Section 2–2 Properties of Water (pages 40–43)

Key Concepts
- Why are water molecules polar?
- What are acidic solutions? What are basic solutions?

The Water Molecule (pages 40–41)
1. Is the following sentence true or false? A water molecule is neutral. ______ true
2. Why is a water molecule polar? _______ There is an uneven distribution of electrons between the oxygen and hydrogen atoms.
3. Circle the letter of each sentence that is true about hydrogen bonds.
   a. A hydrogen bond is stronger than an ionic bond.
   b. The attraction between the hydrogen atom on one water molecule and the oxygen atom on another water molecule is an example.
   c. A hydrogen bond is stronger than a covalent bond.
   d. They are the strongest bonds that form between molecules.
4. Complete the table about forms of attraction.

<table>
<thead>
<tr>
<th>Form of Attraction</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohesion</td>
<td>Attraction between molecules of the same substance</td>
</tr>
<tr>
<td>Adhesion</td>
<td>Attraction between molecules of different substances</td>
</tr>
</tbody>
</table>

Solutions and Suspensions (pages 41–42)
5. What is a mixture? A mixture is a material composed of two or more elements or compounds that are physically mixed together but not chemically combined.
6. A mixture of two or more substances in which the molecules of the substances are evenly mixed is called a(an) ______ solution _______.
7. The greatest solvent in the world is _______ water _______.
8. What is a suspension? A suspension is a mixture of water and nondissolved substances that are so small they do not settle out.
9. Complete the table about substances in solutions.

**SUBSTANCES IN SOLUTIONS**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Definition</th>
<th>Saltwater Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solute</td>
<td>Substance that is dissolved</td>
<td>Table salt</td>
</tr>
<tr>
<td>Solvent</td>
<td>Substance in which the solute dissolves</td>
<td>Water</td>
</tr>
</tbody>
</table>

**Acids, Bases, and pH (pages 42–43)**

10. Why is water neutral despite the production of hydrogen ions and hydroxide ions? 
   *It is neutral because the number of positive hydrogen ions produced is equal to the number of negative hydroxide ions produced.*

11. What does the pH scale indicate? *It indicates the concentration of H⁺ ions in solution.*

12. On the pH scale below, indicate which direction is increasingly acidic and which is increasingly basic.

   ![Image of pH scale]

13. How many more H⁺ ions does a solution with a pH of 4 have than a solution with a pH of 5? *10 times*

14. What is an acid? *An acid is any compound that forms H⁺ ions in solution.*

15. Is the following sentence true or false? Strong bases have pH values ranging from 11 to 14. *true*

16. What are buffers? *Buffers are weak acids or bases that can react with strong acids or bases to prevent sharp, sudden changes in pH.*