

# History of the atom assignment



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BUSTER**

\* Democritus Democritus had a theory that all matters are composed with tiny unbreakable particles called atom. He tried to break down matters into smallest particles. His model was that the matter would stop splitting in halves when it reaches its smallest matter. He called that an atom. \* John Dalton In 1803, John Dalton proposed a theory. The theory had 4 parts into it. 1. Elements are made of identical atoms. 2. Atoms of different elements are physically different 3. Compounds are formed by a combination of two or more different kinds of atoms. 4. A chemical reaction is arrangement?? of atoms.

Dalton formed different compounds from its elements. Adding extra of one reactant made no different. He tried variety of different combinations to form a new compound. The ratio that he was combining was inaccurate, but for the time back then, his experiment was closer to the modern technology. \* JJ Thomson He tested the origin and properties of cathode ray using a cathode ray tube. And his observation was with electricity, a metal plate produces a cathode ray. The model is called plum pudding model. Because it has negative charged particles named electrons inside atom.

They can be removed or added to form an ion. \* Lord Ernest Rutherford \* Lord Ernest Rutherford came from Nelson New Zealand. In 1911, his observation was the atom should be, if the plum theory was correct, solid pudding, small particles might not pass through the pudding. For experiment, Alpha particles were shot through the gold and beamed out. Almost all alpha particles passed through a thin sheet of gold but some were deflected or bounced back. \* Neil Bohr Neils Bohr came up with a

observation that, since + and ??? charges electrons on the outside should come crashing into the nucleus cancelling both out.

His experiment involved studying light coming from atoms that are 'excited' by electricity or flame. The light is made of distinct colour lines called an emission spectrum. Electrons were absorbing and releasing specific of energy. The theory was electrons could be found in fixed levels. -James Chadwick James Chadwick predicted that atoms are heavier than electrons and protons. The experiment was looking at beryllium when it hit alpha particles- which caused a neutral beam to be emitted. His theory was that the nucleus of an atom contains neutrons.

The History of the Atom In many ways our learning of the atom has influenced human's knowledge. In addition to that, the history of the atom, and how it's been used has equally affected human's knowledge. This knowledge of the atom we have acquired can help us improve life from day to day and explain the phenomenon known as the Theory of Everything. The founder of the atom was Democritus (460-370B. C. ), an ancient Greek philosopher whose goal in life was to explain the natural world. It was he who made the basis for which the foundation of the atom was created.

This foundation was his theory that all tangible objects in the world had a "primary matter" which was used in different variations to make everything that surrounds us. He also discovered that this "primary matter", or atom, as he first established, only had three main differences; he discovered shape, size, and weight differed between atoms. All of the work that Democritus did is seen as a more or less basic description of an atom.

Despite his uncanny accuracy of the atom with such limited technology, and without being able to do any experiments, the atom was ignored for the subsequent 2000 years.

The next essential scientist to be recorded as an innovator in history for the atom was John Dalton(1766-1844). “ Dalton’s theory can be summarized as follows: 1. Matter is composed of small particles called atoms. 2. All atoms of an element are identical, but are different from those of any other element. 3. During chemical reactions, atoms are neither created nor destroyed, but are simply rearranged. 4. Atoms always combine in whole number multiples of each other. For example, 1: 1, 1: 2, 2: 3 or 1: 3. ” 1 As you can see from Dalton’s four main ideas, it is a decent expansion from Democritus’ first theory of the atom.

J. J. Thomson was the next leader of the task, understanding the atom. He was the first of the scientist studying the atom to use equipment for experiments such as a cathode ray. “ When a potential is placed between the cathode (the negatively charged plate) and the anode (the positively charged plate) a “ ray” of electric current passes from one plate to the other. Thomson discovered that this ray was actually composed of particles. ” This experiment he composed was a very crucial one in the history of the atom, for the reason that this test discovered that there are negative charges inside of atoms.

The structure of the atom at that time would look similar to the one below.

11 This is a very important model because it is the first atom structure that includes that there is more than the simple “ different types of matter” way

of thinking. The most recent of the atom innovators would be Rutherford and Bohr. I believe that these two scientists needed the work of Democritus, Dalton, and Thomson to get to the atomic structure and understanding that we have today. In Rutherford's gold foil experiment (shown below) we can see that the particles fired at the gold foil were partially deflected and some pass completely through the foil undisturbed, this of course could be monitored by the detecting screen put around the gold foil. Rutherford concluded that the previous model of the atom could not be entirely accurate because if it was true that all atoms had negative and neutrally charged ions then the particles fired at the foil should all have gone through without disruption. Rutherford could never come to this conclusion if he did not have the previous model from J. J. Thomson.

But, Rutherford did have the model and information at that time, and he arranged a new model, which is very similar to the current one. (Seen under) 2 Last, the most recent recorded scientist in history to alter the structure of the atom, Niels Bohr. It has many aspects correct that we have today in the modern model of the atom. It was one of the first models to contain a nucleus with an orbit. Although it is not completely true that electrons, neutrons, and protons "orbit" the nucleus, it is a much closer model to the current one than the plum model.

