

# Module 4: Radiation and the Electromagnetic Spectrum

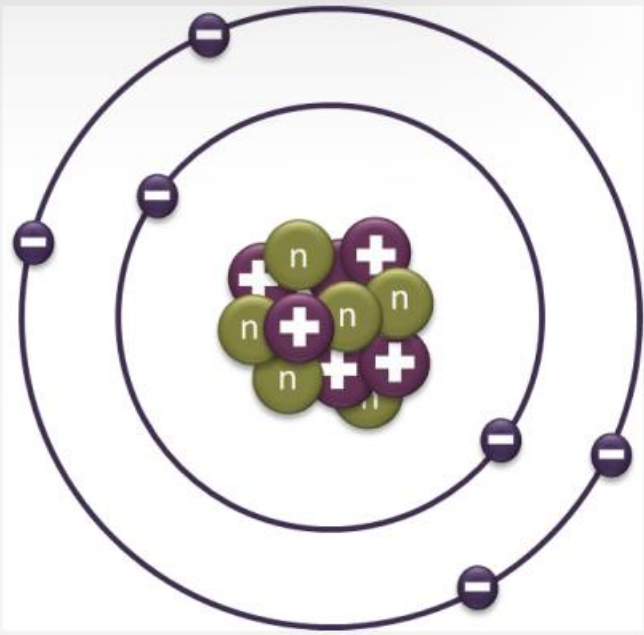
## Topic 1 Content: Atomic Structure: Carbon Notes

### Introduction

#### Atomic Structure: Carbon

##### Introduction

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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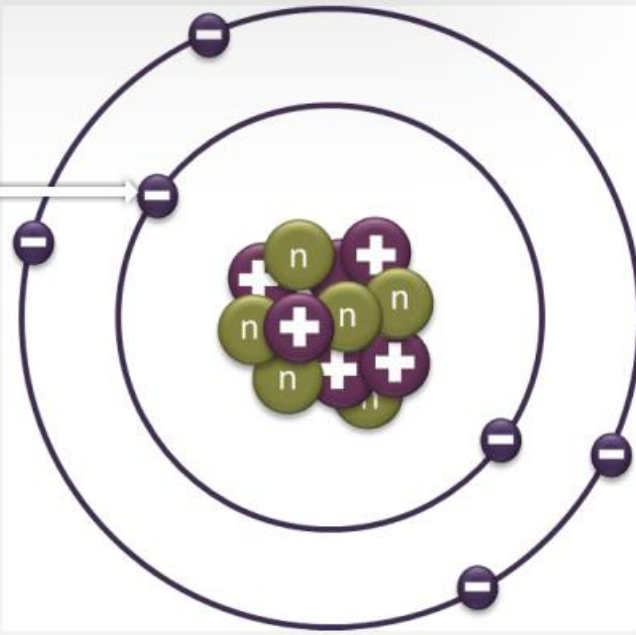
### Topic 1 Content: Atomic Structure: Carbon Notes

#### Electron

**Atomic Structure: Carbon**

**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 carbon atom with a central nucleus and two electron shells. The nucleus is composed of six protons (represented by purple circles with a '+' sign) and six neutrons (represented by green circles with an 'n' sign). The inner shell (K-shell) contains two electrons (represented by purple circles with a '-' sign). The outer shell (L-shell) contains four electrons. A white arrow points from the text on the left to one of the electrons in the inner shell.

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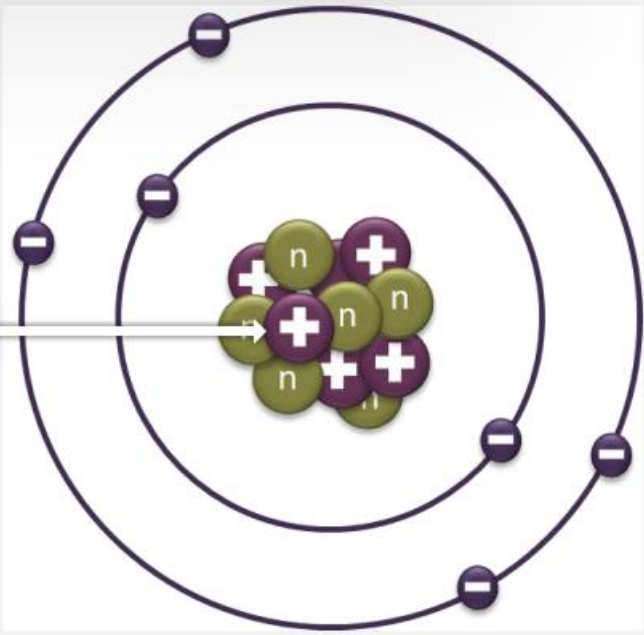
### Topic 1 Content: Atomic Structure: Carbon Notes

#### Proton

**Atomic Structure: Carbon**

**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 atomic structure of carbon. It features a central nucleus composed of six protons (represented by purple circles with a white plus sign) and six neutrons (represented by green circles with a white 'n'). Surrounding the nucleus are two concentric 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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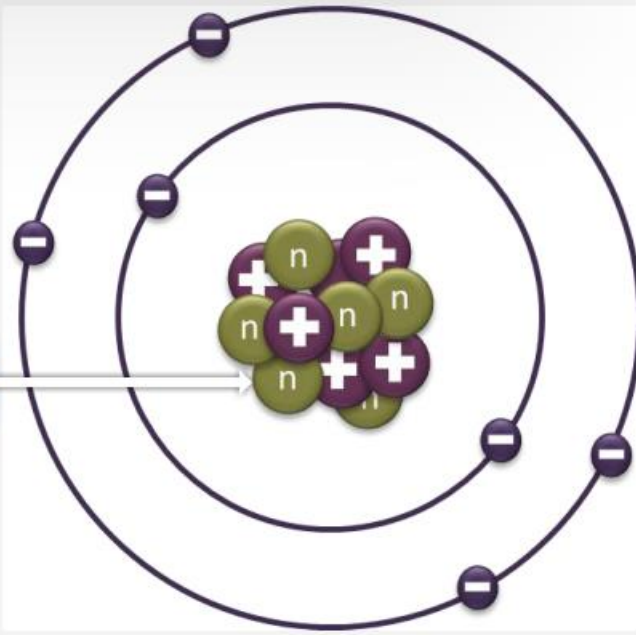
### Topic 1 Content: Atomic Structure: Carbon Notes

#### Neutron

#### Atomic Structure: Carbon

#### 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.



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