02 Basic Chemistry

CHAPTER LESSON PLANS & OBJECTIVES

Lesson 2.1: General Chemical Principles, Part I: Matter, Elements, Atoms, Bonds, and Ions

1. Define the terms *matter, element*, and *atom*, and do the following:
    a. List the four elements that comprise 96% of body weight.
    b. Describe the three components of an atom.
    c. Describe the role of electrons in the formation of chemical bonds.
2. Differentiate among ionic, covalent, and hydrogen bonds.
3. Explain ions, including the differences among electrolytes, cations, and anions.

Lesson 2.2: General Chemical Principles, Part II: Molecules, Compounds, Chemical Reactions, Energy, and Other Chemical Terms

4. Explain the difference between a molecule and a compound, and list five reasons why water is essential to life.
5. Explain the role of catalysts and enzymes.
6. Differentiate between an acid and a base, and define pH.
7. List the six forms of energy and describe the role of adenosine triphosphate (ATP) in energy transfer.
8. Differentiate between a mixture, solution, suspension, colloidal suspension, and a precipitate.

CHAPTER TEACHING FOCUS

- In this chapter, students will have the opportunity to learn the four elements that comprise 96% of body weight.
- Students will be introduced to the three components of an atom and the role of electrons in the formation of chemical bonds.
- Students will also have the opportunity to explain the differences among electrolytes, ions, cations, and anions.
- They will be introduced to the difference between a molecule and a compound and will list five reasons why water is essential to life.
- Students will have the opportunity to define energy and describe the role of adenosine triphosphate (ATP) in energy transfer. They will also explain the role of catalysts and enzymes, differentiate between an acid and a base, and define pH.
- Students will also have the opportunity to differentiate among mixtures, solutions, suspensions, and colloidal suspensions.

CHAPTER PRETEST

Have the students answer these questions prior to covering this chapter to understand where they stand in relation to the content.

1) Chemistry is the study of _____.
   a) chemicals
   b) biological functions
   c) matter
   d) chemical reactions

2) An element is composed of atoms that:
   a) have the same number of positive charges in their nuclei.
   b) have a greater number of positive than negative charges in their nuclei.
   c) have a lesser number of positive than negative charges in their nuclei.
   d) have no positive charges in their nuclei.

3) Which of the following element groups make up 96% of the body's weight?
   a) oxygen, carbon, hydrogen, and nitrogen
   b) oxygen, carbon, calcium, and sodium
   c) oxygen, carbon, hydrogen, and sodium
   d) oxygen, nitrogen, potassium, and iron

4) Which three subatomic structures comprise an atom?
   a) protons, electrons, and matter
   b) protons, neutrons, and electrons
   c) ions, neutrons, and electrons
   d) protons, ions, and the nucleus

5) Which of the following statements are true?
   a) Cations are negatively charged ions, and anions are positively charged ions.
   b) The transfer of electrons is responsible for the formation of ions (cations and anions).
   c) The atomic number refers to the number of electrons within the atom.
   d) Chemical bonds are formed when chemical compounds bond with each other.

6) What causes an ionic bond?
   a) the transfer of energy from one nucleus to another nucleus
   b) polarity
   c) the transfer of electrons between atoms
   d) the sharing of electrons by the outer shells of the atoms

7) Which of the following atoms always forms covalent bonds?
   a) carbon
   b) oxygen
   c) nitrogen
   d) carbohydrate

8) When two or more atoms bond, they form a(n) _____.
   a) ion
   b) electrolyte
   c) neutron
   d) molecule

9) Which of the following substances is most abundant in the human body?
   a) oxygen
   b) water
   c) sodium
   d) carbon dioxide

10) Which of the following would be considered a base substance?
   a) lemon juice
   b) household ammonia
   c) stomach contents
   d) black coffee

CHAPTER PRETEST ANSWERS

1) c
Chemistry is the study of matter.
p. 15

2) a
An element is matter that is composed of atoms that have the same number of positive charges in their nuclei.
p. 16

3) a
Four elements—carbon, hydrogen, oxygen, and nitrogen—make up 96% of the body weight.
p. 16

4) b
An atom is composed of three subatomic particles: protons, neutrons, and electrons.
p. 16

