

Chp 12: LECT 1: The Atom

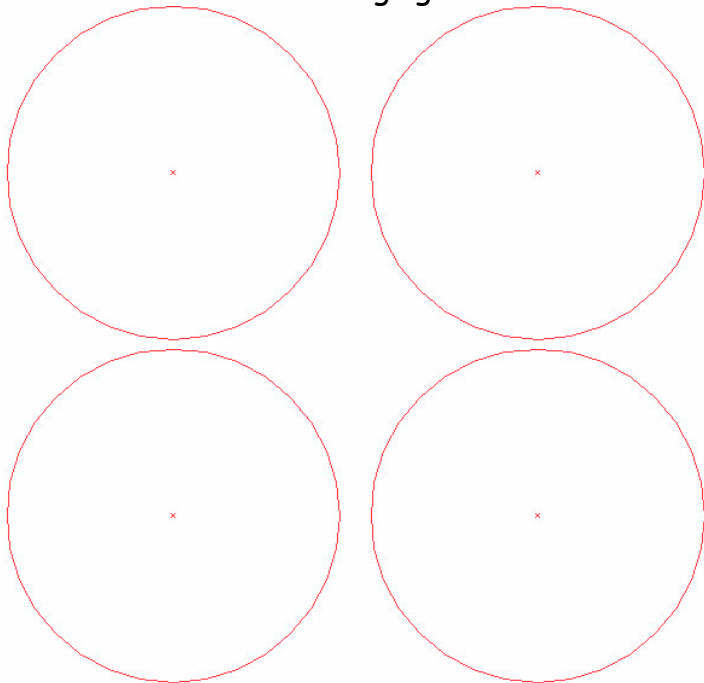
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Where Is It?

Theories about the internal structure of atoms were developed by aiming moving particles at atoms. In this activity you will develop an idea about the location and size of a hidden object by rolling marbles at the object.

Obstainers Lab: Drawings go here



What did you learn: _____

Atomic Structure & Its History

Much of what we know about _____ today is the result of _____ of atoms and the particles of which they are composed.

The Greek philosopher _____ was the first to propose that matter was composed of atoms, and that was over _____. He believed that atoms were those parts of nature that could not be cut down any further. He was correct in one part: _____

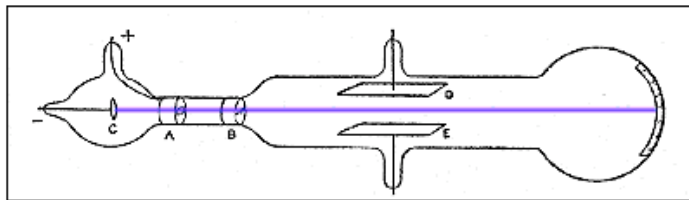
_____ are the most powerful in the entire universe making atoms indivisible in all but extremely powerful reactions. Those reactions are called _____, and it is when the nucleus of an atom is _____. When this occurs tremendous energy is released. _____ are an example of this incredible force. Direct observation of atomic structure is all but impossible. Scientists have relied on models to represent the structure of atoms.

English chemist John Dalton developed the first model in 1803. He saw them as _____

_____. His theories were based on what had been observed in chemical reactions and was widely accepted until the development of the Crooks tube.

The Crooks Tube

The _____ is the ancestor to _____. English scientist JJ Thompson noticed that a stream of negatively charged particles would flow through the tube no matter what gas was used.



He theorized that _____ were present in the atoms of all elements. His final theory was that atoms were made up of _____ charged particles evenly distributed and that the atoms was a solid mass. Video Notes:

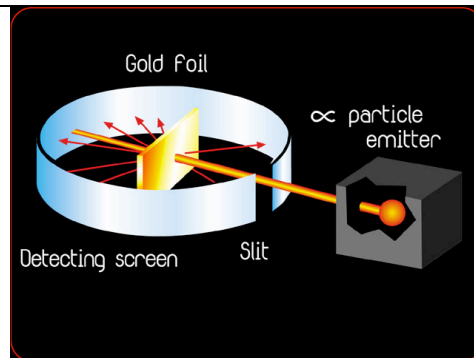
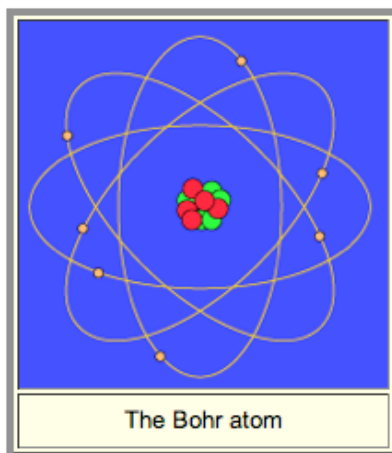
British physicist Lord Rutherford's experiments in 1909 indicated that atoms were _____ .

Video Notes: _____

Danish scientist Neils Bohr developed a model of the atoms that proposed certain _____ in which _____ Bohr proposed _____, or distances that occur around the nucleus.

_____ of the electrons at that level.

His models suggested that in an atom's normal state, all electrons are in the lowest energy levels, and because of this cannot move to a lower level. The _____ and said to be at its _____ state.



The Bohr Model is probably familiar as the "planetary model" of the atom illustrated in the adjacent figure that, for example, is used as a symbol for atomic energy (a bit of a misnomer, since the energy in "atomic energy" is actually the energy of the nucleus, rather than the entire atom). In the Bohr Model the neutrons and protons (symbolized by red and blue balls in the adjacent image) occupy a dense central region called the nucleus, and the electrons orbit the nucleus much like planets orbiting the Sun (but the orbits are not confined to a plane as is approximately true in the Solar System). The adjacent image is not to scale since in the realistic case the radius of the nucleus is about 100,000 times smaller than the radius of the entire atom, and as far as we can tell electrons are point particles without a physical extent.

If energy is added to the atom by heat or electrical energy, the absorbed energy can cause one or more of the electrons within the atom to move to a _____. When this happens the atoms are said to be in an _____. The atom at the _____ and makes efforts to return to _____. As the electrons return to this level _____. The energy given off exactly equals the amount absorbed when the electrons moved to the higher energy levels.

The Modern Model of the Atom: _____ this shows electrons as being part of a diffused cloud of varying densities .

Electrons are negatively charged particles found in electron clouds outside the nucleus. The size of the electron clouds determines the size of the atom.

The **nucleus** is the small, dense, positively charged center of the atom. It contains most of the atom's mass.

The diameter of the nucleus is 1/100,000 the diameter of the atom.

Protons are positively charged particles in the nucleus of an atom.

Neutrons are particles in the nucleus of an atom that have no charge.

An atom consists of three different types of particles—protons, neutrons, and electrons.

Electron clouds

Nucleus

In the current model of the atom, regions of the atom called electron clouds are the most likely places to find electrons.