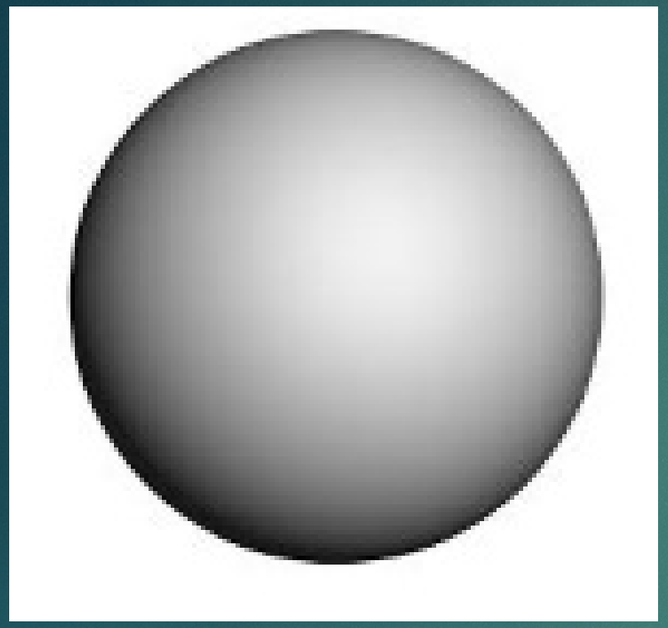
Model #1:



Activity: Read the following story.

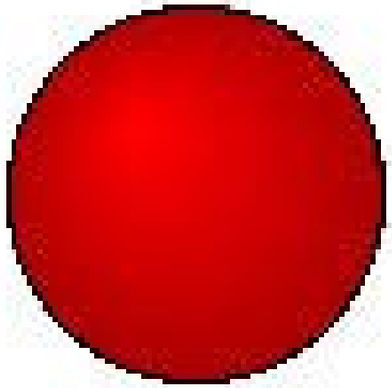
The smell of warm bread wafts up the staircase; but instead of thinking lunchtime, you are about to formulate the beginnings of one of the most important scientific theories ever devised. You are Democritus, and you are about to introduce Ancient Greece to The Atom. Circa 400 BC, Democritus was a well-off, well-travelled Greek, with a background in philosophy. He was a laterally-minded man, and he used such skills to compose his Atomic Theory. As he smelt the freshly baked bread carried by his servant, he deduced that there must be tiny particles of bread leaving the loaf and entering his nostrils. His leap of genius, however, was to speculate that, although a loaf could be cut in half, eventually it would reach a level in which no more divisions could be made. This was the 'uncuttable' level, and 'uncuttable' translates to Ancient Greek as 'atom'.

Unfortunately, Democritus' hypothesis led him to believe in a spherical planet, a notion too radical for many of his contemporaries, and his theory was largely forgotten, whilst the up-and-coming loudmouth Aristotle led the rest of the world to believe in 5 elements: Earth, Fire, Air, Water and Ether (the upper sky).

Model #1: Helpful Hints

What gave Democritus the idea of the atom?

Model #2



1 oxygen atom at 16 mass units each =

16 mass units

Activity:

