# Answers to Unit Opener and Closer Questions: Unit 2

## Essential Questions

1. How does the organization of elements in the periodic table help us predict their properties?  
 - The periodic table arranges elements by increasing atomic number and groups them by similar chemical properties. This organization reveals periodic trends such as atomic radius, ionization energy, and electronegativity, which help predict reactivity, bonding behavior, and physical states of elements.

2. How do atoms combine to make all the different compounds that exist?  
 - Atoms combine by forming chemical bonds, including ionic, covalent, and metallic bonds. The type of bond depends on the atoms' electron configurations and their need to achieve stable electron arrangements (e.g., complete outer shells). This bonding diversity allows for the vast array of compounds found in nature.

## Unit STEM Task

3. Explain how the atomic structure impacts chemical bonding and influences the properties of substances we encounter in daily life, such as water as a solvent, salt dissolving in water, or metal not dissolving in water.  
 - Atomic structure determines bonding behavior:  
 - \*\*Water as a solvent:\*\* The polar nature of water molecules allows them to interact with and dissolve ionic compounds like salt.  
 - \*\*Salt dissolving in water:\*\* Ionic bonds in salt are broken by the dipole forces of water, separating the ions.  
 - \*\*Metal not dissolving in water:\*\* Metallic bonds are strong and lack the polarity needed for interaction with water molecules.

## Unit Wrap-Up

9. How do atomic models, periodic trends, and bonding theories together explain the structure and behavior of matter?  
 - Atomic models provide the foundation for understanding periodic trends and bonding. Periodic trends reveal element reactivity and predict bonding behavior, while bonding theories explain how atoms combine to form compounds, determining material properties like conductivity and melting points.

10. How does understanding atomic interactions help explain the materials and processes we encounter in daily life?  
 - Knowledge of atomic interactions explains:  
 - Why water dissolves ionic substances (polarity and hydrogen bonding).  
 - Why metals conduct electricity (delocalized electrons).  
 - Why certain materials, like ceramics, are brittle (ionic bonding).