer the following questions below:

1. What atom is being represented? _____
2. What is happening to the majority of the alpha particles (make sure you observe this for awhile before describing)?
3. What do you think is the charge of an alpha particle from this experiment?
4. What did Rutherford prove about the atom from this experiment?

Step 4: Now, change the following:

- 1-Select the tab at the top for PLUM PUDDING
- 2- Keep the ENERGY the same
- 3-Keep SHOW TRACES checked

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Step 5: Turn on the beam again by clicking on it, observe what happens for a few minutes, and answer the following questions below:

5. What atom is being tested using the Plum Pudding model? _____

6. What is happening to the alpha particles?

7. Did you expect this to happen knowing what JJ Thomson's Plum Pudding model looks like? Explain.

8. How is this result different from the result shown with Rutherford's Nuclear model?

9. Which model is closer to the version of today's modern model of the atom? Why?

Step 6: Now, play around with both models and adjust the various settings. Consider thinking about:

- Particle speed
- Particle energy
- Numbers of protons
- Numbers of neutrons
- Relative proportion of protons and neutrons

10. Does anything change when you change the settings? Why or why not? Does anything surprise you about the results of this simulation?