

General, Organic, & Biological, 4e

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Detailed List of New Features

New Problem-Solving Approach

Sample Problems lead students through the thought process tied to successful problem solving by employing Analysis and Solution parts. Sample Problems are categorized sequentially by topic to match chapter organization, with a title so students know what they should be learning from each Sample Problem. Sample Problems are now paired with Practice Problems to allow students to apply what they have just learned. The Practice Problems are followed by More Practice lists to point students to end-of-chapter Problems that are similar in concept.

New Photos

Roughly one-half of the chapter-opening photos have been replaced with photos emphasizing relevant material within the chapter. More marginal photos of applications have also been added.

New Art

The colors in artwork throughout the text were revised for emphasis, clarity, and consistency. Many chemical structures in Chapters 11 through 24 were updated for a cleaner appearance to help student understanding.

New Problems

Over 180 new problems have been added, many of which incorporate molecular art or photographs.

Chapter by Chapter Changes

CHAPTER ONE Matter and Measurement

- Two new Sample Problems were added: Sample Problem 1.2 (Translating a Measurement into a Metric Unit) and Sample Problem 1.10, which uses an environmental example to solve a problem with a conversion factor.

CHAPTER TWO Atoms and the Periodic Table

- New Sample Problem 2.2 uses a more complex ball-and-stick model to illustrate structure, and new Sample Problem 2.17 uses molecular art to predict periodic trends.

CHAPTER THREE Ionic Compounds

- A revised Section 3.1 includes images to visually show the difference between ionic and covalent bonding.

- New material was added to Section 3.2 on the relative size of anions, cations, and atoms.
- A new Sample Problem 3.12 on deriving a formula for a compound with a polyatomic ion was also added.

CHAPTER FOUR Covalent Compounds

- Each of the chapter's Sample Problems on drawing Lewis structures was revised to emphasize how electrons are counted. All dashed bonds were updated to dashed wedges.

CHAPTER FIVE Chemical Reactions

- To assist understanding with number calculations, more molecular art was added as a visual aid within the body of the text, in the How To's, and in the Sample Problems.

CHAPTER SIX Energy Changes, Reaction Rates, and Equilibrium

- Molecular art has been added to visually aid students in their understanding of difficult concepts. Figure 6.6 shows what an equilibrium constant means in molecular art. Figure 6.7 shows Le Châtelier's principle in molecular art, so that students can better understand what species increase and decrease in concentration.
- New Sample Problem 6.10 relates the equilibrium constant through counting molecules in molecular art.
- New Sample Problem 6.14 uses molecular art to show how temperature affects the amount of product.

CHAPTER SEVEN Gases, Liquids, and Solids

- Ball-and-stick models have been added to Section 7.7, including a new problem that uses models.

CHAPTER EIGHT Solutions

- More molecular art and a new Sample Problem 8.17 appear in Sections 8.8 and 8.9 on colligative properties and osmotic pressure.

CHAPTER NINE Acids and Bases

- New molecular art has also been added to several sections and problems: Section 9.1A and 9.1B to help visualize acid–base reactions; Section 9.5 to show how two molecules of water react; and Section 9.11 on buffers in the blood.
- New Sample Problem 9.7 uses molecular art to visualize acid strength.

CHAPTER TEN Nuclear Chemistry

- Two new Sample Problems were added: Sample Problem 10.4 on half-lives and Sample Problem 10.8 on nuclear fusion.
- There is also new material in Section 10.4B on smoking and radioisotopes in the lungs.

CHAPTER ELEVEN Introduction to Organic Molecules and Functional Groups

- This chapter has been revised to increase early familiarity with skeletal structures. Section 11.4 has been expanded, with more material on skeletal structures, including using them with acyclic molecules. A How To on interpreting skeletal structures in Section 11.4 and Figure 11.4, which interprets skeletal structures in rings, were added to expand the coverage on skeletal structures.

CHAPTER TWELVE Alkanes

- This chapter has also been revised to increase familiarity with skeletal structures. Material added on skeletal structures includes a new Figure 12.1 on identifying alkyl groups in skeletal structures and a new Sample Problem 12.5 on naming a skeletal structure.
- The information on CO₂ concentration in the atmosphere has also been updated in Section 12.8 and Figure 12.4.

CHAPTER THIRTEEN Unsaturated Hydrocarbons

- New sample problems were added: Sample Problem 13.6 on stereoisomers versus constitutional isomers and Sample Problem 13.9 on hydration of alkenes. To again increase familiarity with skeletal structures, a new Sample Problem 13.3 on naming a skeletal structure was included, and skeletal structures were added to Table 13.1.

CHAPTER FIFTEEN The Three-Dimensional Shape of Molecules

- Three new Sample Problems have been added to aid student understanding of the chapter concepts: Sample Problem 15.1 on isomers; Sample Problem 15.3 on finding chirality centers; and Sample Problem 15.4 on drawing an enantiomer and constitutional isomer for compounds with chirality centers on rings.

CHAPTER SIXTEEN Aldehydes and Ketones

- This revised chapter includes a new Sample Problem 16.8 on locating an acetal, hemiacetal, and ether in a cyclic compound and a new example in Section 16.8C on acetal hydrolysis.

CHAPTER SEVENTEEN Carboxylic Acids, Esters, and Amides

- Two new Sample Problems have been added to aid student understanding of the chapter concepts: Sample Problem 17.4 on the solubility of carboxylic acids and carboxylate anions and Sample Problem 17.10 on polymer components.
- The coverage of aspirin solubility in Section 17.7 was also expanded for clarity.

CHAPTER EIGHTEEN Amines and Neurotransmitters

- There is a new Sample Problem 18.6 on solubility.

CHAPTER NINETEEN Lipids

- A new Figure 19.8 on the structure of HDL and LDL particles was added, and more skeletal structures for fatty acids and triacylglycerols are used throughout.

CHAPTER TWENTY Carbohydrates

- This revised chapter includes a new Section 20.5C on human milk oligosaccharides in breast milk and a new Sample Problem 20.4 on locating anomers.

CHAPTER TWENTY-ONE Amino Acids, Proteins, and Enzymes

- Two new Sample Problems were added for better student understanding of peptides—Sample Problem 21.3 and Sample Problem 21.4.

CHAPTER TWENTY-TWO Nucleic Acids and Protein Synthesis

- The revised chapter includes a new Section 22.10D on the Human Genome Project.

CHAPTER TWENTY-THREE Metabolism and Energy Production

- A new Figure 23.6 on the structure of acetyl CoA was added.
- The coverage of the citric acid cycle was expanded with new art in Figure 23.8 and material added in Section 23.5.

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