

Chemistry, 13e

Raymond Chang and Jason Overby

©2019

ISBN: 1260162036

Detailed List of New Features

REVIEW OF CONCEPTS AND FACTS

In previous editions, Review of Facts questions were provided throughout various sections of the book as a way for students to quickly gauge their understanding of a concept just presented. We have now expanded these checks to be a Review of Concepts and Facts provided at the end of most sections in a chapter. Over 170 new questions have been added to the Review of Concepts and Facts boxes ensuring students have ample opportunity to practice and review the major concepts and facts presented in that section. The answers to each of these questions are provided at the end of the chapter.

STUDENT HOT SPOTS

The adaptive reading tool SmartBook® now gives authors a detailed analysis of student performance on various learning objectives and concepts. With this powerful insight into the ideas and concepts students struggle with, we are now able to provide strategically-placed notifications about access to additional learning resources. Identified areas of particularly difficult content are now denoted with a margin note called “Student Hot Spots”. These are intended to direct students to additional learning resources specific to that content. Students now have access to over 1,000 digital learning resources throughout the SmartBook® version of this text. Included in these learning resources are over 200 videos of chemistry faculty solving actual problems or explaining concepts.

In the electronic version of this text, all the learning resources for the Student Hot Spots are readily available.

Further, access to student results has guided the editing of content in many chapters. While many of the changes are subtle, some are more comprehensive. The ability to edit based on real time assessment data from students is the new paradigm for textbook authoring. Undoubtedly this changes how we provide and

enhance learning materials for our students in the future!

LEARNING OBJECTIVES

All chapters now have a comprehensive list of learning objectives provided to help facilitate instructors' assessment of their students. Every learning objective item is tagged by its location in the chapter. Further, each learning objective is written using only appropriate action verbs based on Bloom's taxonomy.

QUESTIONS AND PROBLEMS

The Review Questions and Problems at the end of each chapter have been reorganized so that they fully correlate to a given section. In many cases, the heading for a group of questions was revised to reflect the title of a section. These changes should increase the ease with which students and instructors alike can identify appropriate questions and problems for practice or assignments.

ART PROGRAM AND DESIGN

For this edition, the art program was thoroughly revised to impart a more modern look and enhance visibility. Clear graphics are a vital component of the student learning process and as such, all graphs, periodic tables, and other figures have been updated with a new look and color scheme. In some instances, illustrations have been replaced with scientifically accurate photographs for enhanced chemical context. Many chapter opening photographs have been updated for new insights into various chemical topics and applications.

PROBLEM SOLVING

The development of problem-solving skills has always been a major objective of this text. The two major categories of learning are shown next.

- Worked examples follow a proven step-by-step strategy and solution.
- Problem statement is the reporting of the facts needed to solve the problem based on the question posed.
- Strategy is a carefully thought-out plan or method to serve as an important function of learning.
- Solution is the process of solving a problem given in a stepwise manner.
- Check enables the student to compare and verify with the source information to make sure the answer is reasonable.
- Practice Exercise provides the opportunity to solve a similar problem in order to become proficient in this problem type. The Practice Exercises are available in the Connect electronic homework system. The margin note lists additional similar problems to work in the end-of-chapter problem section.
- End-of-Chapter Problems are organized in various ways. Each section under a topic heading begins with Review Questions followed by Problems. The Additional Problems section provides more problems not organized by section, followed by the problem type Interpreting, Modeling & Estimating.
- Many of the examples and end-of-chapter problems present extra tidbits of knowledge and enable the student to solve a chemical problem that a chemist would solve. The examples and problems show students the real world of chemistry and applications to everyday life situations.

