Name _____

Polarity Power: How It Shapes Molecule Magic

Open-Ended Response Answer Key

1. A molecule with a polar covalent bond, like hydrogen chloride (HCl), has a partial positive charge on hydrogen (δ+) and a partial negative charge on chlorine (δ-). This polarity arises because chlorine is more electronegative than hydrogen, leading to unequal electron sharing.
2. Examples of polarity affecting solubility include salt (polar) dissolving in water (polar) but not in oil (nonpolar), and oil (nonpolar) dissolving in nonpolar solvents but not in water. These examples have implications for food preparation, chemistry, and environmental science.
3. Polarity affects reactivity by influencing the strength of intermolecular forces. For instance, hydrogen peroxide (H2O2) can decompose more readily than nonpolar molecules due to its ability to form hydrogen bonds, leading to its use as a bleaching agent and disinfectant.
4. Polarity in biological processes is essential. For instance, polar water molecules interact with polar amino acids in proteins, helping maintain protein structures and facilitating chemical reactions in living organisms. Polar molecules like glucose and DNA also rely on hydrogen bonds for their functions in cells.