Section 2–4 Chemical Reactions and Enzymes (pages 49–53)

This section describes what happens to chemical bonds during chemical reactions. It also explains how energy changes affect chemical reactions and describes the importance of enzymes.

Chemical Reactions (page 49)
1. What is a chemical reaction? ________________________________

2. Complete the table about chemicals in a chemical reaction.

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactants</td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td></td>
</tr>
</tbody>
</table>

3. Chemical reactions always involve changes in chemical ________________.

Energy in Reactions (page 50)
4. What is released or absorbed whenever chemical bonds form or are broken? ________________

5. What do chemical reactions that absorb energy need to occur? ________________

6. Chemists call the energy needed to get a reaction started the ________________.

7. Complete the graph of an energy-releasing reaction by adding labels to show the energy of the reactants, the energy of the products, and the activation energy.
Enzymes (pages 51–52)

8. What is a catalyst? A catalyst is a substance that speeds up the rate of a chemical reaction.

9. Proteins that act as biological catalysts are called enzymes.

10. What do enzymes do? Enzymes speed up chemical reactions that take place in cells.

11. From what is part of an enzyme’s name usually derived? It is derived from the reaction it catalyzes.

Enzyme Action (pages 52–53)

12. The reactants of enzyme-catalyzed reactions are known as substrates.

13. Why are the active site and the substrates in an enzyme-catalyzed reaction often compared to a lock and key? The active site and the substrates have complementary shapes, and the fit is very precise.

14. The binding together of an enzyme and a substrate forms a(an) enzyme-substrate complex.

15. How do most cells regulate the activity of enzymes? Most cells contain proteins that help turn key enzymes “on” or “off” at critical stages in the life of the cell.
WordWise

Answer the questions by writing the correct vocabulary term in the blanks. Use the circled letter(s) in each term to find the hidden vocabulary word. Then, write a definition for the hidden word.

<table>
<thead>
<tr>
<th>Clues</th>
<th>Vocabulary Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is a negatively charged subatomic particle?</td>
<td>_ _ _ _ O _ _ _ _</td>
</tr>
<tr>
<td>What is the basic unit of matter?</td>
<td>_ _ O _</td>
</tr>
<tr>
<td>What is a large compound formed from combinations of many monomers?</td>
<td>_ _ _ _ _ O _ _</td>
</tr>
<tr>
<td>What is an organic compound called that is used to store energy and forms important parts of biological membranes?</td>
<td>_ _ _ O _ _ _ _</td>
</tr>
<tr>
<td>What is an element or compound called that is produced by a chemical reaction?</td>
<td>_ _ O _ _ _ _ _</td>
</tr>
<tr>
<td>What is the type of mixture whose components are evenly distributed throughout?</td>
<td>_ _ _ _ O _ _ _ _</td>
</tr>
<tr>
<td>What is an atom called that has a positive or negative charge as a result of gaining or losing electrons?</td>
<td>_ _ O _</td>
</tr>
<tr>
<td>What is a monomer of nucleic acids called?</td>
<td>_ _ _ _ _ _ _ _ _ O _ _</td>
</tr>
</tbody>
</table>

Hidden Word: _ _ _ _ _ _ _ _

Definition: A substance formed by the chemical combination of two or more elements in definite proportions.