

**Why?**

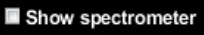
There have been many versions of the atomic model over the year, each of which incorporated the scientific evidence of that time. As technology evolved, and particle accelerators lead to the discovery of quarks and other fundamental particles, the model became more and more refined, finally leading to the current Quantum Mechanical Model.

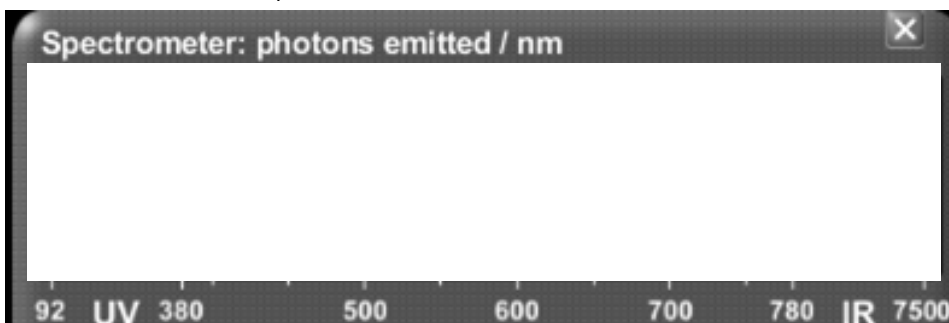
**Success Criteria**

- Determine which model of the hydrogen atom best fits the experimental data.
- Explain the relationship between photons of light and the movement of electrons between energy levels.

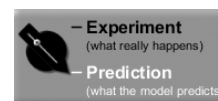
<http://phet.colorado.edu/en/simulation/hydrogen-atom>

**Part 1: The Experiment**

1. Turn the light beam “on.” and highlight “Experiment” white.
2. Describe what happens when photons ( ${}^0_0\gamma$ ) are sent through a hydrogen atom.
3. When determining how an atom works, scientists witnessed something similar to what you are witnessing now. They then deduced how the atom must be organized.
  - a. What do you think is making the photons ‘deflect’?
  - b. What do you observe about how many or what color photons ( ${}^0_0\gamma$ ) are deflected?
4. Click the “show spectrometer” box. 
  - a. Let the simulation run for several minutes on “fast”.
  - b. Draw the results from spectrometer.

**Part 2: Understanding different Models of the Hydrogen Atom**

- A. Now that you’ve theorized about what is happening to the photons of energy, hi-light the “Prediction” button and observe other scientist’s theories about the atom.
- B. Complete the chart by comparing the 6 models with the experiment (what is really happening) and try to explain why the model does/does not explain the experimental observations.



Atomic Model	Observations	Does it support or not support the experiment?
Billiard Ball		
Plum Pudding		
Classical Solar System		
Bohr		
De Broglie		
Schrodinger		

1. With the Bohr's model selected, click the "Show electron energy level diagram." Using the Electron Energy Level Diagram and the spectrometer, **describe what is happening to hydrogen's one electron**. What do you notice about the transitions to Energy Level 2?
  
2. In the "help menu", click on "transitions". Click on "Monochromatic" in the light box. Enter the first 3 wavelengths into the box and observe what happens to the electron. Does this support your hypothesis of why the photon is being 'deflected' by the atom? If not, readjust your statement to explain your new hypothesis about the behavior of the electron.
  
3. Now enter 2 wavelengths that are not listed. What do you observe? Does this support your hypothesis from #2? If not, readjust your statement to explain the interaction between a photon and an electron.