Houghton Mifflin Harcourt

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Modern Chemistry

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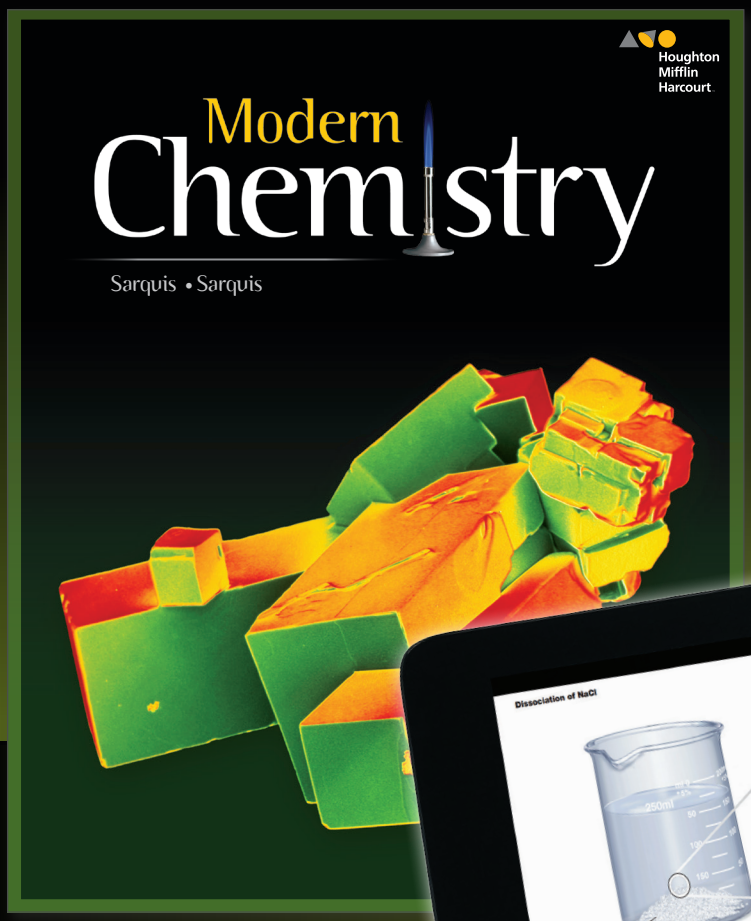
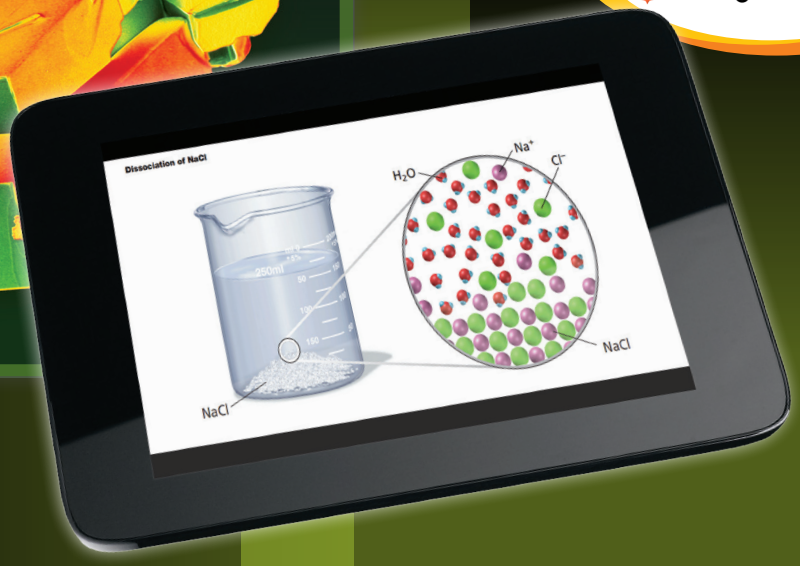




Featuring content from THING EXPLAINER and Google Expeditions

Houghton Mifflin Harcourt

Modern Chemistry®

Less paper, more **convenience**

Everything you need—now in one convenient online location!

The Interactive Online Edition gives students and teachers 24/7 point-of-use access to all program components.

Dashboard

Classrooms using ***Modern Chemistry*** **© 2017** will now have the benefit of the **improved** online interface provided by the HMH Dashboard. This also includes *my*SmartPlanner, enabling teachers to combine calendar functionality with curriculum mapping and program resources.

Try it now!

Just follow these steps to see how interactive and engaging online resources can be!

1	**Go to:**	HMHScience.com
2	**Click on**	**PREVIEW**
3	**Enter Sample Word and Click Next:**	**HSNASC17**
4	**Fill in the Required Personal Information, Click the Checkbox to Agree to the Terms of Use and Privacy Policy, and Click:**	**Register**
5	**Write Down Your User Name and Password and Log in at:**	HMHScience.com

Any Device, Anytime, Anywhere

Why It Matters

Each chapter opens with a dynamic video that relates the content to everyday life.

Virtual Labs

Students can conduct meaningful experiments in a simulated lab or field setting without the expense, time, or risk of traditional lab settings.

Animated Chemistry

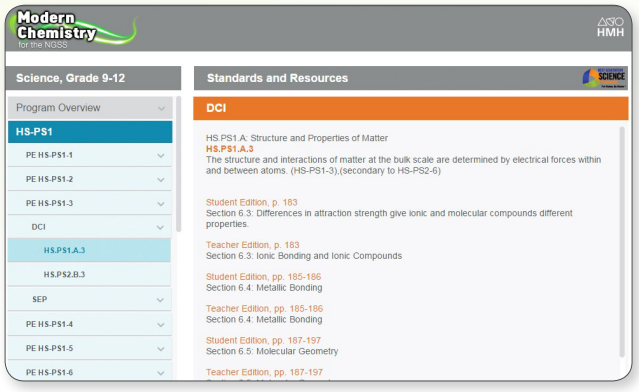
Animations and simulations help students visualize and comprehend complex concepts.

Learn It! Videos

Tutorial videos walk students through challenging problems and offer tips for success.

Solve It! Cards

Portable reference cards offer quick access to strategies for solving almost any chemistry problem.



NGSS* Correlations

Correlations both online and in the TE facilitate standards implementation.

