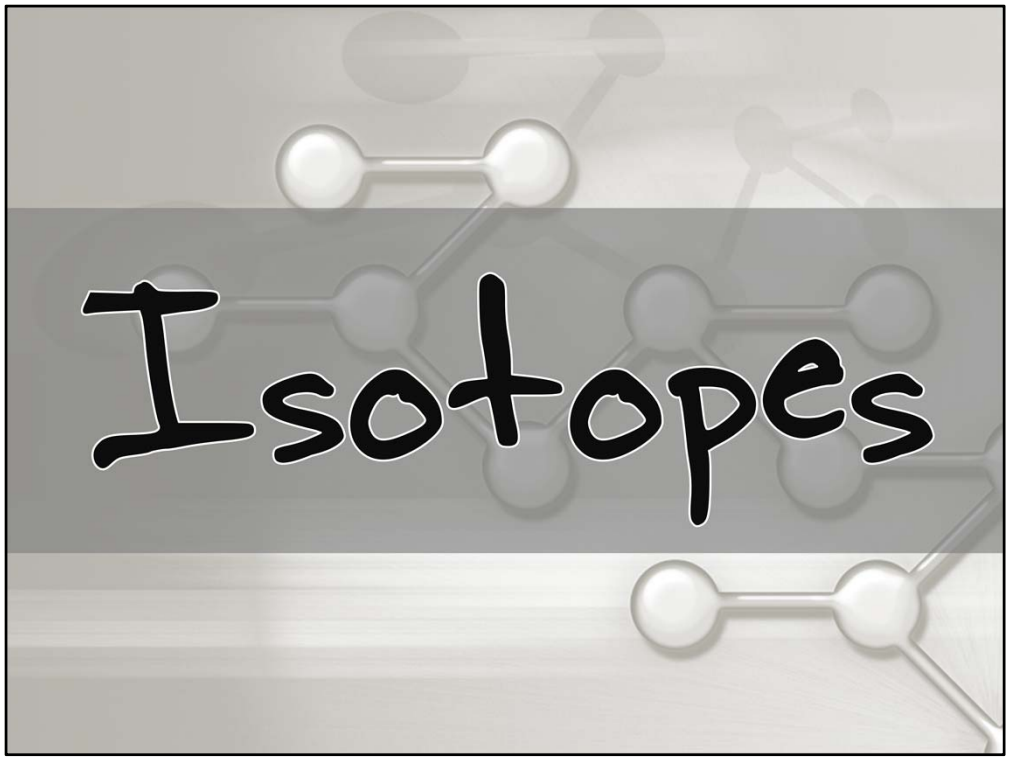
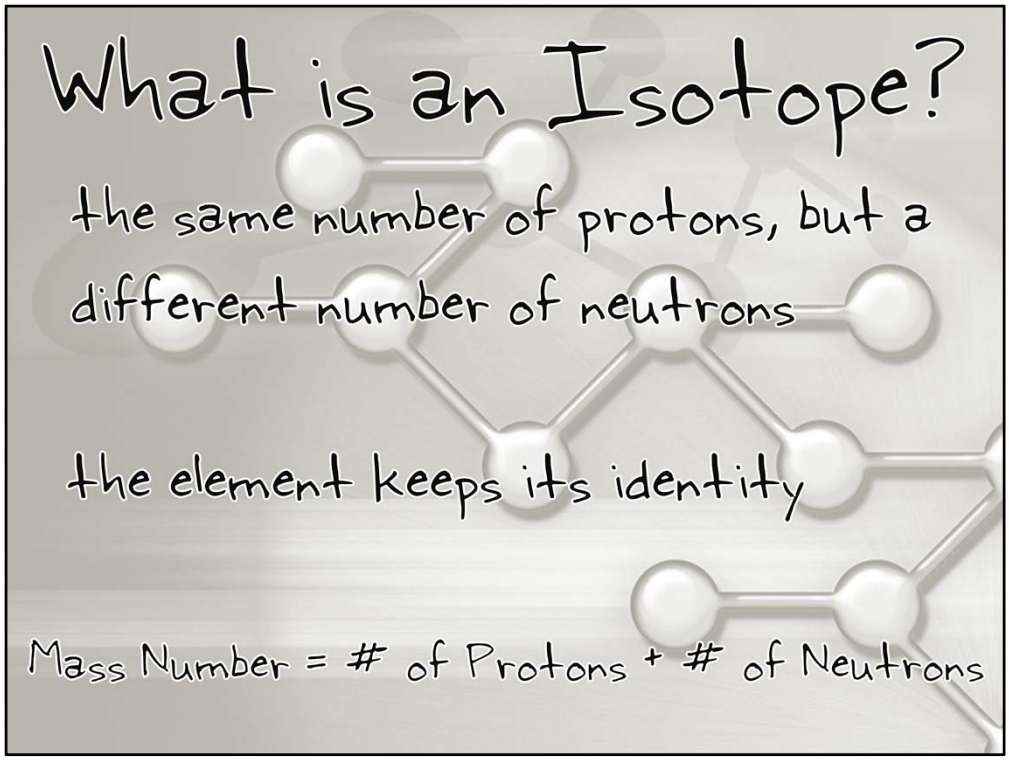
Module 2: Atomic Structure and the History of Atomic Theory