5) b
The transfer of electrons is responsible for the formation of ions (cations and anions).
p. 18

6) c
An ionic bond is caused by a transfer of electrons between atoms.
p. 18

7) a
Carbon atoms always form covalent bonds.
p. 18

8) d
When two or more atoms bond, they form a molecule.
p. 21

9) b
Water is the most abundant compound in the body.
p. 21

10) b
A **base** has a bitter taste and is slippery like soap. Bases are substances that combine with H^+. Bases often contain the hydroxyl ion (OH^-), such as sodium hydroxide (NaOH).
p. 23

Classroom Preparation

Lesson 2.1: General Chemical Principles, Part I: Matter, Elements, Atoms, Bonds, and Ions

INSTRUCTOR PREPARATION

Textbook Objectives Covered

1. Define the terms *matter, element*, and *atom*, and do the following
    a. List the four elements that comprise 96% of body weight.
    b. Describe the three components of an atom.
    c. Describe the role of electrons in the formation of chemical bonds.
2. Differentiate among ionic, covalent, and hydrogen bonds.
3. Explain ions, including the differences among electrolytes, cations, and anions.

Lesson Preparation Checklist

- Prepare lecture from TEACH lecture slides available on Evolve.
- Assemble materials and supplies needed for each lesson as indicated below.

Materials and Supplies

- beans, beads, or self-stick dots of various colors
- computer
- projector

Classroom Preparation

Lesson 2.1: General Chemical Principles, Part I: Matter, Elements, Atoms, Bonds, and Ions

STUDENT PREPARATION (2 hrs)

1

READ – Textbook (pp. 15-18)

ANSWER – Textbook

- Re-Think (pp. 16, 18)
- Review Your Knowledge
  - Matching: Atoms and Elements, questions 1-5 (p. 28)
  - Matching: Structure of the Atom, questions 1-5 (p. 28)
  - Multiple Choice, questions 2, 7 (p. 28)

REVIEW – Textbook

- Go Figure, question 1 (p. 28)

ANSWER – Study Guide

- Part I: Mastering the Basics
  - Matching: Matter, Elements, and Atoms, questions 1-16 (p. 7)
  - Matching: The Atom, questions 1-15 (pp. 7-8)
  - Similars and Dissimilars, questions 1, 2 (p. 10)
- Part II: Putting it All Together
  - Multiple Choice, question 16-18 (p. 12)
  - Puzzle, question 3, 12 (p. 12)

REVIEW – Evolve Student Resources

- Audio Glossary
- Interactive Activity: Word Builder
- Practice Chapter Exam, questions 1-3
  - Online Course – Anatomy and Physiology Online
    - Module 2: Basic Chemistry
      - Lesson 1: Basic Concepts of Chemistry

2

READ – Textbook (pp. 18-20)

- Re-Think (p. 20)

REVIEW – Textbook

- Go Figure, question 2, 3 (p. 28)

ANSWER – Study Guide

- Part I: Mastering the Basics
  - Matching: Bonds, questions 1-7 (p. 8)
  - Similars and Dissimilars, question 3 (p. 10)
- Part II: Putting It All Together
  - Multiple Choice, question 7 (p. 11)
  - Puzzle, questions 1, 7 (p. 12)

REVIEW – Evolve Student Resources

- Practice Chapter Exam, questions 4, 5
- Online Course – Anatomy and Physiology Online
  - Module 2: Basic Chemistry
    - Lesson 1: Basic Concepts of Chemistry

3	**READ – Textbook (p. 20)**
	
	ANSWER – Textbook
	• Re-Think (p. 20)
	• Review Your Knowledge
	  ○ Matching: Ions and Electrolytes, questions 1-5 (p. 28)
	  ○ Multiple Choice, questions 1, 3, 6 (p. 28)
	
	REVIEW – Textbook
	• Go Figure, question 4 (p. 28)
	
	ANSWER – Study Guide
	• Part I: Mastering the Basics
	  ○ Matching: Cations, Anions, and Electrolytes, questions 1-11 (p. 8)
	  ○ Similars and Dissimilars, question 4 (p. 10)
	• Putting It All Together
	  ○ Multiple Choice, questions 4-6, 12 (p. 11)
	  ○ Puzzle, questions 11, 13 (p. 12)
	