NEXT GENERATION SCIENCE STANDARDS
For States, By States

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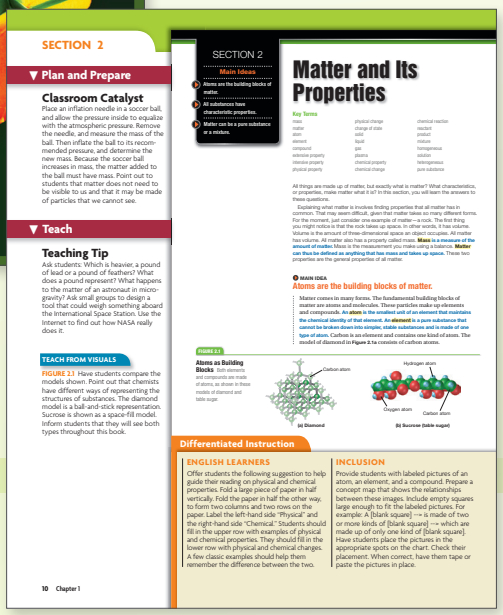
Print components designed and aligned for easy access

HMH *Modern Chemistry* enables you to reach all learners by providing time-saving, easy-to-use resources to help students of all abilities achieve understanding and success.

Student Edition

Offers features that make chemistry concepts more accessible, such as **highlighted vocabulary, problem-solving support,** and references to online student support tools.



Teacher Edition

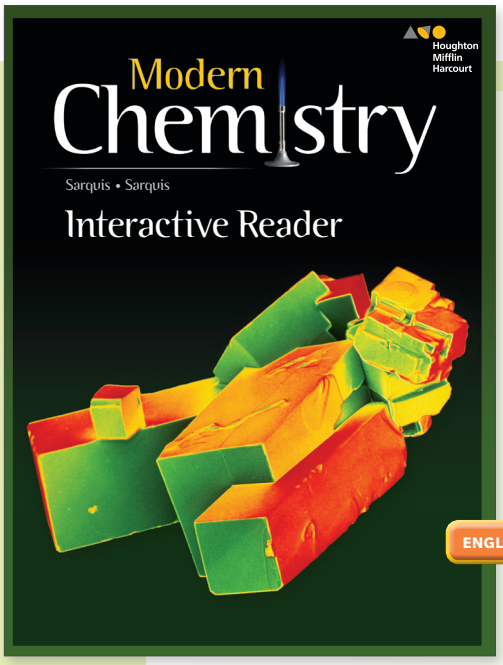
Packed with a wide variety of **strategies** to help all students master chemistry concepts, plus **extended learning** opportunities for advanced students.

Dr. Jerry Sarquis,
Professor *Emeritus*,
Chemistry Education,
Miami University

Mickey Sarquis,
Professor *Emerita*,
Chemistry Education,
Miami University

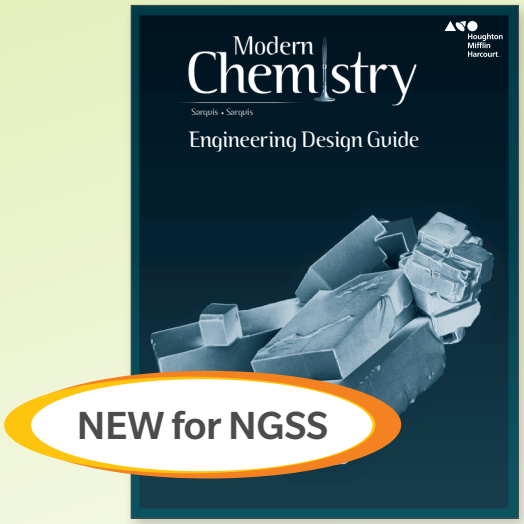
Meet the Authors

Dr. Jerry Sarquis and **Mickey Sarquis** were both professors in the Department of Chemistry at Miami University in Oxford, Ohio. These renowned authors were motivated to contribute to ***Modern Chemistry*** because they had a desire to give back to the community, and they wanted to influence students whom they couldn't even see, through the unfolding of a textbook and all the resources that support such a book. Jerry and Mickey Sarquis got into teaching because of their love of learning, and the more they taught, the more they learned from their interactions with their students.



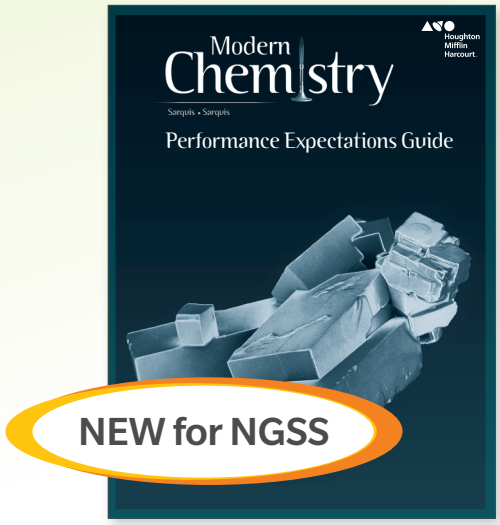
Interactive Reader and Answer Key

A **write-in worktext** that provides all of the essential content and vocabulary of the Student Edition at a reading level one to two grades below the text. A great resource for students of all ability levels, the Interactive Reader is both a core instructional tool for **struggling students** and a useful **study guide** for all students. The Answer Key provides teacher notes and answers for every section of the Interactive Reader.



Engineering Design Guide Student Edition and Teacher Edition

This Engineering Design Guide provides an overview of the **engineering design process**, along with activities and checklists that can help foster students' **critical-thinking** and **problem-solving skills**. For curriculums aligned to NGSS*, this guide can also help support the engineering-related Performance Expectations.



Performance Expectations Guide Student Edition and Teacher Edition

Designed to integrate easily into any curriculum, a separate Performance Expectations Guide is available to ensure that students meet the NGSS Performance Expectations. Also included is an **overview of NGSS** and **teacher tips** for integrating each activity into the classroom.