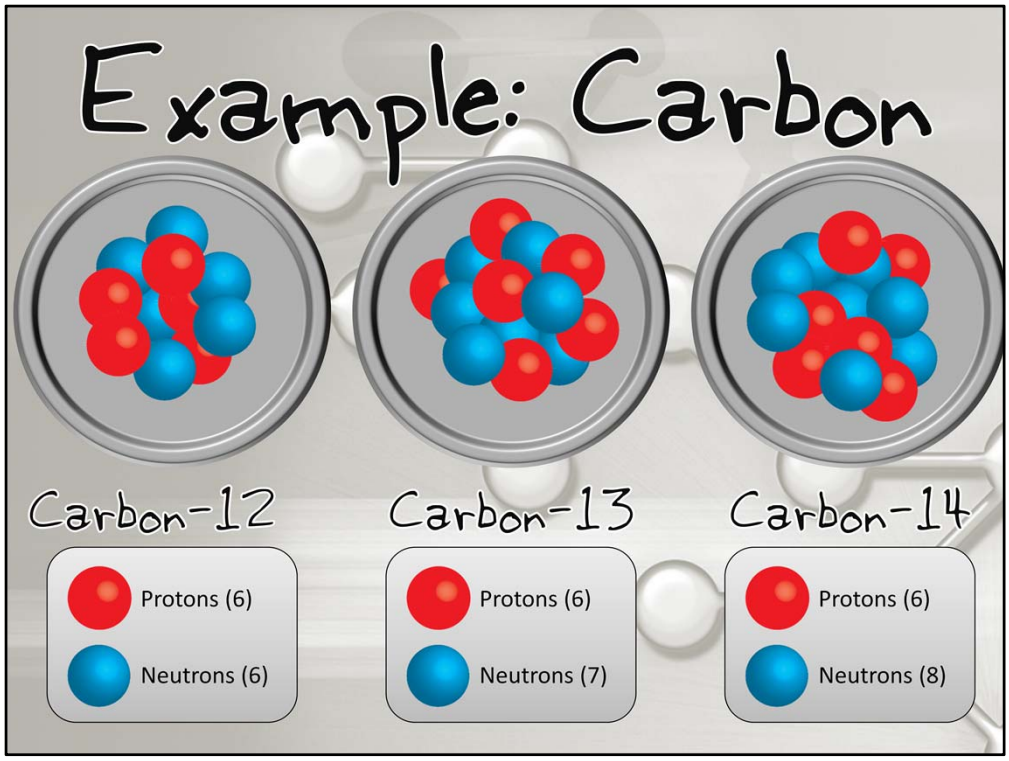
Topic 4 Content: Atoms, Isotopes, and the Periodic Table Presentation Notes



