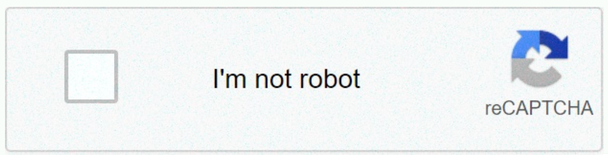

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History of atomic theory worksheet

In order to continue to enjoy our site, we ask you to confirm your identity as a human. Thank you so much for your cooperation. Even scientists change their minds! In this story, you'll learn how the scientists involved used the evidence to change their ideas. The idea of atoms is very old. Philosophers in ancient Greece imagined what would happen if he tried to cut something into smaller and smaller pieces. Finally (they thought) the piece would be so small that it couldn't be cut anymore. Tiny pieces were called atoms. In the model, all other things had their own atoms - atoms of wood, atoms of skin, atoms of rock, even atoms of color and taste. Although the atoms are tiny, the rest of the model turned out to be bad. The next person to develop the idea of atoms was John Dalton. He examined the chemical reactions and realized that some chemicals were made by connecting compounds - different types of elements. For example, there are no atoms of water - instead, you can water by linking hydrogen and oxygen atoms together. Dalton thought each element was a different kind of sphere. Later, a physicist named J.J. Thomson discovered a particle called an electron. When the electrical current passes through a wire, it's because the electrons are moving. Thomson showed me that these electrons came out of atoms. It showed that Dalton's model of atoms with solid spheres was bad because atoms could have electrons pulled out of them. Thomson imagined the electrons scattered around the atom like a piece of fruit in the cake. For this reason, Thomson's model is called a plum pudding model. In 1907, Ernest Rutherford conducted an experiment that produced very surprising results. He fired a kind of particle called an alpha particle (you'll learn more about these some physics activities) on a thin sheet of gold. He expected the alpha particles to go straight through the gold plate, and most did. But some bounced off the page, which seemed impossible. Rutherford said: It was almost as incredible as being shot in a 15-inch shell (a shell of sorts of balls) with a piece of tissue paper and came back and hit it. The only way to make sense of the results of the alpha scattering experiment was if the plum pudding model was wrong. In Rutherford's atomic model, all the positive charges and masses of the atom had to be squeezed into a tiny sphere in the center of the atom. Rutherford's atomic model had positive protons in the nucleus in the center of the atom, surrounded by a cloud of negative electrons flying around the rest of the atom. The nuclear model of the atom explained the results of the alpha scattering experiment. Most alpha particles easily passed through the foil because they passed through the gaps between the nuclei. However, when an alpha particle head, bounced straight off it. Since only a few alpha particles have bounced off the nucleus, the core must be very small. Unfortunately, there were problems with the nuclear model. It was hard to explain why the electrons didn't make it to the core. Later, scientists discovered that atoms are able to emit (emit) and absorb light, but only certain colors - which is why fluorescent lamp tubes are often strange purple and white in color. These problems were solved by Niels Bohr. Instead of electrons flying freely, the Bohr atom trapped them in certain orbits or shells. Because the electrons were trapped in shells, they couldn't fall into the nucleus. The gaps between the shells explained the effects on light and color. Even better, the idea of electrons in shells explained some patterns of chemical reactions which people could but could not explain. There was one final step in thinking about the structure of the atom. In 1932, James Chadwick found that not all particles were protons. There was another type of particle, similar in size and mass, but there was no electrical charge. These particles were called neutrons. So instead of protons, it was a mixture of protons and neutrons. Everyone you studied in this activity had to use their imagination to think about the model of the atom, which explained what they knew about how atoms work. When they found new information, they had to change their model to include the new information. That's ok, because that's what scientists do. Now let's move on to a few questions. Issues.