NEXT GENERATION SCIENCE STANDARDS
For States, By States

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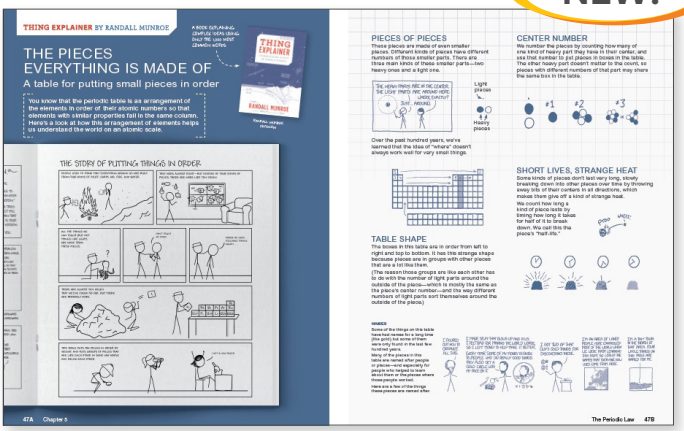
Print and Digital Tools That Motivate and Engage

HMH *Modern Chemistry* offers the latest print and multimedia resources that speak directly to your students in a visual language they understand—ensuring that they will stay engaged.

NEW!



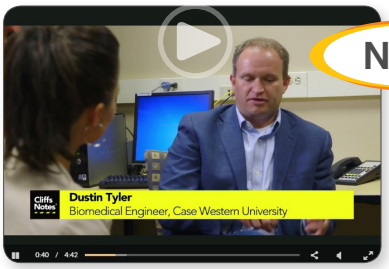
Thing Explainer

Through an exclusive partnership with author and Internet sensation **Randall Munroe**, HMH has incorporated highly engaging and educational material from Randall's latest book, *Thing Explainer,* into our print and digital editions. Randall's webcomic style, as seen on **xkcd.com**, humorously explains complex topics in easy-to-understand language.

NEW!

Google Expeditions

Through its alliance with Google® , HMH is developing content for Google® Expeditions. Using a simple Google Cardboard™ device and a smartphone, students are swept away into **immersive virtual worlds** where learning and engagement are maximized. These virtual field trips are 3D, 360-degree experiences in fascinating locations, directly tied to content! A **Teacher Guide** provides ideas for incorporating the Expeditions into your lessons, as well as tips on **how to guide and customize the experience.**



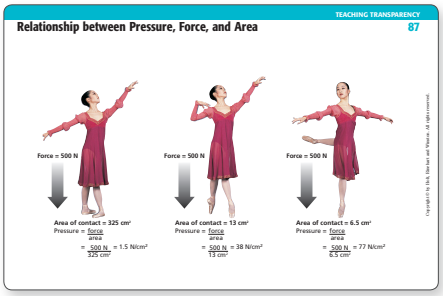
NEW!

On the Job STEM Videos

As part of our Premium offering, HMH now includes 29 *On the Job* STEM videos that **profile STEM careers** in today's fastest-growing industries. Our energetic hosts shadow passionate professionals in a day "on the job." These short segments are inspirational and entertaining with the hosts actually performing parts of the job! These videos will **motivate students** to enter emerging STEM fields.

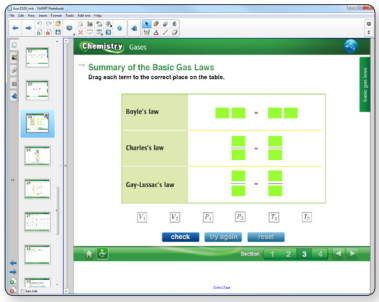
Why It Matters Videos

Seventeen chapter-introductory videos are an effective way to begin a new topic of chemistry study. Each video is designed to take the content of the chapter and relate it to everyday objects or situations that are familiar to students.



Teaching Visuals

Digital versions of key illustrations and diagrams are ideal for **whole-class instruction.**



Interactive Whiteboard Resources

IWB resources include interactive **teaching visuals** and **content-reinforcement lessons** for each chapter of the textbook.

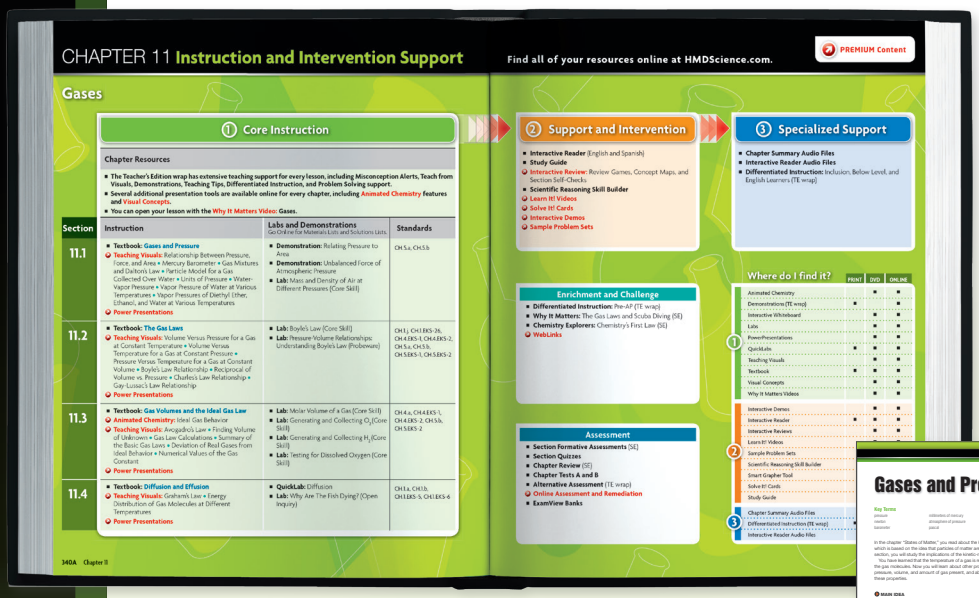
Animated Chemistry

Each Animated Chemistry includes 3 parts—an overview of the concept, an interactive simulation, and assessment.

Unparalleled resources for

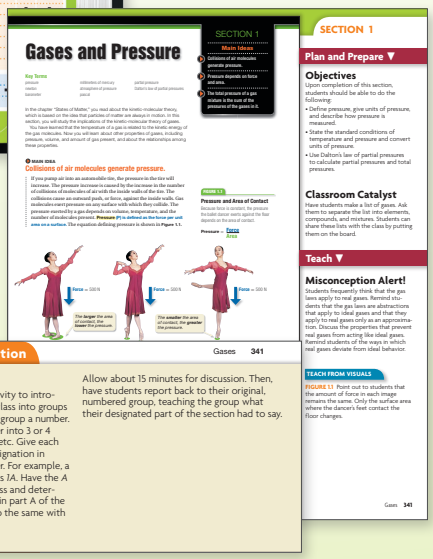
Differentiated Instruction

Students approach chemistry with a wide variety of skills and levels of preparation. HMH *Modern Chemistry* gives teachers what they need to help all students succeed.



