

Atomic Theory Timeline Project

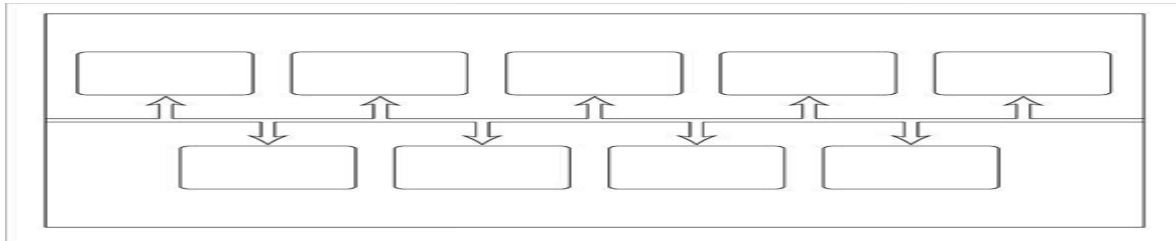
MAKE AN ATOMIC THEORY TIMELINE!

Directions:

- 1) Read the information about the scientists and theories that have developed over time about matter and the atom in the Atomic Theory Timeline information packet.
- 2) Cut out all of the scientists' names, information boxes, scientist pictures, atomic models, and analogies and organize them by date/theory.
- 3) On a separate sheet of paper, design a timeline that includes these dates:

400 B.C., 300 B.C. to Early 1800s, 1803, 1897, 1908, 1913, 2000

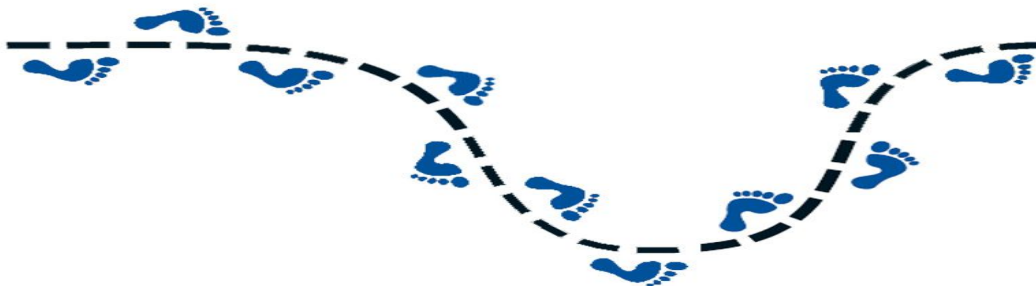
Your timeline may be straight like this:



Or it may be more like a “journey” (you can be creative with this):

1803

1908



1897

- 4) For each of the seven dates, arrange and glue the correct scientist name and picture, atomic model, analogy and additional information (there are two or three information boxes per theory).
- 5) Make your timeline look great! Give it a title, use crayons or colored pencils to decorate the dates and/or names, and maybe add boxes or bubbles around the information for each date.
- 6) Answer the 8 included questions and look over the rubric to see how this project will be graded. Tape the Questions/Rubric page to the back of your timeline before submitting it.

Atomic Theory Timeline Questions and Rubric

Please choose the correct answer to the following questions. Use the Google form to answer the questions. Answer in complete sentences.

1) Who discovered the electron?

- a) Dalton b) Thomson c) Rutherford d) Bohr

2) What did Rutherford discover in his experiment?

- a) nucleus b) electrons c) neutrons

3) In which model are atoms imagined as tiny balls?

- a) Dalton b) Thomson c) Rutherford d) Bohr

4) Who proposed a model with electrons moving in specific layers?

- a) Dalton b) Thomson c) Rutherford d) Bohr

5) What does atom mean? a) small b) visible c) indivisible d) particle

6) Who is “responsible” for the 2000-year “Death of Chemistry”?

- a) Aristotle b) Democritus c) Thomsen d) Dalton

7) Rutherford’s “gold-foil” experiment using alpha particle scattering concluded that

- a) the center of the atom is empty b) atomic mass is spread over the whole atom
c) the center of the atom has a negative charge d) most of the atom is empty

8) In which model are atoms imagined as the solar system?

