

Week 1 - Chemistry

Learning Goal: Understand basic concepts in chemistry needed to appreciate the structure and function of biological molecules and cells.

After the pre-class assignments you should be able to:

- Describe the structure of an atom
- Define and relate the terms electronegativity and polarity
- Explain how nonpolar and polar covalent bonds are formed between atoms
- Explain how the potential energy of two atoms changes as they form or break a bond
- Describe each type of chemical bond and intermolecular force: nonpolar covalent bonds, polar covalent bonds, ionic bonds, hydrogen bonds, and van der Waals' forces
- Define the terms "hydrophilic" and "hydrophobic"

By the time you take the first midterm you should also be able to:

- Identify the number of covalent bonds formed by H, C, O, and N
- Compare and contrast the relative electronegativities of H, C, O, and N
- Determine whether a molecule is likely to be polar or nonpolar based on its chemical structure and the relative electronegativity of its atoms
- Relate the potential energy change of an atomic interaction to its "strength"
- Compare the relative strengths of bonds and electrostatic interactions and relate these strengths to the amount of energy required to break them
- Determine whether a molecule is able to participate in hydrogen bonding with itself or another molecule based on its chemical structure and relative electronegativity of its atoms
- Determine whether a molecule is likely to be hydrophilic or hydrophobic based on its ability to form hydrogen bonds with water