Answer Key
Mixtures, Solubility, and Acid/Base Solutions

Lesson 1
Before You Read
1. Disagree
2. Agree

Read to Learn
1. a compound because it is made of two elements that are chemically bonded together
2. Substances are elements or compounds that have a composition that is always the same. Mixtures are two or more substances that are physically but not chemically bonded together.
3. You can observe whether the mixture is evenly mixed (homogeneous) or unevenly mixed (heterogeneous).
4. Yes; a mixture can be composed of two or more substances: two or more elements, two or more compounds, or a combination.
5. You can see the liquid state of the water and taste its saltiness.
6. The substances that make up a mixture are not chemically bonded. In a compound, they are. Some of the properties of substances that make up a mixture are observable in the mixture. The properties of the elements that make up a compound are not observable in the compound. The parts of a mixture can be separated using physical processes. The parts of a compound cannot.

After You Read
1. Possible answer: A solution and a homogeneous mixture are the same thing.
2. a. substances; b. elements; c. compounds; d. heterogeneous mixtures; e. homogeneous mixtures
Lesson 2

Before You Read
3. Agree
4. Disagree

Read to Learn
1. A solvent is the substance that exists in the greatest quantity in a solution. All other substances in a solution are solutes.
2. solid
3. because electrons have a negative charge
4. having a slightly negative end and a slightly positive end
5. Substances that are polar will dissolve in water because water is also polar. Nonpolar substances will not dissolve in water because water is polar and dissolves only other polar molecules or ionic compounds.
6. Both molecules are polar.
7. water
8. \( C = \frac{m}{V} = \frac{5 \text{ g}}{0.2 \text{ L}} = 25 \text{ g/L} \)
   \( m = C \times V = 3 \text{ g/L} \times 5 \text{ L} = 15 \text{ g} \)
9. the volume of solute in a given volume of solution
10. Concentration describes how much solute is dissolved in a given volume of solution. Solubility describes the maximum amount of the solute that can be dissolved in a given amount of solvent.
11. The solubility of sugar in water increases as temperature increases.
12. about 20 g
13. By changing the temperature of a solution; in the case of gases dissolved in a liquid, changing the pressure of a gaseous solute can change its solubility in a liquid.

After You Read
1. Possible answer: Find the substance that is most abundant in the solution. That substance is the solvent and all other substances are solutes.
2. 

<table>
<thead>
<tr>
<th>Do these factors . . .</th>
<th>affect the solubility of . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>solids in a liquid?</td>
</tr>
<tr>
<td>Temperature change</td>
<td>yes</td>
</tr>
<tr>
<td>Pressure change</td>
<td>no</td>
</tr>
<tr>
<td>Stirring the solution</td>
<td>no</td>
</tr>
</tbody>
</table>
3. The concentration decreases.
Lesson 3

Before You Read
5. Agree
6. Disagree

Read to Learn
1. Students should circle the hydrogen atom on the hydrochloric acid molecule.
2. Both involve an interaction with water molecules and the transfer of a hydrogen atom.
3. The hydrogen in the acid attaches to a water molecule to create a hydronium ion. The base contains a hydroxide ion that separates from the base in solution, or the base takes a hydrogen atom from water, producing a hydroxide ion.
4. Possible answer: I drink milk and write on paper.
5. pH decreases as hydronium ion concentration increases and vice versa.
6. a. acid
7. A tomato is about 100,000 times more acidic than detergent ($9 - 4 = 5; 10^5 = 100,000$).
8. by changing color
9. by finding a matching color on the chart of standard colors and reading the pH value that corresponds to that color
10. Possible answers: pH indicators, pH testing strips, pH meters

After You Read
1. Possible answer: The concentration of hydronium ions is inversely related to pH. As the concentration of hydronium ions increases, pH decreases and vice versa.
2. A and D: acid; B and E: base; C and F: neutral
3. Students should explain how their chart helped them learn about acids and bases. They should then write a question from their chart and answer it.