Teacher Edition

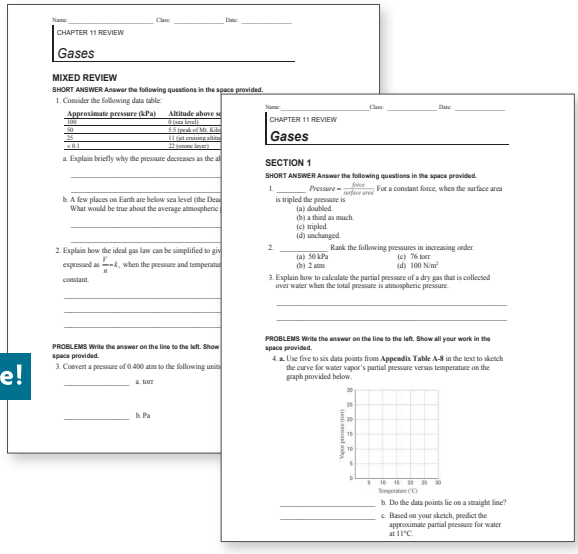
The **Instruction and Intervention** feature located in each chapter of the Teacher Edition provides **strategies for every lesson** to assist you in helping students with a wide range of needs. To simplify lesson planning, these support pages at the beginning of each chapter provide a full listing of the activities and classroom resources available for each section.



The wrap margin includes a **Differentiated Instruction** feature with a wide variety of strategies to help all students master chemistry concepts. Material categories include Below Level, English Learners, Pre-AP®, and Inclusion.

Chapter and Section Study Guide

The student worksheets in this guide cover the content in each section of the textbook using a **variety of questioning strategies.**



Editable!

Interactive Reader Audio Files

The entire Interactive Reader has been professionally read and is available to students to help **bolster learning comprehension.**

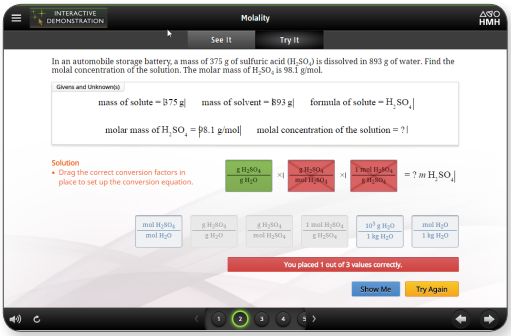
#HMHScience

and Problem Solving

Nearly half of the sample problems in HMH *Modern Chemistry* have been refreshed to give even the most loyal program users something new and different to challenge and strengthen their students' problem-solving skills.

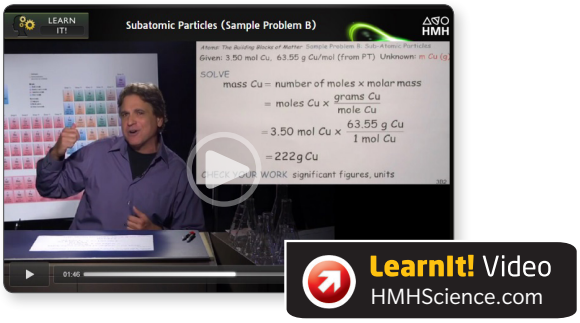
Solution Tutor

Guides students step-by-step through selected problems, recognizes their error patterns, then provides hints and targeted remediation to improve their problem-solving skills.



Interactive Demonstrations

Each sample problem in the textbook has an accompanying Interactive Demonstration that **walks through the steps of solving** that type of chemistry problem. The Try It Yourself feature helps students apply what they have learned. Each includes a full audio narrative.

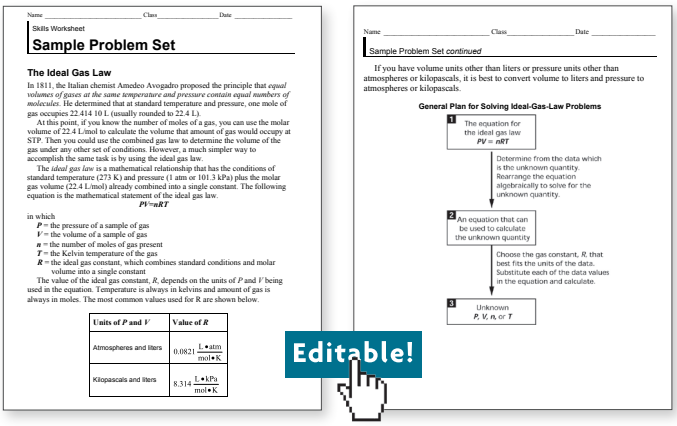


Learn It! Videos

Forty professional tutorial videos **walk students through challenging chemistry problems**, with tips and strategies for success.

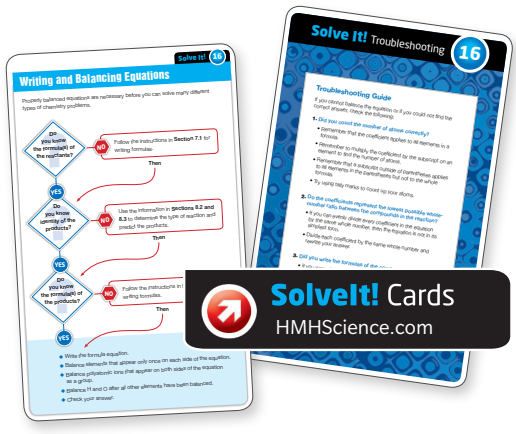
Sample Problem Sets

These skills worksheets provide **problem-solving strategies** and an extensive bank of student **practice problems** for every type of chemistry problem in the textbook.