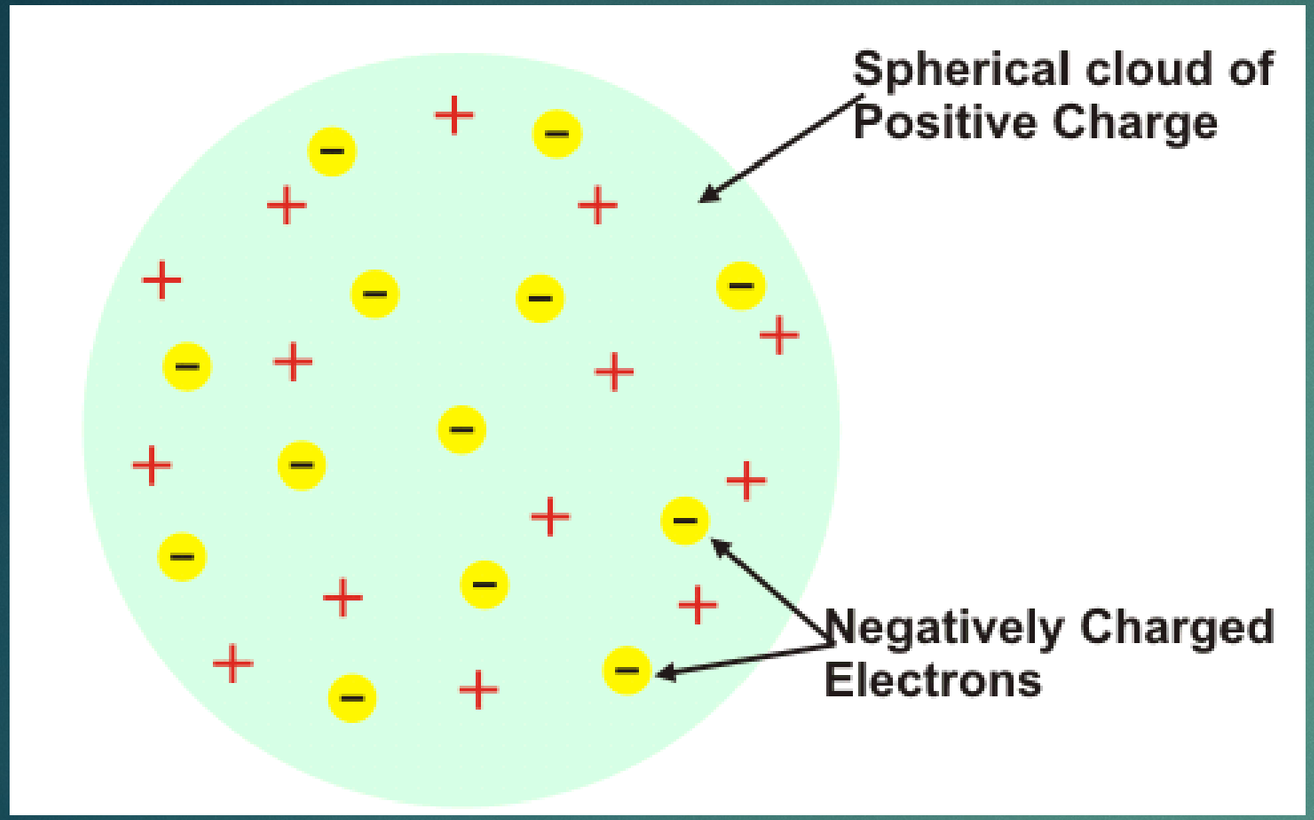
Look at data on webpage

Model #2: Helpful Hints

What new thing did Dalton add to the model of the atom?

What can we infer that he had to do to figure this out?