	REVIEW – Evolve Student Resources
	• Practice Chapter Exam, questions 6- 8

50-Minute Lesson Plan

Lesson 2.1: General Chemical Principles, Part I: Matter, Elements, Atoms, Bonds, and Ions

LECTURE OUTLINE (15 min)	
1	**MATTER, ELEMENTS, AND ATOMS (SLIDES 3-12) (pp. 15-18)** • Define matter, elements, and atoms. • Discuss the three states of matter, and give examples. • Explain the relationship of matter, elements, and atoms. • Discuss the four main elements of the human body weight, and using Table 2.1, have the students identify the symbols for these elements. • Discuss subatomic particles (protons, neutrons, electrons) and their arrangement in relationship to the nucleus. • Identify the difference between atomic number, atomic mass, and isoptopes.
2	**CHEMICAL BONDS (SLIDES 13-16) (pp. 18-20)** • Define chemical bonds and identify three types of chemical bonds (covalent, hydrogen, ionic) • Discuss the cause of an ionic bond. Use the chlorine and sodium atoms in the diagram of NaCl as an example of an ionic bond. • Discuss the relation of carbon and covalent bonds. • Using the figure on slide 16, have students find the two H atoms and the single O atom; explain how the weak attraction between water molecules illustrates a hydrogen bond.
3	**IONS (SLIDES 17-21) (p. 20)** • Define and identify ions. • Explain the charges of cations and anions. • Review common ions, including extracellular and intracellular cations. • Explain the relationship between electrolytes and ionization. • Using the example of table salt in water, explain how ionization works. • Have the students sketch a similar diagram of the ionization of saline solution for potassium chloride.

LEARNING ACTIVITIES (choose one or more to equal 35 min)	
1	**REVIEW (15 min)** • Working in pairs and referring to Figure 2.1, students will provide a second example to illustrate the difference between physical and chemical change. • Have students work in pairs to draw an atom and label its structure. • Project several diagrams of atoms, and ask students to point out the electrons in the outer shell that would be involved in chemical bonding.

2
3
	DEMONSTRATE (15 min)
	• Using beans, beads, or self-stick dots of various colors, students will illustrate each of the following:
	  ○ Hydrogen atom, lithium atom, oxygen atom, chlorine atom
	  ○ "Heavy hydrogen"
	  ○ Ionic bond of lithium chloride
	  ○ Covalent bond of water
	• Covalent bonds in the molecules of hydrogen and oxygen
	• Discuss Figure 2.4, showing the ionization of NaCl (salt), and ask students to sketch their own diagrams illustrating the ionization of KCl (potassium chloride).
	• Using colored beans, beads, or self-stick dots, students will show the sodium ion, the chloride ion, and the water molecule.

1	**PRACTICE (15 min)** • Play a matching game in pairs. Student A lists the elements from Table 2.1 in random order, and student B lists the symbols in random order. Each pair matches up symbols and elements as quickly as possible. Recognize the quickest pair.
2 **3**	**POST & COMMENT (10 min)** • Post the Critical Thinking Question for this lesson on the Evolve discussion board. Students should post their answers and conduct an online discussion in comments.
2 **3**	**DISCUSS (10 min)** • Conduct a class discussion on the Critical Thinking Question for this lesson. • Divide students into two groups. Assign one group to discuss the roles of the cation of calcium in fluid balance and the other group to discuss the cation of potassium in the electrical activity of nerves and muscles. Ask a volunteer from each group to present their topic to the class.

CRITICAL THINKING QUESTION

Covalent bonds are strong and do not break apart in water. Why is this important to the function of the circulatory system?

Discussion Guidelines: Students may discuss the fact that proteins are transported throughout the body by blood. Because blood is mostly water, the proteins would break apart if the covalent bonds were not strong enough to stay together in water. Therefore, important hormones would be unable to reach their destinations and perform important tasks in the proper functioning of the body.

