

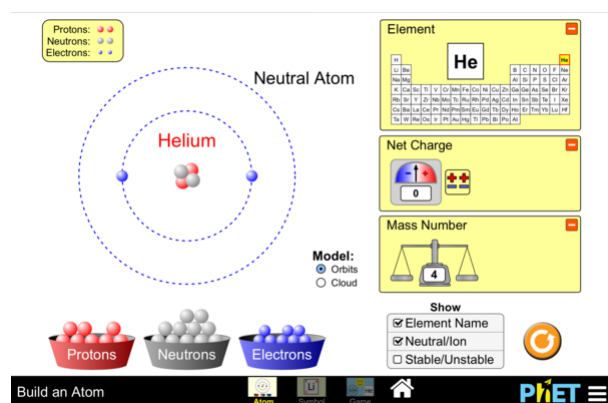
Contents

Learning Objectives

1. Differentiate between an atom, an element, a compound, a molecule and subatomic particles; given a list of such terms, he/she should be able to match them with appropriate phrases or synonyms - selecting at least 10 of a choice of 15 possibilities.
2. Determine the pertinent characteristics (atomic number, atomic mass, location of protons, neutrons, electrons) of 15 of the first 20 elements in the periodic table.
3. Indicate the relative chemical activities of eight out of ten of a given list of atoms (such as hydrogen, helium, boron, carbon, nitrogen, oxygen, sodium, chlorine, potassium, and calcium).
4. Given at least three of five possible features of a theoretical atom - state the atomic mass and number.
5. Indicate the chemical and biological significance of isotopes, selecting two from a list of five supplied to him/her.
6. Define and give examples of electrovalence, covalence, non polar, and polar covalent bonds, ionic bonding and hydrogen bonding.
7. Contrast between and give four (4) examples of inorganic and organic compounds of biological significance.

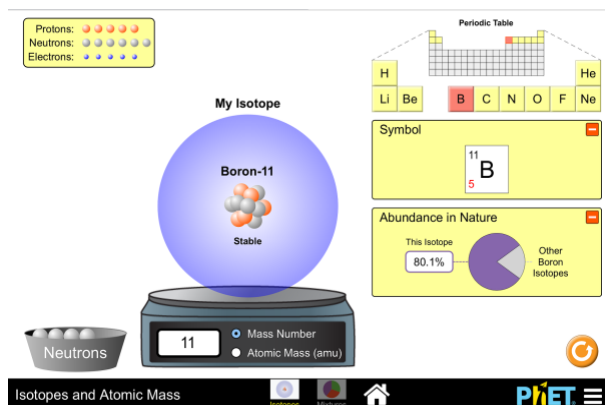
Atoms and Molecules

Build atoms using subatomic particles



Build an Atom

Understand Atomic Mass and Isotopes



The simulation displays the Boron-11 isotope. On the left, a legend shows: Protons (5 red dots), Neutrons (6 blue dots), and Electrons (5 green dots). A central diagram shows a Boron-11 atom with 5 protons and 6 neutrons in the nucleus, and 5 electrons orbiting. Below it, a digital scale shows a mass of 11 amu. A 'Neutrons' container holds 6 neutrons. On the right, a periodic table highlights Boron (B) in red. Below the table, a 'Symbol' box shows $^{11}_{5}\text{B}$. An 'Abundance in Nature' pie chart shows 80.1% for this isotope and 19.9% for other Boron isotopes. The bottom navigation bar includes 'Isotopes and Atomic Mass', 'Isotopes', 'Molecules', a home icon, and the PhET logo.

The Bohr Model and Electron Configurations

How do Bonds Form?

Covalent Bonding

Isomers