

Section 1.2: Water: Life's Solvent

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1. The polarity of water helps the formation of hydrogen bonds among water molecules. Hydrogen bonds create the lattice structure of water.
2. Answers may vary. Sample answer: Water's lattice structure is stable which leads to a high specific heat of water. High specific heat gives water a high boiling point. The lattice structure keeps molecules close causing high surface tension. Water has the ability to form H-bonds with other polar molecules, which gives water its adhesion properties.
3. When potassium bromide, KBr, is dissolved in water it dissociates into potassium ions, K^+ , and bromine ions, Br^- ions. These ions are enveloped by water molecules to form a surface coat.
4. No, because octane is non-polar and no bonding will occur.
5. Answers may vary. Sample answer: Polar water molecules can surround polar biological molecules or ions, thus dissolving them.
6. Acids when placed in aqueous solution cause the production of hydronium ions, increasing H^+ concentration and lowering the pH. Bases cause the production of hydroxide ions in aqueous solution, increasing OH^- concentration, and raising the pH.
7. The degree of ionization or dissociation determines its classification. Strong acids or bases completely dissociate or ionize while a weak acid or base does not.
8. Answers may vary. Sample answer: Changes in pH of the environment can have a negative impact on organisms by inhibiting or altering chemical reactions critical to normal metabolism and the health.
9. Answers may vary. Sample answer: Buffers help to maintain proper pH levels in different cells in the body by being able to absorb excess hydronium or hydroxide ions. Buffers use systems of weak acids or weak bases to accomplish this.
10. A buffer solution is one that maintains a relatively constant pH when H^+ or OH^- are added. However, the pH can change slightly. It remains relatively constant not completely constant.
11. (a) The name suggests it acts as an acid and would likely generate hydronium ions in aqueous solution.
(b) Vitamin C would taste sour because it is an acid.
12. Answers may vary. Sample answer: Ants produce formic acid for defense, trail marking, and recruitment. Other insects like carabid beetles also produce formic acid.