Model #3



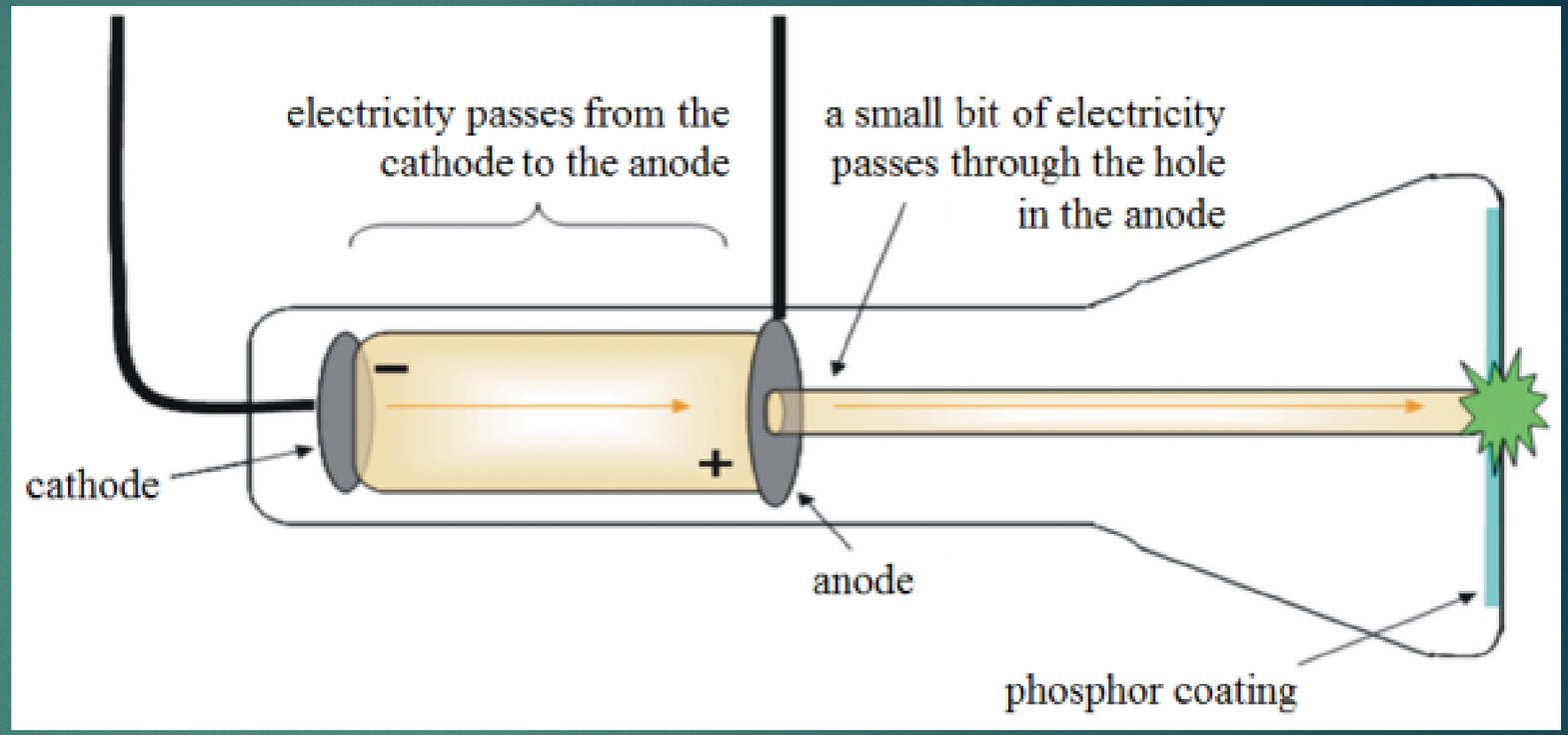
Activity:

Look at cathode tube virtual lab.

1. Make sure "TURN ON by connecting high voltage to electrodes" is checked
2. Click on "Display beam"
3. Adjust the charge on the horizontal plate