- a) Dalton b) Thomson c) Rutherford d) Bohr e) Cloud Model

Rubric:

Timeline has a title	4 pts _____
Organization of events is neat, clear and chronological	12 pts _____
All pictures, atomic models and analogies of the atom are included and accurate	12 pts _____
Correct matching of information boxes with the responsible scientist(s)	12pts _____
Poster looks aesthetically pleasing (color, outlining, easy to read and interpret, creative)	8 pts _____
Class time is used wisely	4 pts _____
Questions #1-8 (1/2 point each)	8pts _____

Total Points Earned: _____ / 60

Everything You Need to Make an Atomic Theory Timeline!

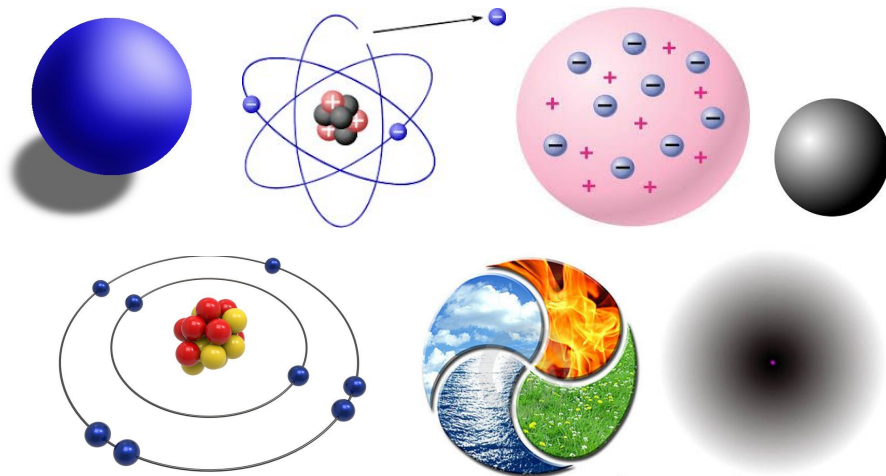
Democritus Bohr Aristotle Thomson
Rutherford Dalton Schrodinger
Heisenberg Einstein & other scientists

Most of an atom's mass is in the nucleus.	Electrons move around the nucleus billions of times in one second.	There are small, negatively charged particles inside an atom called electrons.
"Atomos" means "not to be cut," which refers to the smallest piece of matter.	All matter is made up of four elements: fire, air, water and earth.	Atoms contain mostly empty space.
Electrons' locations depend upon how much energy they have.	Electrons travel in paths called energy levels.	Atoms are "uncuttable"
Atoms are made of a single material that is formed into different shapes and sizes.	Atoms of the same element are exactly alike.	Electrons are found in electron clouds, not in paths.
Electrons are scattered around nucleus at a distance	This theory led to the "plum pudding" model, in which negative particles are stuck in a positively charged substance.	Matter has four properties: hot, cold, dry and wet.
Atoms of different elements are different	Energy levels are located certain distance from the nucleus.	There is a small, dense, positively charged nucleus.

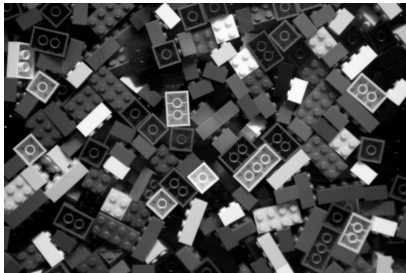
(-SCIENTIST- ATOMIC MODELS-MODEL ANALOGIES-)



Atomic Models:



Model Analogies:

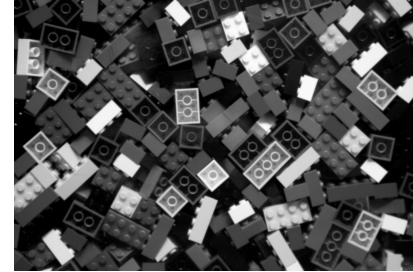


SCIENTIFIC
KNOWLEDGE
BUILDS ON PAST
RESEARCH AND
EXPERIMENTATION

THE ATOMIC THEORY
HAS CHANGED OVER
TIME AS NEW
TECHNOLOGIES HAVE
BECOME AVAILABLE.

