

Module 2: Atomic Structure and the History of Atomic Theory

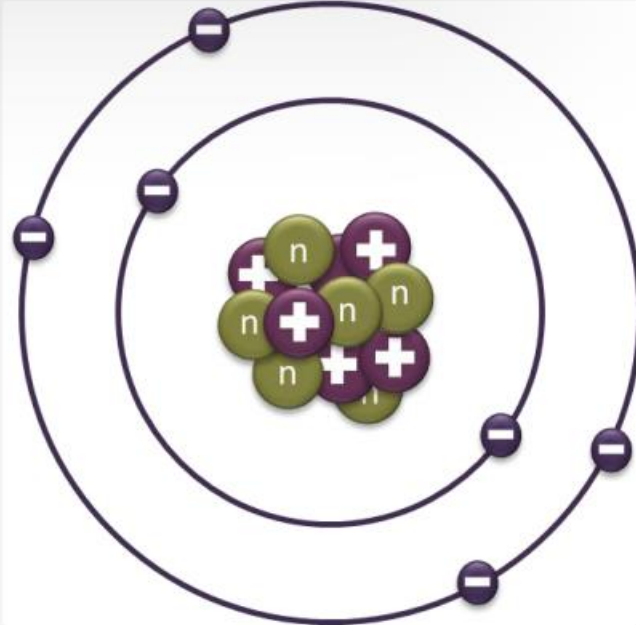
Topic 4 Content: Atomic Structure Presentation Notes

Introduction

Atomic Structure

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Atoms are composed of even smaller particles called protons, neutrons, and electrons. The atom shown in the image to the right is a carbon atom. In this activity, use the arrows in the lower right corner to learn about each of these particles.



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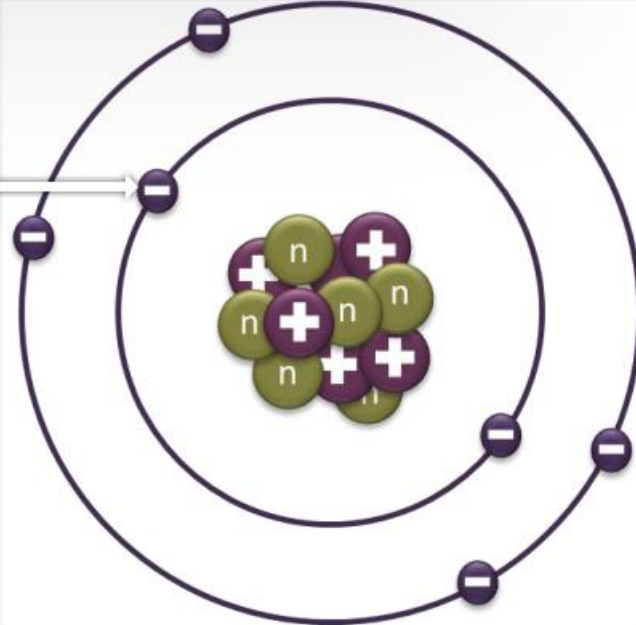
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Electron

Atomic Structure

Electron

An electron is a negatively charged particle in an atom. Electrons orbit the nucleus of an atom on shells or electron orbitals. In a normal atom, the number of electrons equals the number of protons and the atom has a neutral charge. Electrons are much smaller than other atomic particles. Occasionally, atoms can lose or gain an electron to create a positively or negatively charged atom called an ion.



The diagram illustrates a simplified atomic model. At the center is a nucleus composed of several protons (represented by purple circles with a white plus sign) and neutrons (represented by green circles with a white 'n'). Surrounding the nucleus are two concentric circular orbits. The inner orbit contains two electrons (represented by purple circles with a white minus sign), and the outer orbit contains six electrons. A white arrow points from the text on the left to one of the electrons in the inner orbit.