Bohr could never have accomplished what he did without the foundation that was laid before him, along with the help of J. J. Thomson. Bohr's theory may be summarized in the following two statements: 1. Electrons can only occupy certain orbits or shells in an atom. Each orbit represents a definite energy for the electrons in it. 2. Light is emitted by an

atom when an electron jumps from one of its allowed orbits to another. Since each orbit represents a definite electron energy, this electron jump, or transition, represents definite energy jump.

This change in electron energy leads to emission of light of a definite energy or wavelength. “ 3 To conclude, the understanding of the atom and its structure today had been largely improved from that of the days of Democritus. This has only been possible through the work done by the handful of select scientists in history. These scientists have worked off one another to eventually get to the model of the atom we have today, in addition to our current understanding of the atom and its properties.

Many times in history we have used our knowledge of the atom for furthering technology and improve life around us. This can be seen many times history and common day household items such as a smoke detector to weapons of mass destruction used in nuclear war. In any event, it is possible to, in technology, see the use of the understanding of the atom. My first example of how the atom has been used and changed the world is a common household item, the smoke detector. The smoke detector, even though it may not seem at first glance to be such an advanced piece of technology, uses a process called ionization.

Ionization is the physical process of converting an atom or molecule into an ion by adding or removing charged particles such as electrons or other ions. Smoke detectors specifically use this in a way, which two electrodes are in a small ionization chamber maintaining a steady current. Any time in which this current is broken the alarm will trigger. This is useful because once

smoke atoms enter the ionization chamber they will absorb the electrodes and interrupt the current, henceforth causing the alarm. Although there is no exact world event concerning the smoke detector, it has made modern life much safer. Next, our understanding of the atom and how it reacts with other atoms has helped us use gas, even crude oil, to alter it to a variety of different shapes and forms for different uses. This crude oil, commonly known as methane, is consisted of mainly carbon and hydrogen. These hydrocarbons have a very dense amount of raw energy inside of them. Because of this, many things are derived from crude oil, such as gasoline and diesel fuel. This fuel is obviously used for many things, from cooking food to launching spaceships to the moon.

But there is still more that this crude oil can do, it is extremely versatile by chemically cross-linking hydrocarbon chains you can get everything from synthetic rubber to nylon guitar strings to the plastic in tupperware. 5 As you can see, this crude oil alone serves no purpose, but when we add in our understanding of the atom and how we can change and alter it, crude oil is one of our most valuable non renewable resource. Finally, we have the atomic bomb, such as that used in World War II by America. The atomic bomb is a fairly simple weapon; it simply uses a process called nuclear fission.

Nuclear fission is a process in which atoms release a great deal of energy due to their raw power and instability. These atomic bombs were fueled by uranium, which is the said raw instable substance. The uranium is so unstable it needs to break down into smaller atoms to be stable, when it does this it has left over energy. This energy is the actual explosion from

the bomb, and all that is happening is the breaking down of atoms and releasing of unstable energy. The infamous world events little boy and fat man were the first two times that an atomic bomb was used in nuclear warfare. In this war though, I seriously question the ethics of the U. S. A. America had the power to use the atomic bomb but did not restrain themselves from using it. If there is no restraint on the power that a country has, then there will be no civility. The casualty of the two bombs is estimated to be around 200, 000 people, most of whom were civilians. This many deaths of innocent lives is unjust in any case. Also, the use of these bombs had a huge effect on Japan's environment and economy. America did not seem to be all shifted by the fact that they had caused his distress. But, you can safely assume the economy took a huge blow, losing two cities and 200, 000 citizens. Furthermore, the effect on the environment would have had to have been a great loss as well. The two bombs together destroyed thousands of miles of land, including some forest and mountain. The bombs, in addition to people, killed thousands of animal and wildlife, and destroyed the habitat for any future animals. Work Cited 1. Democitus. (n. d. ). A BRIEF HISTORY OF ATOMIC THEORY DEVELOPMENT. Retrieved September 26, 2010, from [http://www.eoam.cc.ok.us/~rjones/Pages/online1014/chemistry/chapter\\_8/pages/history\\_of\\_atom.html#top%20anchor](http://www.eoam.cc.ok.us/~rjones/Pages/online1014/chemistry/chapter_8/pages/history_of_atom.html#top%20anchor) 2. Freudenrich, C. C. (2010). Crude Oil. In How Oil Refinery Works. Retrieved September 26, 2010, from New York Times website: <http://science.howstuffworks.com/environmental/energy/oil-refining1.htm> 3. Helmenstine, A. M. (2010). Ionization Detectors. In How Do Smoke Detectors Work? Retrieved September 26, 2010, from New York Times website: <http://chemistry.about.com/cs/howthingswork/a/aa071401a.htm> 4. <https://assignbuster.com/history-of-the-atom-assignment/>



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