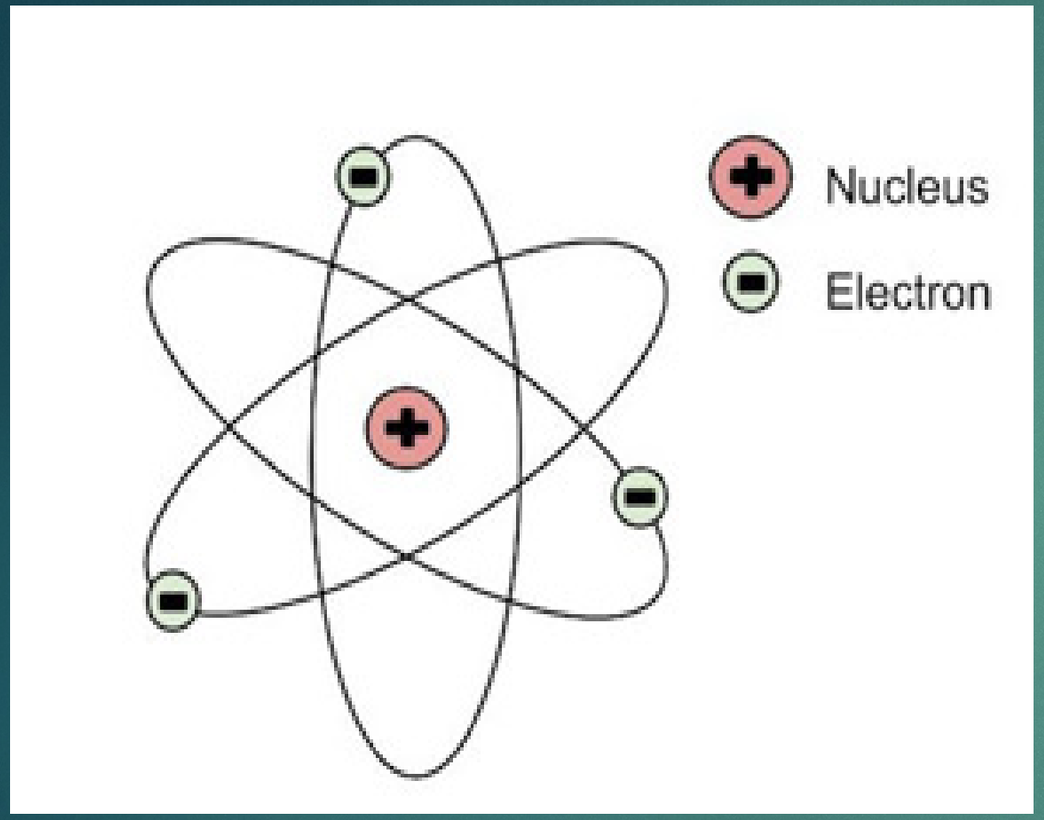
Model #3 : Helpful Hints

- What happens to the beam?
- What does it go towards? Away from?



- What can we infer about the particles in the beam?

Model #4



Activity:

Look at the gold foil virtual lab.