Classroom Preparation

Lesson 2.2: General Chemical Principles, Part II: Molecules, Compounds, Chemical Reactions, Energy, and Other Chemical Terms

INSTRUCTOR PREPARATION

Textbook Objectives Covered

4. Explain the difference between a molecule and a compound, and list five reasons why water is essential to life.
5. Explain the role of catalysts and enzymes.
6. Differentiate between an acid and a base, and define pH.
7. List the six forms of energy and describe the role of adenosine triphosphate (ATP) in energy transfer.
8. Differentiate between a mixture, solution, suspension, colloidal suspension, and a precipitate.

Lesson Preparation Checklist

- Prepare lecture from TEACH lecture slides available on Evolve.
- Print the situations outlined in the class activity for objective 5 on index cards.
- Assemble materials and supplies needed for each lesson as indicated below.

Materials and Supplies

- computer
- clay, beads, beans of self-stick dotes in three colors
- projector
- red and blue crayons
- rice
- sand, salt, or sugar
- water and rice

Classroom Preparation

Lesson 2.2: General Chemical Principles, Part II: Molecules, Compounds, Chemical Reactions, Energy, and Other Chemical Terms

STUDENT PREPARATION (2 hrs)

4	**READ – Textbook (pp. 21-22)**
	
	ANSWER – Textbook
	• Re-Think (p. 21)
	• Review Your Knowledge
	  • Multiple Choice, question 4 (p. 28)
	
	REVIEW – Textbook
	• Go Figure, question 5 (p. 29)
	
	ANSWER – Study Guide
	• Part I: Mastering the Basics
	  • Matching: Molecules and Compounds, questions 1-11 (pp. 8-9)
	  • Similars and Dissimilars, question 7 (p. 10)
	• Part II: Putting It All Together
	  • Multiple Choice, questions 10 (p. 11)
	
	REVIEW – Evolve Student Resources
	• Interactive Activity: Multiple Choice, questions 3, 4
	• Online Course – Anatomy and Physiology Online
	  • Module 2: Basic Chemistry
	  • Lesson 1: Basic Concepts of Chemistry

5	**READ – Textbook (p. 22)**
	
	ANSWER – Study Guide
	• Part II: Putting It All Together
	  • Multiple Choice, question 8 (p. 11)
	  • Puzzle, questions 4-6 (p. 12)
	
	REVIEW – Evolve Student Resources
	• Practice Chapter Exam, questions 9-4, 9-6
	• Online Course – Anatomy and Physiology Online
	  • Module 2: Basic Chemistry
	  • Lesson 1: Basic Concepts of Chemistry

6	**READ – Textbook (pp. 22-24)**
	
	REVIEW – Textbook
	• Go Figure, question 6 (p. 29)
	
	ANSWER – Textbook
	• Re-Think (pp. 23, 24)
	• Review Your Knowledge
	  • Matching: Acids and Bases, questions 1-5 (p. 28)
	  • Multiple Choice, question 8 (p. 28)

	ANSWER – Study Guide
	• Part I: Mastering the Basics
	  • Matching: Acids and Bases, questions 1-13 (p. 9)
	  • Read the Diagram, pH Scale, questions 1-10 (p. 9)
	  • Similars and Dissimilars, questions 5, 6 (p. 10)
	• Part II: Putting It All Together
	  • Multiple Choice, questions 2, 9, 11, 13, 14 (p. 11)
	  • Puzzle, questions 1, 2, 4-6 (pp. 12)
	REVIEW – Evolve Student Resources
	• Practice Exam, questions 9-1-9-3, 9-5, 9-7, 9-8, 10, 11, 12
	• Interactive Activity: Multiple Choice, question 2

7	**READ – Textbook (pp. 24-25)**
	ANSWER – Textbook
	• Re-Think (p. 25)
	• Review Your Knowledge
	  • Multiple Choice, question 5 (p. 28)
	REVIEW – Textbook
	• Go Figure, question 7 (p. 29)
	ANSWER – Study Guide
	• Part I: Mastering the Basics
	  • Matching: Energy, questions 1-10 (pp. 9-10)
	  • Similars and Dissimilars, question 8 (p. 10)
	• Part II: Putting It All Together
	  • Multiple Choice, questions 1, 3 (p. 11)
	  • Puzzle, question 9 (p. 12)
	REVIEW – Evolve Student Resources
	• Practice Chapter Exam, questions 13-15
	• Online Course – Anatomy and Physiology Online
	• Module 2: Basic Chemistry
	  • Lesson 1: Basic Concepts of Chemistry
	  • Self-Assessment Quiz: Basic Concepts of Biochemistry