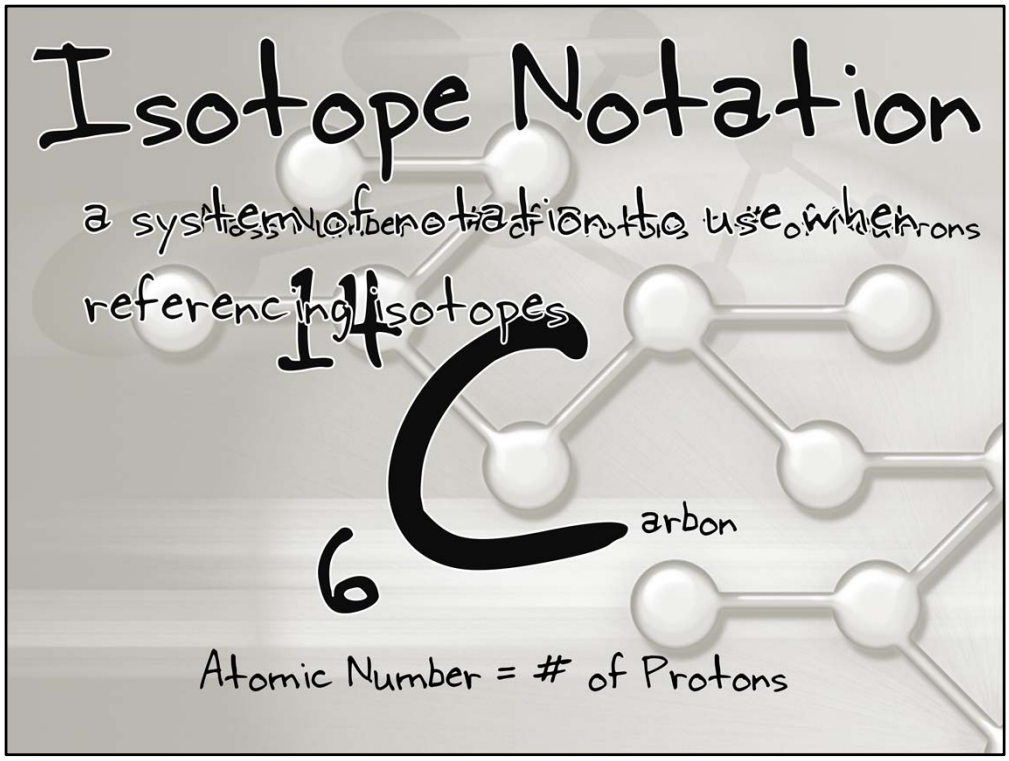
Isotopes



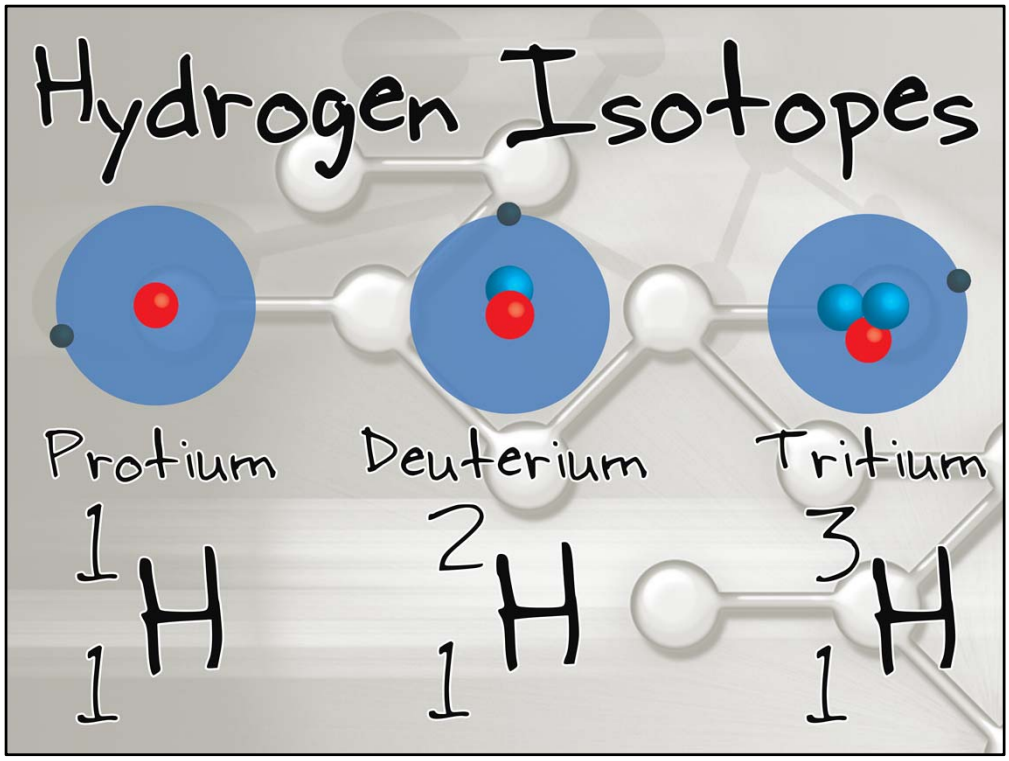
Once the neutron was discovered, scientists learned that elements contain isotopes. Isotopes are like twins for an element. Isotopes have the same number of protons, but a different number of neutrons. Since the number of protons remains the same, the element keeps its identity. Only the number of neutrons will change. It is important to know that the mass number is calculated by adding the number of protons and neutrons in an atom.



The element carbon is a great example because it has fifteen different isotopes. Three isotopes of carbon, carbon-12, carbon-13, and carbon-14 ,are shown here. While all three of these isotopes have six protons, carbon-12 has six neutrons, carbon-13 has seven neutrons, and carbon-14 has eight neutrons. The atomic masses of all of these isotopes vary.



Since every element has an isotope, scientists have developed a system of notation to use when referencing isotopes. This system is called isotope notation. Using isotope notation, the mass number is written above the element symbol. The atomic number is written below the element symbol.



One of the reasons that hydrogen is so special is that its isotopes all have different names. These are referred to as nuclides of hydrogen. Hydrogen-2 is referred to as deuterium. Hydrogen-3 is referred to as tritium.