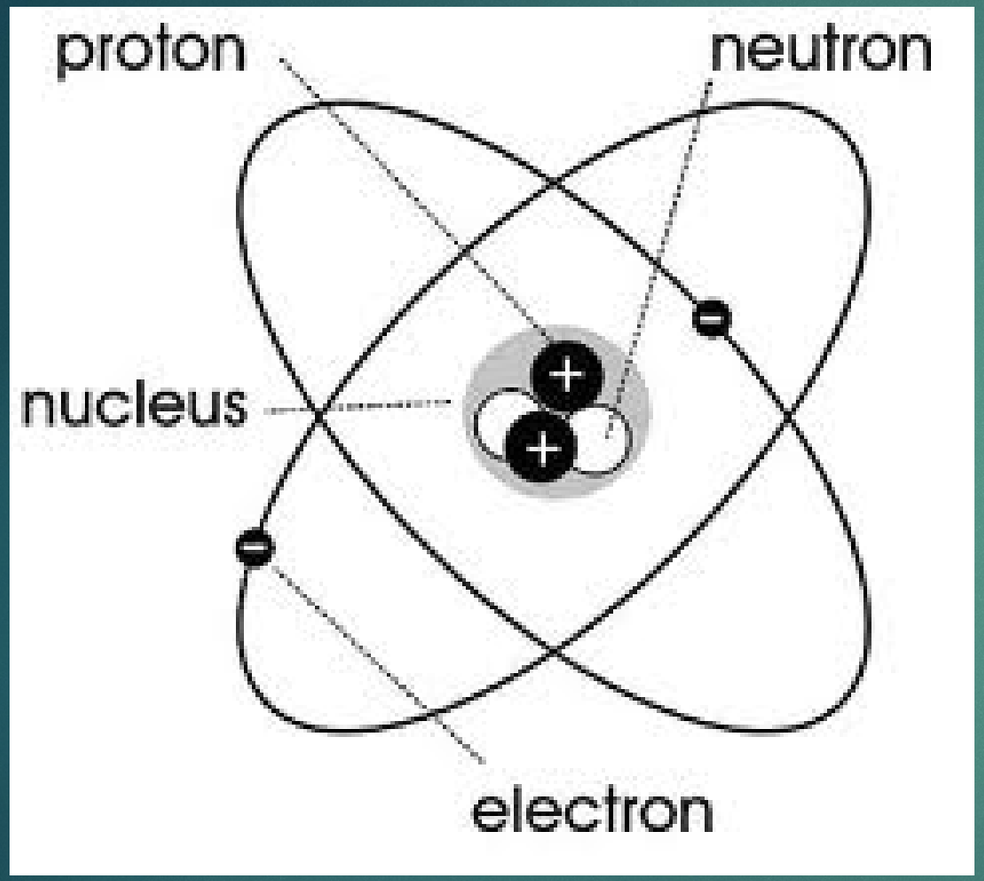
1. Turn Speed to Low

Model #4: Helpful Hints

Before now, they thought that the positive and negative charges were evenly distributed in the atom.

1. If the above were true, what would happen to the positive alpha particles (blue) when they pass through the foil?
2. What happened to MOST of the positive alpha particles (blue)?
3. What happened to the rest of the positive alpha particles (blue)?
4. What does this tell us about WHERE the positive charges are located in the Gold Foil

Model #5



Activity:

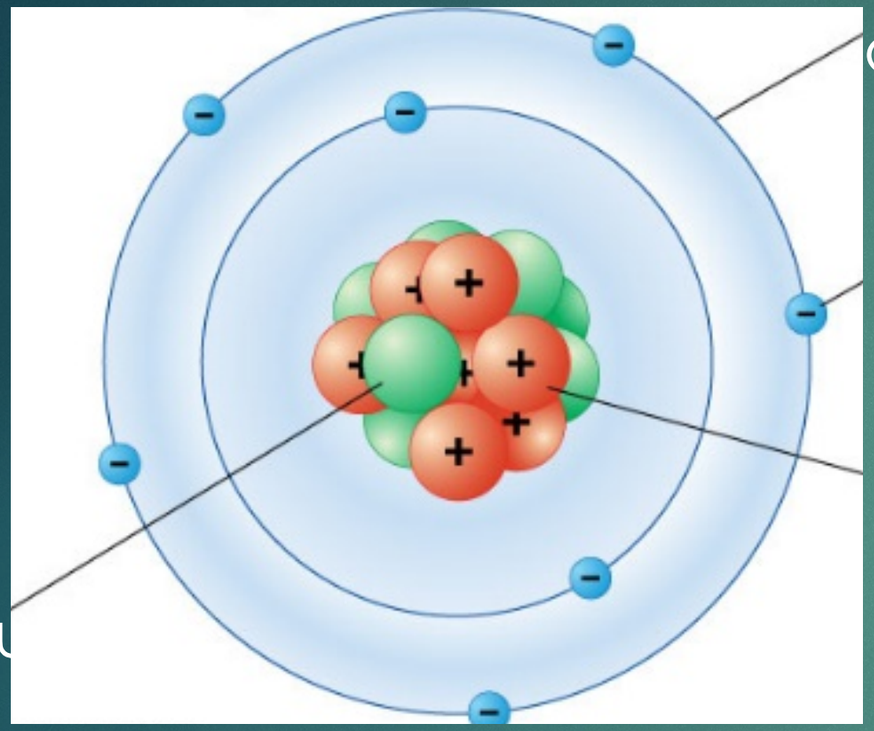
Read about Chadwick's experiment.

Model #5: Helpful Hints

What new information does this model add?

What gave Rutherford the idea to look for more subatomic particles?

