Name _____

Electrifying Bonds: Polar and Nonpolar Covalent Connections

Open-Ended Response Answer Key

1. The molecule will likely form a polar covalent bond because of the difference in electronegativity between the two atoms. The atom with higher electronegativity will pull the electrons closer to itself, creating charge separation within the molecule.
2. Understanding the difference between polar and nonpolar covalent bonds is essential in the field of environmental science when studying the behavior of pollutants in water. Knowing whether a substance is polar or nonpolar helps scientists predict its solubility in water, its potential for contaminating aquatic ecosystems, and the necessary remediation methods.
3. Polar substances, due to their solubility in water, can have a significant environmental impact. For example, polar pesticides can easily leach into groundwater, affecting drinking water quality. Nonpolar substances, on the other hand, may accumulate in fatty tissues of organisms, leading to biomagnification in food chains.
4. An example of a substance that exhibits both polar and nonpolar bonding is soap. The hydrophilic (water-attracting) head of the soap molecule contains polar bonds, while the hydrophobic (water-repelling) tail contains nonpolar bonds. This dual nature allows soap to dissolve in water and interact with both polar and nonpolar substances, making it effective for cleaning.