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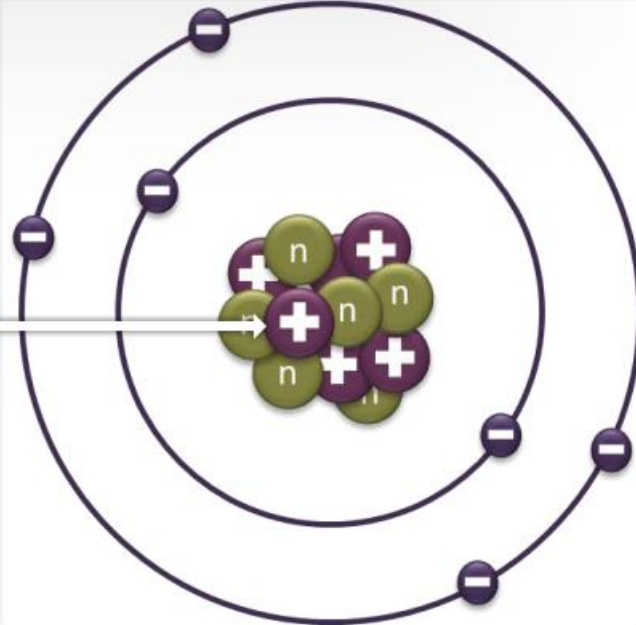
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Proton

Atomic Structure

Proton

A proton is a positively charged particle in an atom. The number of protons in an atom determines which atom it is and its number on the periodic table of elements. Protons are located in the nucleus of an atom where most of the weight resides. The element carbon has six protons, so it has an atomic number of 6.



The diagram illustrates the structure of an atom. At the center is the nucleus, composed of several protons (represented by purple circles with a white plus sign) and neutrons (represented by green circles with a white 'n'). Surrounding the nucleus are two concentric circular orbits representing electron shells. The inner shell contains two electrons (purple circles with a white minus sign), and the outer shell contains four electrons. A white arrow points from the text on the left to one of the protons in the nucleus.

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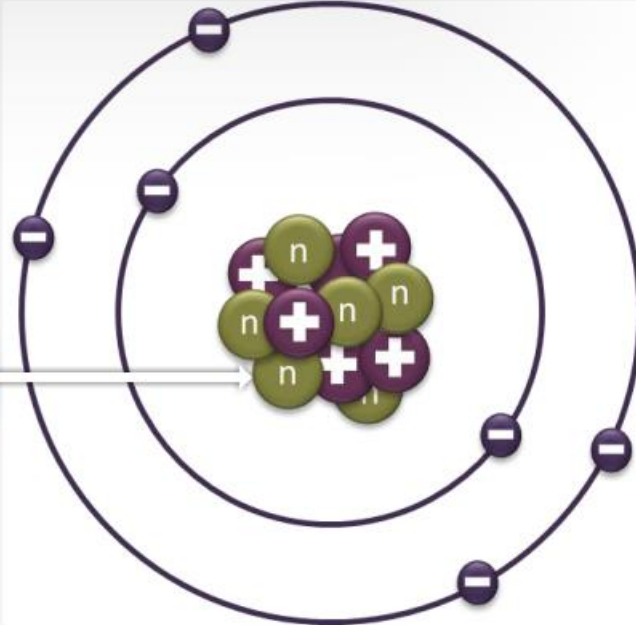
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Neutron

Atomic Structure

Neutron

A neutron is an uncharged particle found in the nucleus of the atom. Neutrons are slightly heavier than protons. To determine how many neutrons are contained in an atom, you will take the atomic weight of an atom and round it to the nearest whole number. Then, you would subtract the number of protons. The number remaining is the number of neutrons in the atom. Changing the number of neutrons in an atom does not change the element; instead, it produces a heavier or lighter form of the atom called an isotope.



The diagram illustrates the structure of an atom. At the center is the nucleus, composed of several particles: purple spheres with a white '+' sign representing protons and green spheres with a white 'n' representing neutrons. Surrounding the nucleus are two concentric circular orbits. The inner orbit contains two purple spheres with a white '-' sign, representing electrons. The outer orbit contains six purple spheres with a white '-' sign, also representing electrons. A white arrow points from the text on the left towards the nucleus, specifically highlighting the neutrons.

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