Model #6



Activity:
Use the following Models of the Hydrogen Atom simulation

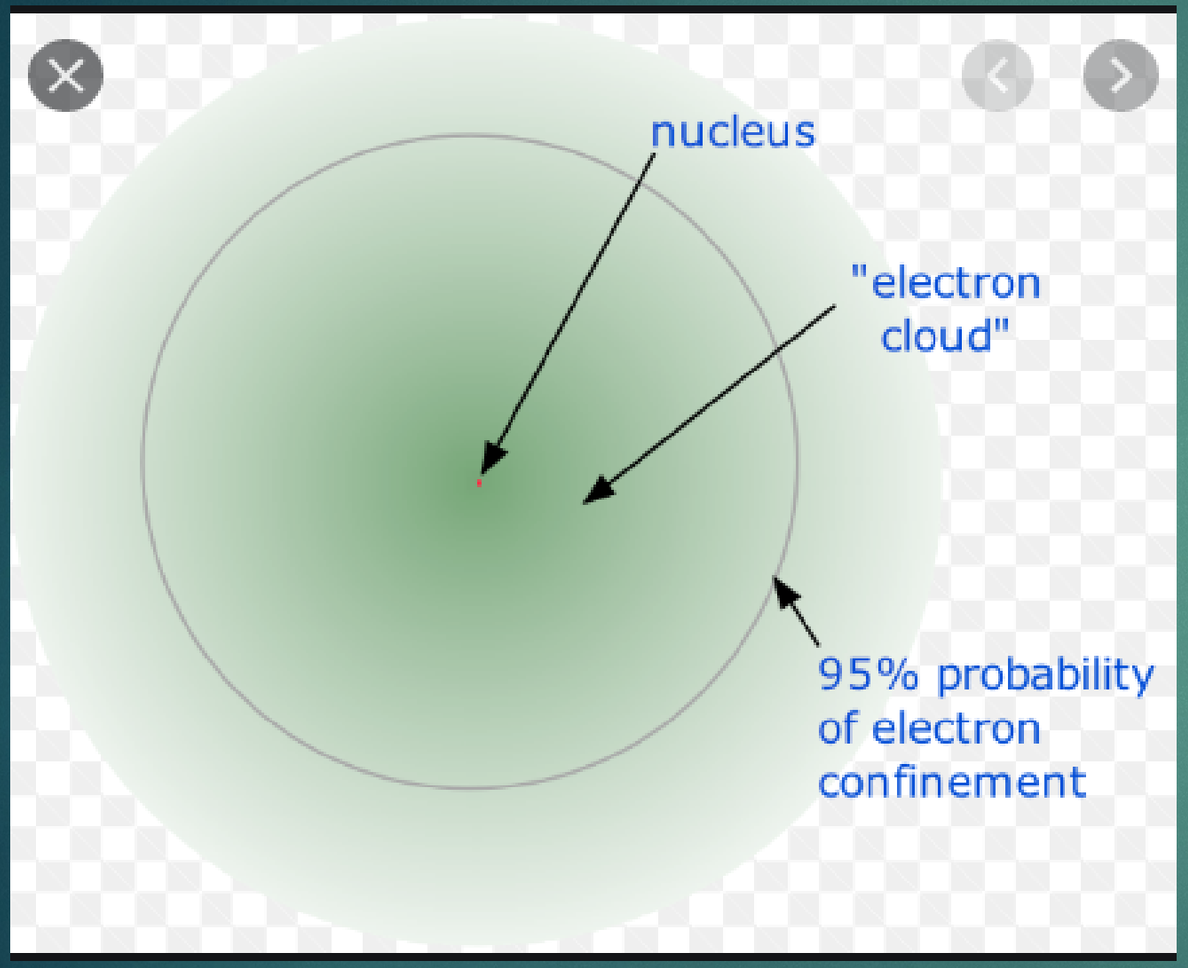
1. Click on Prediction
2. Click on Bohr under Atomic Model
3. Click the Red 0 button to shoot light (photons) at the Hydrogen atom

Model #6: Helpful Hints

What happens when a photon comes in contact with the electron?

What does this tell us about the organization of the electrons?

Model #7



Activity:

Use the same simulation as Model #6 and follow the below directions

1. Select Prediction (black dial)
2. Select Schrodinger under Atomic Model
3. Click the Red 0 button to shoot light at the Hydrogen atom

Model #7: Helpful Hints

What is different about how the electron is represented in this model?

What happens when a photon comes in contact with the electron now?