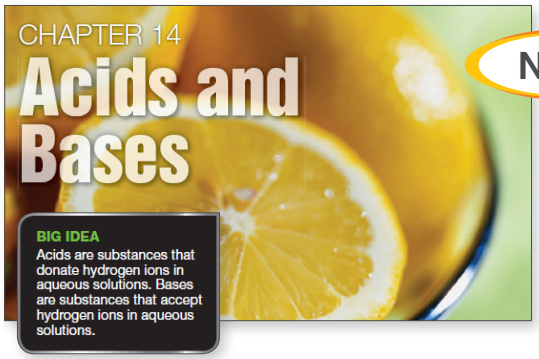
Solve It! Cards

These printable and **portable reference cards** provide students with quick access to effective problem-solving strategies and guidelines.



Wide-ranging support for
Reading and Vocabulary

Your students will get the most out of their reading with numerous student and teacher print and multimedia point-of-use resources that enable them to build understanding and retain more information on key concepts.



NEW!

Student Edition

Big Ideas in every Chapter Opener & Summary help students concentrate on key concepts.

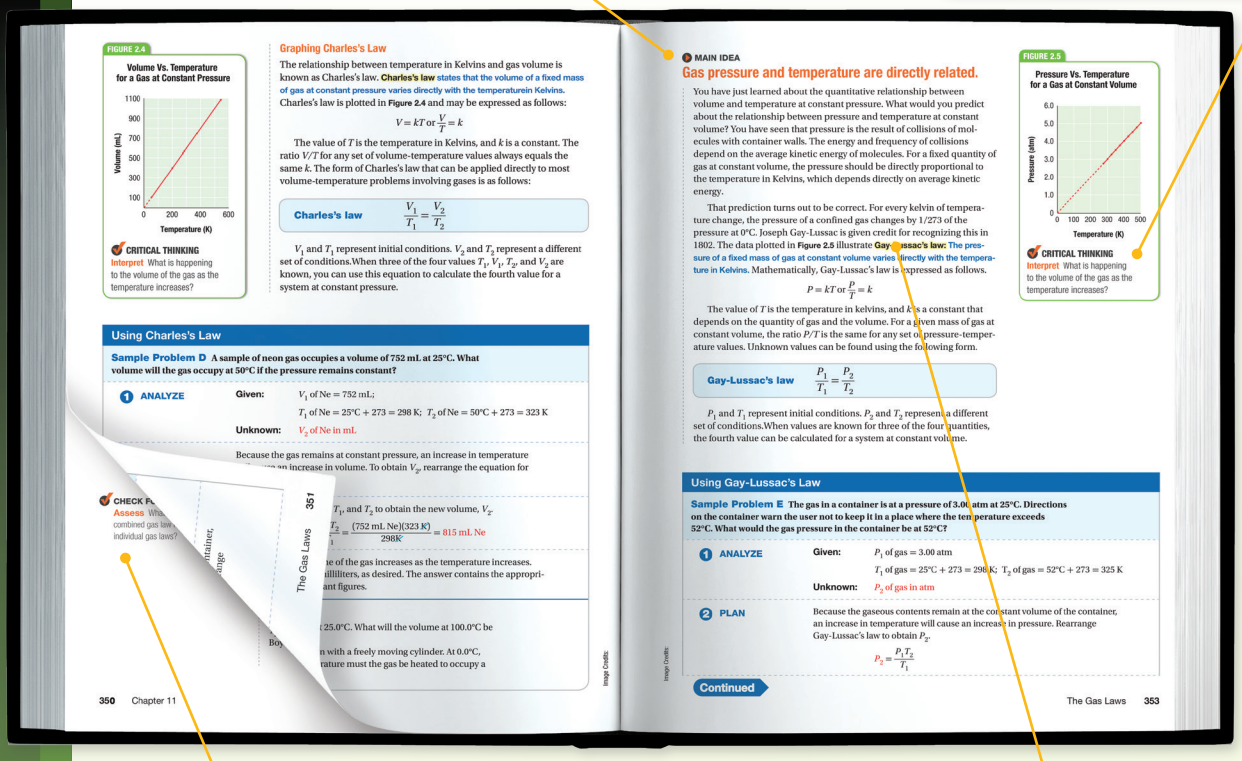
Main Idea

Chapter content has been organized around main ideas.

Critical Thinking

Critical-Thinking questions prompt your students to think deeply.

CRITICAL THINKING
Interpret What is happening to the volume of the gas as the temperature increases?



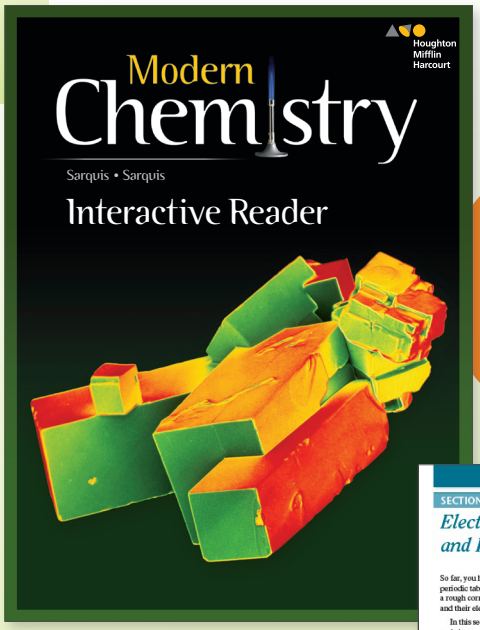
CHECK FOR UNDERSTANDING
Assess What advantage does the combined gas law have over the three individual gas laws?

Check for Understanding

These reading comprehension questions help reinforce the important points of the section.

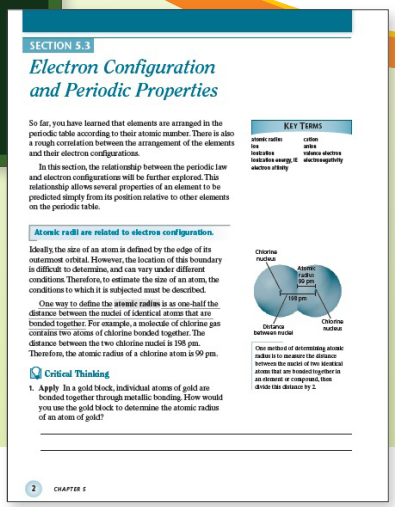
In-text definitions

As students study, they'll find key vocabulary has been highlighted in context.