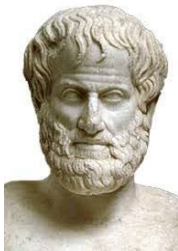
Atomic Theory Notes

Democritus : 400 B.C.



Democritus, a philosopher in ancient Greece, began the search for a description of matter. he questioned whether matter could be divided into smaller and smaller pieces forever until eventually the smallest possible piece would be obtained. he believed that the smallest possible piece of matter was indivisible and he named the smallest piece of matter “atomos,” meaning “not to be cut.” to democritus, atoms were small, hard particles that were all made of the same material, but were formed into different shapes and sizes.

Aristotle: 300 B.C. to Early 1800's



In ancient Greece, the popular philosopher Aristotle declared that all matter was made of only four elements: fire, air, water and earth. He also believed that matter had just four properties: hot, cold, dry and wet. Aristotle had a lot of influence over the public at this time, so his ideas were generally accepted for centuries.

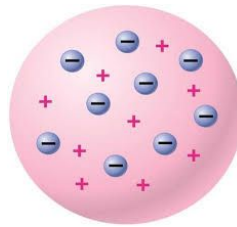
Dalton: 1803



In the early 1800s, the English chemist John Dalton performed a number of experiments that eventually led to the acceptance of the idea of atoms. He formulated the first atomic theory since the “death of chemistry” that occurred during the prior 2000 years. Dalton theorized that all matter is made of

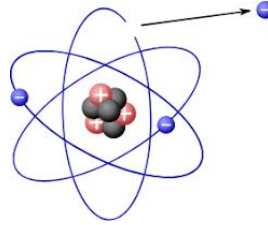
atoms and that atoms are too small to see, “uncuttable,” and indestructible. He also theorized that all atoms of a given element are exactly alike and atoms of different elements are different.

Thomson: 1897



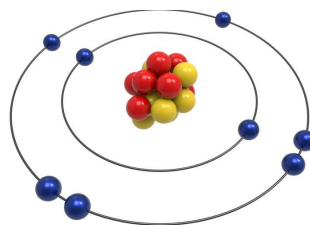
In 1897, the English scientist named J.J. Thomson provided the first hint that an atom is made of even smaller particles. He discovered the presence of a negative particle in the atom – the electron. He proposed a model of the atom that is sometimes called the “plum pudding” model. His theory was that atoms are made from a positively-charged substance with negatively-charged electrons scattered about, like raisins in a pudding or chocolate chips in a cookie.

Rutherford: 1908



In 1908, the new Zealand-born physicist, Ernest Rutherford, performed an experiment using positively-charged particles fired at gold foil. Through his experiment, he proved that atoms are not a “pudding” filled with a positively charged material. He theorized that atoms have a small, dense, positively-charged center, which he called the “nucleus”. He said that the nucleus is tiny compared to the atom as a whole, because the atom is mostly open space! He concluded that the negatively-charged particles are scattered outside the nucleus at a distance.

Bohr: 1913



In 1913, the danish scientist niels bohr proposed an improvement to the atomic model. he built on the concept that the mass of an atom is contained mostly in the nucleus. he also theorized that electrons move in definite orbits around the nucleus, much like planets circle the sun. in his model, these orbits, or energy levels, are located at certain distances from the nucleus.

Modern Cloud Theory 20th :Century Theory



Schrodinger, Heisenberg, Einstein & many other scientists:

According to today's atomic theory, electrons do not orbit the nucleus in neat planet-like orbits but move at high speeds in an electron cloud around the nucleus. in the electron cloud, electrons

whirl around the nucleus billions of times in one second. but they are not moving around in random patterns--an electron's location within the 'cloud' depends upon how much energy the electron has.