

Scientific Literacy Center

How the Discovery Process Works Activity

Class Time: 15 minutes

Grade Level: High School- Pre-Freshmen

Assignment Type: Homework

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Adapted From: ScienceNetLinks: The History of the Atom Series- <http://sciencenetlinks.com/lessons/history-atom-ancient-greeks/>

History of the Atom

You have been learning about how the discovery process works in both biological and physical science over time. In this activity, you will explore the evolution of modern ideas on the inner working of atoms and the contributions of J.J. Thomson. Answer the questions for this activity on the Student Exploration Sheet as you move through each section.

Part I Exploration-

Learn about the discovery of the electron and the contributions of J.J. Thomson by reading these two resources:

- **3 Experiments, 1 Big Idea-** <http://www.aip.org/history/electron/jj1897.htm>
- **The Legacy for Today-** <http://www.aip.org/history/electron/jjlegacy.htm>

Answer the following questions:

1. Who was J.J. Thomson, and what was the nature of his work?
2. What did his experiments with cathode rays cause him to conclude?
3. What kind of impact did these findings about the inner workings of atoms have on technology?

Part II Discovery-

Now, complete the simulation of J.J. Thomson's experiment.

<http://www.furryelephant.com/content/radioactivity/discovery-electron-thomson/thomson-charge-mass-simulation/>. Then manipulate the variables in the animation of the experiment using a cathode tube to measure the e/m ratio.

<https://sites.google.com/site/physicsflash/home/thomson>

Now watch a video demonstration of Thomson's experiment at <http://www.youtube.com/watch?v=o1z2S3ME0cl> . Answer the questions in the Discovery section of the Students Activity Sheet.

Answer the following:

4. Describe what is happening in the experiment.