Interactive Reader

This write-in worktext presents all the vocabulary and essential content from the textbook in a lower-level, easy-to-read text, with instructional visuals and frequent comprehension checks. This unique component is a great tool for all students—the core content for struggling students and a useful study guide for others.


SECTION 5.3

Electron Configuration and Periodic Properties

So far, you have learned that elements are arranged in the periodic table according to their atomic number. There is also a rough correlation between the arrangement of the elements and their electron configurations.

In this section, the relationship between the periodic law and electron configurations will be further explored. This relationship allows several properties of an element to be predicted simply from its position relative to other elements on the periodic table.

KEY TERMS

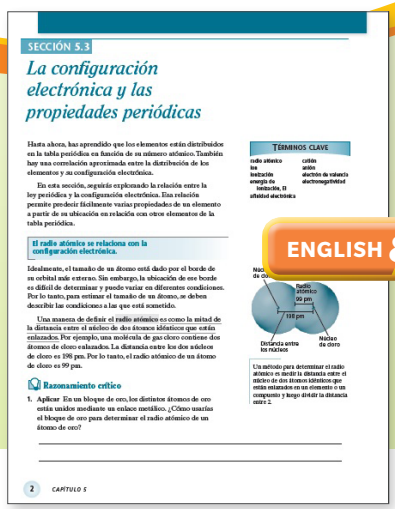
Atomic radii are related to electron configuration.

Ideally, the size of an atom is defined by the edge of its outermost orbital. However, the location of this boundary is difficult to determine, and can vary under different conditions. Therefore, to estimate the size of an atom, the conditions to which it is subjected must be described.

One way to define the atomic radius is as one-half the distance between the nuclei of identical atoms that are bonded together. For example, a molecule of chlorine gas contains two atoms of chlorine bonded together. The distance between the two chlorine nuclei is 198 pm. Therefore, the atomic radius of a chlorine atom is 99 pm.

Critical Thinking

1. **Apply** In a gold block, individual atoms of gold are bonded together through metallic bonding. How would you use the gold block to determine the atomic radius of an atom of gold?


SECCIÓN 5.3

La configuración electrónica y las propiedades periódicas

Hasta ahora, has aprendido que los elementos están distribuidos en la tabla periódica en función de su número atómico. También hay una correlación aproximada entre la distribución de los elementos y su configuración electrónica.

En esta sección, seguirás explorando la relación entre la ley periódica y la configuración electrónica. Esta relación permite predecir fácilmente varias propiedades de un elemento a partir de su ubicación en relación con otros elementos de la tabla periódica.

TÉRMINOS CLAVE

El radio atómico se relaciona con la configuración electrónica.

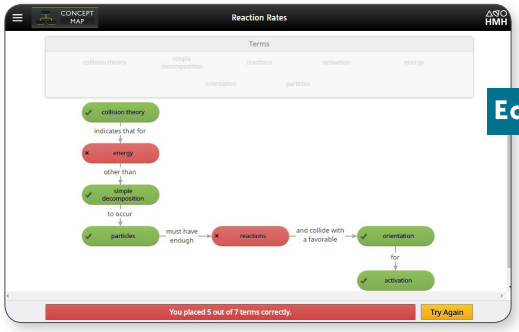
Idealmente, el tamaño de un átomo está dado por el borde de su orbital más externo. Sin embargo, la ubicación de ese borde es difícil de determinar y puede variar en diferentes condiciones. Por lo tanto, para estimar el tamaño de un átomo, se deben describir las condiciones a las que está sometido.

Una manera de definir el radio atómico es como la mitad de la distancia entre el núcleo de dos átomos idénticos que están enlazados. Por ejemplo, una molécula de gas cloro contiene dos átomos de cloro enlazados. La distancia entre los dos núcleos de cloro es 198 pm. Por lo tanto, el radio atómico de un átomo de cloro es 99 pm.

Razonamiento crítico

1. **Aplicar** En un bloque de oro, los distintos átomos de oro están unidos mediante un enlace metálico. ¿Cómo usarías el bloque de oro para determinar el radio atómico de un átomo de oro?

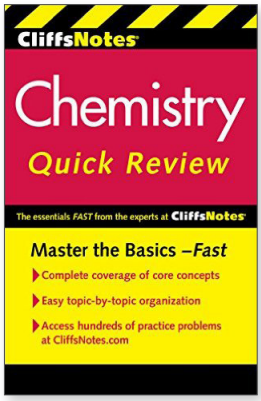
ENGLISH & SPANISH



Editable!

Interactive Concept Maps

Each chapter includes an interactive, advanced **graphic organizer** that shows the relationships among concepts covered and helps students develop logical thinking and study skills.



CliffsNotes® Chemistry Quick Review

With a Premium package purchase, a class set of these study guides provides **essential reinforcement of core concepts** in an easy-to-use format.

eBook

This **online version** of the print Student Edition features a wealth of **built-in tools** to help students access the content, including the chunking of content around Main Ideas, with frequent comprehension checks, superior support for problem-solving, high-quality instructional visuals, point-of-use references to online animations, Problem-Solving tutorials, and virtual labs that make abstract concepts more concrete. Features include data persistence, on-page media links, bookmarking, search, notes, and highlighting functionality.

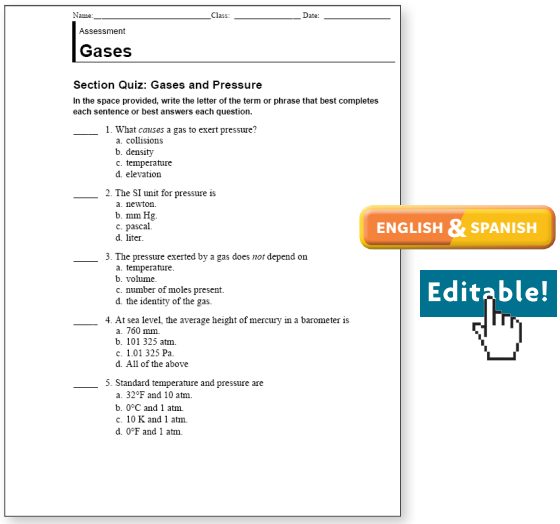
Flexible Assessment Tools to Track Student Progress

The comprehensive assessment options located on HMHScience.com bring together all HMH *Modern Chemistry* assessment tools into one convenient place, giving you many choices for the best way to assess your students' learning.

