Atomic theory timeline foldable research guide

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During this part of the chemical department, students learn that the atom, our current theory of how it looks, and how our views on it evolved over time. How big is the atom? Check out this link to see the scale of things in the universe... WARNING: Your mind will be blown up... :) Concepts to Cover: 2 - Evolution of Atomic Theory NOTES (.pdf) Homework: Atomic Theory Important Scientists (.pdf) Mini-Project: Evolution of Atomic Theory Folding (.pdf Files) Atomic Theory Timeline Folding - Research Guide to Atomic Theory Timeline Folding - Instructions NOTE: Applied Applications Related to Atomic Theory Can Be Found in Atomic Theory background knowledge: The history of the atom is a thing of the past for centuries. Around 440 BC, the Greek philosopher Democritus first declared the existence of a tiny unfeasible particle that makes up everything in the world around it. Each of these particles will be a small, solid sphere that cannot be broken further. Each of them will have unique features that affect the properties of this particle. For example, he thought that if the substance has an unpleasant odor, the particle should be prickly or prickly. From the Greek word uncircumcised (atom), we get the current word atom! In 1802-1803, British schoolteacher and metorologist John Dalton revised Democrit's ideas about the atom and developed his atomic theory, which scientists still recognize. In it, he affirmed democrit's idea that matter is made up of tiny particles that he called atoms and that the atoms of one element are the same as all other atoms of this element, while the atoms of different atoms were different. He then clarified that the compound is formed when the atoms of different elements are combined, and the chemical reaction occurs when these atoms are rebuilt, but the atoms are not affected by themselves. Dalton named his atom, a billiard ball model after his likeness of a billiards (pool) ball. Around 1897, another British scientist named J.J. Thomson made a huge contribution to understanding what constitutes an atom. Using a cathode beam gun, he passed an electric current through magnetized plates, and found that by positively or negatively charging the plate, it could change the direction of the electric current. As the charges of the plate dictated the direction of current movement, he realized that the atom must be composed of positive and negative charges. From this experiment we get an electron, a negatively charged particle inside an atom. This experiment led Thomson to the idea that the atom is a sphere filled with positively charged liquid, and it floats negatively charged particles (electrons). this idea reminded him of plums suspended in bread, he named his model, Plum Pudding model. The next big discovery, which changed the concept of the atom, occurred in 1909-1911. Ernest Rutherford, a new physicist, with the help of Hans Geiger (yes, the radiation detection device, Geiger Counter!) and Ernest Marsden conducted the famous Gold Foil Experiment. In it, the alpha particles were directed through a thin slit in the lead screen to a thin gold foil just 100 atoms thick. They predicted that if positive and negative charges were evenly distributed throughout the atom, the atoms would not have enough energy to deflect heavy alpha particles. Most of the particles passed through the foil as expected, but some particles were deflected from the foil and some even bounced back. This surprised the scientists and led them to the conclusion that since most alpha particles went straight through the foil, atoms must be made mostly from empty space. Since positively charged alpha particles deviated at such extreme angles, there must have been something positive causing deviation. This dense, positively charged area in the center of the atom is now known as the nucleus. Because the alpha particles were so small, they believed that the nucleus should be small compared to the total size of the atom. This new vision of the atom began to take shape, similar to the planet Saturn, with a dense area in the center orbiting electrons, such as rings around the planet. For this reason, his model became known as the Planetary Model. In 1913, one of Ernest Rutherford's students, a Danish physicist named Nils Bohr, proposed changes to the Planetary Model. To try to explain why electrons orbiting an atom do not lose energy and spiral inward to the nucleus, he suggested that electrons rotate in different orbits, but electrons could jump between these orbits, either gaining energy (moving into distant electronic shells), or losing energy (falling on electronic shells closer to the nucleus). Energy will either be absorbed, or emitted in the form of photons, or bundles of energy, which are the main units of light. These photons can be detected by spectroscope and are used to identify the atoms of various elements both here on Earth and in stars and galaxies throughout the universe. Bohr also suggested that the size of the atom was much smaller than previously thought, and explained that electrons revolve around the nucleus in concentric circles. The inner shells, due to their size and proximity to the nucleus, can hold fewer electrons in their orbits than outer shells. His model became widely known as the Bor Model. Bora's model was effective in explaining Hydrogen element, however, it was unable to explain the properties for items more complex than this. Because of this, other scientists began to work to understand that Bohr could not explain. Around 1924, the French physicist Louis de Broglie presented his theory of electronic waves as a theory of the duality of waves/particles of matter. Based on the work of Max Planck and Albert Einstein, he suggested that any moving particle or object had a related wave (achaney/tmve/wiki100k/docs/Louis_de_Broglie.html) through which the particle could be transported. From this we understand that particles can sometimes behave like a particle, and in other cases can behave like a wave. Around the same time, Erwin Schroedinger developed a mathematical formula to explain de Brogli's work. From this new understanding, we came to the view of the atom not as a nucleus surrounded by electrons moving in completely circular orbits, but as electrons moving in waves around the nucleus. Orbits will vary in size depending on the wavelengths of electrons as a direct result of the electron's pulse. Instead of completely circular orbits, electrons will be found in the clouds of space around the nucleus. It is also impossible to know the speed and exact location of the voter in this cloud, but we can calculate the probability of finding it in that space. Their model is known as the Electronic Cloud Model, or quantum mechanical model. NOTE: Many more scientists have contributed to the evolution of the atom than what is listed here. For a more comprehensive list, feel free to check out the following link: During this part of the chemical unit, students learn that the atom, our current theory of how it looks, and how our views on it have evolved over time. How big is the atom? Check out this link to see the scale of things in the universe... 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