VISUALIZATION

- Graphs and Flow Charts are important in science. In Chemistry, flow charts show the thought process of a concept and graphs present data to comprehend the concept. A significant number of Problems and Review of Concepts & Facts, including many new to this edition, include graphical data.
- Molecular art appears in various formats to serve different needs. Molecular models help to visualize the three-dimensional arrangement of atoms in a molecule. Electrostatic potential maps illustrate the electron density distribution in molecules. Finally, there is the macroscopic to microscopic art helping students understand processes at the molecular level.
- Photos are used to help students become familiar with chemicals and understand how chemical reactions appear in reality.
- Figures of apparatus enable the student to visualize the practical arrangement in a chemistry laboratory.

STUDY AIDS

Setting the Stage

- Each chapter starts with the Chapter Outline and A Look Ahead.
- Chapter Outline enables the student to see at a glance the big picture and focus on the main ideas of the chapter.
- A Look Ahead provides the student with an overview of concepts that will be presented in the chapter.

Tools to Use for Studying

Useful aids for studying are plentiful in Chemistry and should be used constantly to reinforce the comprehension of chemical concepts.

- Marginal Notes are used to provide hints and feedback to enhance the knowledge base for the student.
- Worked Examples along with the accompanying Practice Exercises are very important tools for learning and mastering chemistry. The problem-solving steps guide the student through the critical thinking necessary for succeeding in chemistry. Using sketches helps student understand the inner workings of a problem. Similar problems in the end-of-chapter problems section are listed at the end of the examples, enabling the student to apply new skill to other problems of the same type. Answers to the Practice Exercises are listed at the end of the chapter problems.
- Key Equations are highlighted within the chapter, drawing the student's eye to material that needs to be understood and retained. The key equations are also presented in the chapter summary materials for easy access in review and study.
- Summary of Concepts & Facts provides a quick review of concepts presented and discussed in detail within the chapter.
- Key Words are a list of all important terms to help the student understand the language of chemistry.

Testing Your Knowledge

- Review of Concepts & Facts lets students pause and check to see if they understand the concept

presented and discussed in the section occurred. Answers to the Review of Concepts can be found in the Student Solution Manual.

- End-of-Chapter Problems enable the student to practice critical thinking and problem-solving skills. The problems are broken into various types:
- By chapter section. Starting with Review Questions to test basic conceptual understanding, followed by Problems to test the student's skill in solving problems for that particular section of the chapter.
- Additional Problems uses knowledge gained from the various sections and/or previous chapters to solve the problem.
- Interpreting, Modeling & Estimating problems teach students the art of formulating models and estimating ballpark answers based on appropriate assumptions.

REAL-LIFE RELEVANCE

- Interesting examples of how chemistry applies to life are used throughout the text. Analogies are used where appropriate to help foster understanding of abstract chemical concepts.
- End-of-Chapter Problems pose many relevant questions for the student to solve. Examples include Why do swimming coaches sometimes place a drop of alcohol in a swimmer's ear to draw out water? How does one estimate the pressure in a carbonated soft drink bottle before removing the cap?
- Chemistry in Action boxes appear in every chapter on a variety of topics, each with its own story of how chemistry can affect a part of life. The student can learn about the science of scuba diving and nuclear medicine, among many other interesting cases.
- Chemical Mystery poses a mystery case to the student. A series of chemical questions provide clues as to how the mystery could possibly be solved. Chemical Mystery will foster a high level of critical thinking using the basic problem-solving steps built up throughout the text.

Chapter by Chapter Changes

In addition to the more than 170 new Review of Concepts & Facts questions that have been added throughout the chapters, following are just a few of the highlights of the 13th edition content revision.

Chapter 1: A revised discussion of the difference between intensive and extensive properties is provided; Table 1.3 has been expanded to include the common prefix peta-; A more detailed discussion of accuracy and precision has been included.

Chapter 3: The language concerning limiting reactants versus limiting reagents has been made consistent.

Chapter 7: A new worked example concerning quantum numbers has been included.

Chapters 2, 7, 8, 19, and 23: Figures and tables throughout have been updated to reflect the newest additions to the periodic table.

Find Your Rep at mhhe.com/rep



Because learning changes everything.™