EXAMVIEW® ASSESSMENT SUITE

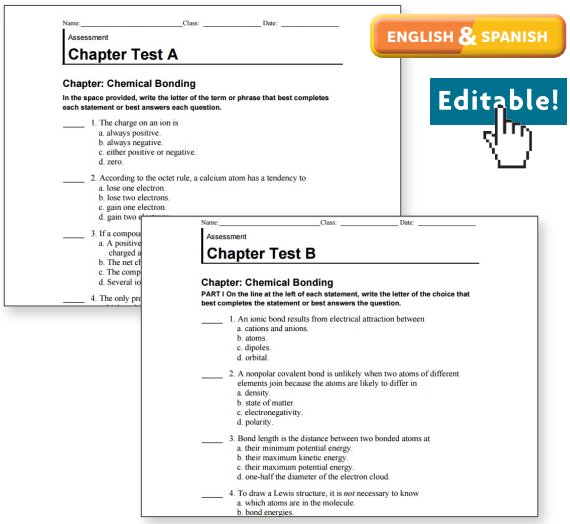
ExamView® Banks

A complete ExamView Software Suite includes all assessment questions for the program and more than **2,300 additional questions** in Bonus Banks.



Section Quizzes

A 10-question multiple-choice and short-answer quiz for each section of the textbook. These are designed for student **formative assessment** to aid in remediation.

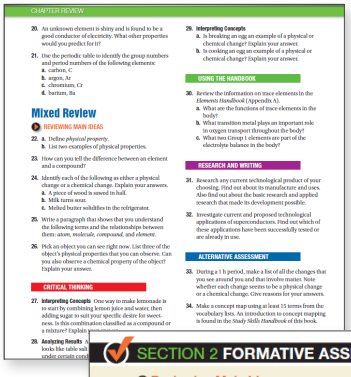


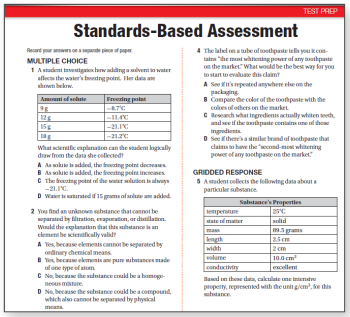
Chapter Test A & B

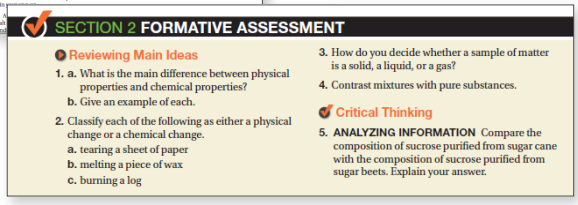
Two **full-length** chapter tests include multiple-choice and short-answer questions. Test B is similar to but more challenging than Test A.

Review and Assessment in the Student Edition

The Student Edition contains **multiple levels of assessment** from Formative to Summative along with helpful review questions that assess students' understanding of chapter and section material.







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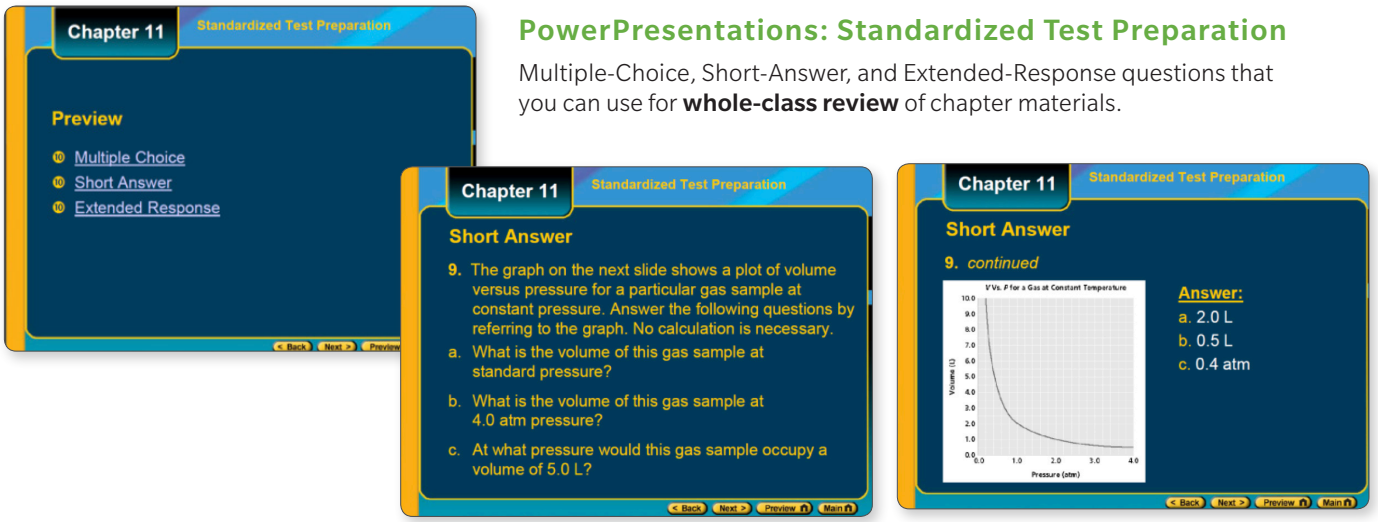
Interactive Review Games

Three different styles of vocabulary and concept review games help reinforce the material learned in each chapter in a fun and engaging format.