8	**READ – Textbook (pp. 25-28)**
	ANSWER – Textbook
	• Re-Think (p. 27)
	ANSWER – Study Guide
	• Part I: Mastering the Basics
	  • Matching: Mixtures, Solutions, Suspensions, and Precipitates, questions 1-12 (p. 10)
	  • Similars and Dissimilars, question 9 (p. 10)
	• Part II: Putting it All Together
	  • Multiple Choice, question 15 (p. 11)
	  • Body Toon (p. 12)
	  • Puzzle, questions 8, 10 (p. 12)
	REVIEW – Evolve Student Resources
	• Interactive Activity: Multiple Choice, question 1
	• Practice Chapter Exam, questions 16-20
	• Terminology Flashcards
	• Classroom Activities:

	• Bingo • Sorting • Word Puzzle • Topic-by-Topic • Online Course – Anatomy and Physiology Online • Module 2: Basic Chemistry • Basic Chemistry: Quick Wrap-Up • Basic Chemistry Module Exam

50-Minute Lesson Plan

Lesson 2.2: General Chemical Principles, Part II: Molecules, Compounds, Chemical Reactions, Energy, and Other Chemical Terms

LECTURE OUTLINE (15 min)	
4	**MOLECULES AND COMPOUNDS: SLIDES 23-25 (pp. 21-22)** • Differentiate between molecules and compounds. • Ask students why water is both a molecule and a compound. • Discuss the vitality of water as a substance. • Ask students why water is called the universal solvent, and why it is important in regulating body temperature. • Explain why oxygen and carbon dioxide are important compounds and molecules.
5	**CHEMICAL REACTIONS: CATALYSTS AND ENZYMES: SLIDE 26 (p. 22)** • Define chemical reaction. • Define catalysts and enzymes and explain how they are related to a chemical reaction. • Ask student why the rate of a chemical reaction is important.
6	**ACIDS, BASES, AND pH: SLIDES 27-29 (pp. 22-24)** • Explain the difference between an acid and a base. • Ask students why it is important to have an acid-base balance. • Use the example of ketoacidosis in a person with uncontrolled diabetes as an acid-base problem. • Explain how pH is related to acids and bases. • Explain how the pH scale works, how it can help identify acidic or basic; discuss acidosis and alkalosis. • Ask students if the pH of intestinal contents is acidic or basic.
7	**ENERGY: SLIDES: 30-34 (pp. 24-25)** • Define energy and discuss the six forms (mechanical, chemical, electrical, radiant, thermal, nuclear) • Discuss energy transfer and the three parts of ATP (base, sugar, three phosphate groups) • Ask the students if they can identify sources of energy.
8	**MIXTURES, SOLUTIONS, SUSPENSIONS, COLLOIDAL SUSPENSIONS, AND PRECIPITATES: SLIDES 35-37 (pp. 25-28)** • Discuss the difference between mixtures, solutions, suspensions, colloidal suspensions, and precipitates. • Ask students what happens to the original substances' properties when mixtures are separated. • Differentiate between a solute and solvent, and discuss the two types of solutions (aqueous and tinctures). • Ask students to name solutions commonly used around the house. • Ask for examples of a suspension. • Ask students how blood plasma is considered a colloidal suspension. • Ask students what can happen if drugs given together for a precipitate.

LEARNING ACTIVITIES (choose one or more to equal 35 min)	
6	**REVIEW (10 min)** • Discuss Figure 2.6, and note the colors that the pH scale uses for acids (increasingly red) and bases (increasingly blue). These colors are also used in litmus paper.

6	**ANALYZE (10 min)**
	• cards, adding any additional situations desired. Give each small group of students an equal number of the cards. Have the group color each card blue (basic) or pink (acidic) according to the pH. Have each group present its cards to the class and provide rationale for the color chosen.
	  ○ A patient has a blood pH of 7.2.
	  ○ A diabetic patient is admitted in ketoacidosis.
	  ○ Hydrochloric acid
	  ○ Vinegar
	  ○ Water
	  ○ Neutralization of an acid by a base
	  ○ Normal blood pH
	  ○ A patient is hyperventilating with a blood pH of 7.5.
	• An older patient with a history of emphysema is admitted in respiratory acidosis.

7 **8**	**DEMONSTRATE (15 min)** • Break up the class into pairs. Give each pair clay, beads, beans, or self-stick notes in three colors to represent oxygen, hydrogen, and carbon. Have the pairs create models of oxygen, hydrogen, water, and carbon dioxide. • Have students work in small groups to create analogies for the role of catalysts and enzymes in a chemical reaction. • Have students refer to Figure 2.7 and tell a story comparing the loaded mousetrap with the meal (i.e., sandwich, milk, and apple). Have a second storyteller tell a story comparing the “sprung” mousetrap with the jogger. • Mix salt or sugar with rice. Strain the mixture, separating the rice from the salt or sugar. Using water, salt (or sugar), and sand, have the students mix a solution and a suspension, explaining the difference between the two.
6 **7**	**POST & COMMENT (10 min)** • Post the Critical Thinking Question for this lesson on the Evolve discussion board. Students should post their answers and conduct an online discussion in comments. • Students should create a post on the Evolve discussion board discussing both everyday and physiological examples of mechanical, chemical, electrical, radiant, and thermal energy. Students should evaluate each other's posts and offer critical feedback in comments.

6	**DISCUSS (10 min)**
	• Divide the class into small groups, or as a class discuss the following topics:
	  ○ Discuss why acids and bases are required for chemical reactions that take place within the body.
	  ○ Discuss how imbalances between acids and bases can cause life-threatening clinical situations, such as ketoacidosis in an uncontrolled diabetic.
	  ○ Explain how the concepts of acid and bases illustrate why giving a patient with gastric hyperacidity an antacid will decrease the acidity in the stomach.

CRITICAL THINKING QUESTION

Why is it important for health care professionals to understand the chemistry of acids and bases?

Discussion Guidelines: Students might discuss the fact that understanding the chemistry of acids and bases will help them understand the necessary balance of these substances in human physiology. Chemical reactions in the human body are necessary to sustain life, and chemical reactions occur only when acids and bases are balanced. The patient's blood pH must be monitored closely during illness to avoid serious clinical problems, help maintain a normal blood pH, and help body enzymes work efficiently.

Assessments

Chapter 2: Basic Chemistry

ASSESSMENTS BY OBJECTIVE

1	**Study Guide**
	• **Part I: Mastering the Basics**
	  ○ Matching: Matter, Elements, and Atoms, questions 1-16 (p. 7)
	  ○ Matching: The Atom, questions 1-15 (pp. 7-8)
	  ○ Similars and Dissimilars, questions 1, 2 (p. 10)
	  ○ Puzzle, questions 3, 12 (p. 12)
	Evolve Instructor Resources
	• Test Bank, questions 1, 24, 32-34, 42, 47-49, 51, 62, 63, 66
	• Instructor's Chapter Exam:
	  ○ Matching A, questions 1-4
	  ○ Matching B, questions 1-5, 7
	  ○ Multiple Choice, questions 2, 7-9, 11
	Evolve Student Resources
	• Practice Chapter Exam, questions 1-3

2	**Study Guide**
	• Part I: Mastering the Basics
	  ○ Matching: Bonds, questions 1-7 (p. 8)
	  ○ Similars and Dissimilars, question 3 (p. 10)
	• Part II: Putting It All Together
	  ○ Multiple Choice, question 7 (p. 11)
	  ○ Puzzle, questions 1, 7 (p. 12)
	Evolve Instructor Resources
	• Test Bank: Multiple Choice, questions 3, 4, 52
	• Instructor's Chapter Exam: Multiple Choice, question 12
	Evolve Student Resources
	• Practice Chapter Exam, questions 4, 5

3	**Study Guide**
	• Part I: Mastering the Basics
	  ○ Matching: Cations, Anions, and Electrolytes, questions 1-11 (p. 8)
	  ○ Similars and Dissimilars, question 4 (p. 10)
	• Part II: Putting It All Together
	  ○ Multiple Choice, questions 4-6, 12 (p. 11)
	  ○ Puzzle, questions 11, 13 (p. 12)
	Evolve Instructor Resources
	• Test Bank: Multiple Choice, questions 5-13, 20, 21, 25, 40, 41, 43, 44, 53, 61, 64, 69
	• Instructor's Chapter Exam:
	  ○ Matching A, question 5
	  ○ Matching B, question 6
	  ○ Matching C, questions 2-5
	  ○ Multiple Choice, questions 1, 3, 4, 13
	Evolve Student Resources
	• Practice Chapter Exam, questions 6-8

4	**Study Guide**
	• Part I: Mastering the Basics
	  ▪ Matching: Molecules and Compounds, questions 1-11 (pp. 8-9)
	  ▪ Similars and Dissimilars, question 7 (p. 10)
	• Part II: Putting It All Together
	  ○ Multiple Choice, questions 10 (p. 11)
	Evolve Instructor Resources

	• Test Bank: Multiple Choice, questions 14, 16, 22, 26, 46, 67
	• Instructor's Chapter Exam:
	  ○ Matching C, question 1
	  ○ Multiple Choice, questions 5, 6, 14, 15
	Evolve Student Resources
	• Interactive Activity: Multiple Choice, questions 3, 4

5	**Study Guide**
	• Part II: Putting It All Together
	  ○ Multiple Choice, question 8 (p. 11)
	  ○ Puzzle, questions 4-6 (p. 12)
	Evolve Instructor Resources
	• Test Bank: Multiple Choice, questions 17, 19, 54, 55
	• Instructor's Chapter Exam:
	  ○ Matching A, question 6
	  ○ Matching C, questions 6, 7
	  ○ Matching D, questions 1-6
	  ○ Multiple Choice, questions 16-19
	Evolve Student Resources
	• Practice Chapter Exam, questions 9-4, 9-6

6	**Study Guide**
	• Part I: Mastering the Basics
	  • Matching: Acids and Bases, questions 1-13 (p. 9)
	  • Read the Diagram, pH Scale, questions 1-10 (p. 9)
	  • Similars and Dissimilars, questions 5, 6 (p. 10)
	• Part II: Putting It All Together
	  • Multiple Choice, questions 2, 9, 11, 13, 14 (p. 11)
	  • Puzzle, questions 1, 2, 4-6 (pp. 12)
	Evolve Instructor Resources
	• Test Bank: Multiple Choice, questions 2, 15, 23, 27-31, 39, 45, 56-59, 65, 70
	• Instructor's Chapter Exam: Multiple Choice, question 10
	Evolve Student Resources
	• Practice Chapter Exam, questions 9-1-9-3, 9-5, 9-7, 9-8, 10, 11, 12
	• Interactive Activity: Multiple Choice, question 2

7	**Study Guide**
	• Part I: Mastering the Basics
	  ○ Matching: Energy, questions 1-10 (pp. 9-10)
	  ○ Similars and Dissimilars, question 8 (p. 10)
	• Part II: Putting It All Together
	  ○ Multiple Choice, questions 1, 3 (p. 11)
	  ○ Puzzle, question 9 (p. 12)
	Evolve Instructor Resources
	  ○ Test Bank: Multiple Choice, questions 18, 35, 50
	Evolve Student Resources
	  ○ Practice Chapter Exam, questions 13-15

8	**Study Guide**
	• Part I: Mastering the Basics
	• Matching: Mixtures, Solutions, Suspensions, and Precipitates, questions 1-12 (p. 10)
	• Similars and Dissimilars, question 9 (p. 10)
	  ○ Part II: Putting it All Together
	  ○ Multiple Choice, question 15 (p. 11)
	  ○ Body Toon (p. 12)
	  ○ Puzzle, questions 8, 10 (p. 12)
	Evolve Instructor Resources
	  ○ Test Bank: Multiple Choice, questions 36-38, 60, 68

	○ Instructor's Chapter Exam: Multiple Choice, question 20 **Evolve Student Resources** ○ Interactive Activity: Multiple Choice, question 1 ○ Practice Chapter Exam, questions 16-20