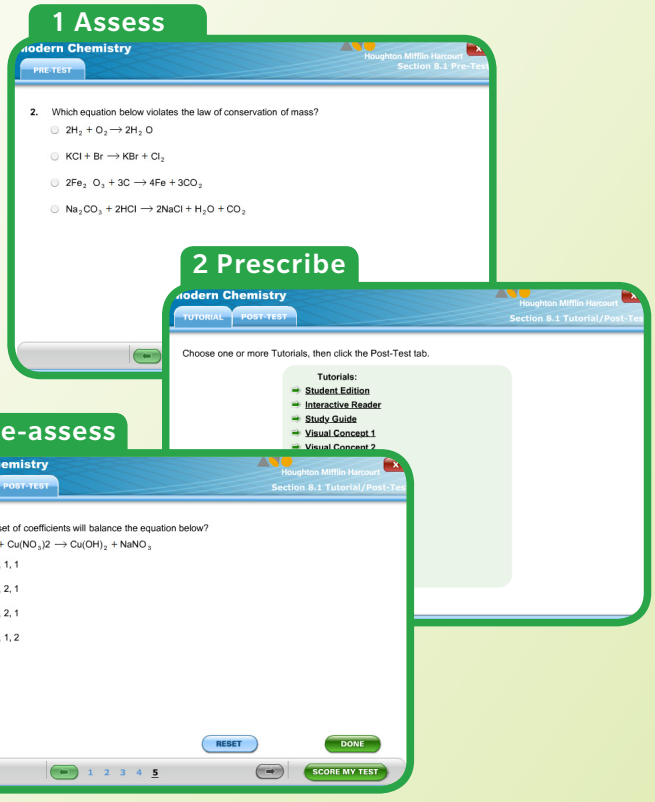


PowerPresentations: Standardized Test Preparation

Multiple-Choice, Short-Answer, and Extended-Response questions that you can use for **whole-class review** of chapter materials.

Online Assessment and Remediation

An advanced, automated assessment and remediation engine enables teachers to assign section quizzes to students. The assessments are **automatically graded**, and remediation that uses materials from the program is prescribed. A post-test is offered to determine student mastery. Critical student **performance data** are recorded and made readily available to the teacher.



Individualized remediation

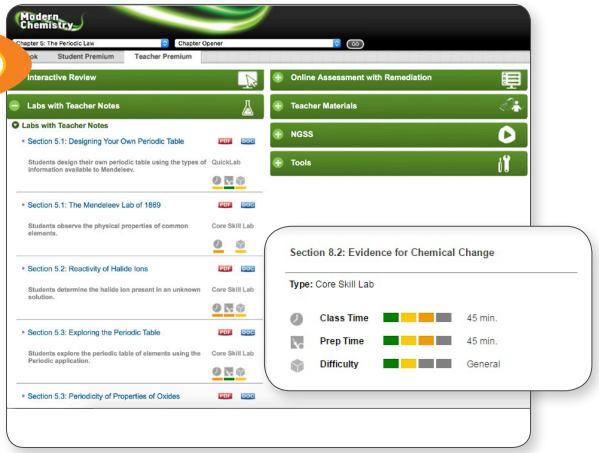
Convenient access to

Labs, Data Analysis and STEM

HMH *Modern Chemistry* includes the most comprehensive lab resources with its wide variety of print and digital lab options for every classroom, along with the most robust data-analysis strand to help students develop these critical skills.

Editable!

Over 200 Editable Labs!



Laboratory Experiments

Wide variety of labs located at point of use on **HMHScience.com**:

- Editable lab sheets
- Teacher notes and answer keys
- Referenced on Instruction and Intervention pages in Teacher Edition

QuickLabs

Designed for reinforcement of key concepts using easy-to-obtain materials.

Standard Labs

Focus on experimental skills and application of chapter concepts through the use of scientific methods.

Core Skill Labs

Provide practice of inquiry skills and scientific methods.

STEM Labs

Science, Technology, Engineering, and Mathematics problem-based labs that emphasize inquiry and the engineering design process.

Open Inquiry Labs

Specifically designed to be short project-based labs that encourage students to collaborate, strategize, construct, and evaluate a lab challenge of their own creation.

Probeware Labs

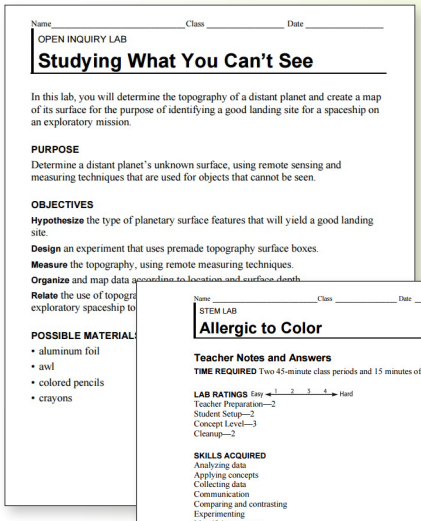
Labs that use Vernier® probeware and Pasco® probeware and SPARK® technology.

Forensic Labs

Application labs that have students demonstrating laboratory skills through the exploration of forensic and applied science scenarios.

Labeled Labs

Lab activities are labeled online by **class time**, **prep time**, **difficulty** to help teachers choose appropriate activities to fit their classroom needs.



Name _____ Class _____ Date _____

OPEN INQUIRY LAB

Studying What You Can't See

In this lab, you will determine the topography of a distant planet and create a map of its surface for the purpose of identifying a good landing site for a spaceship on an exploratory mission.

PURPOSE

Determine a distant planet's unknown surface, using remote sensing and measuring techniques that are used for objects that cannot be seen.

OBJECTIVES

Hypothesize the type of planetary surface features that will yield a good landing site.

Design an experiment that uses premade topography surface boxes.

Measure the topography, using remote measuring techniques.

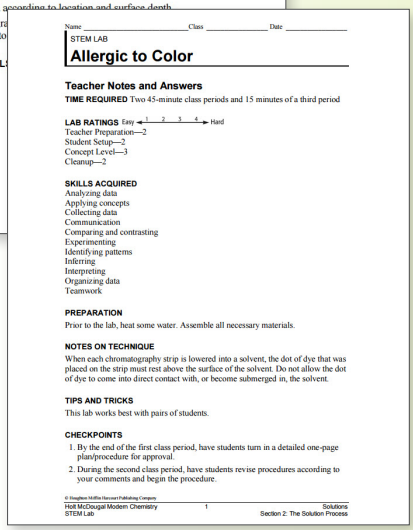
Organize and map data according to location and surface depth.

Relate the use of topogr... exploratory spaceship to...

POSSIBLE MATERIALS

- aluminum foil
- awl
- colored pencils
- crayons

Inquiry labs



Name _____ Class _____ Date _____

STEM LAB

Allergic to Color

Teacher Notes and Answers

TIME REQUIRED Two 45-minute class periods and 15 minutes of a third period

LAB RATINGS Easy ← 1 2 3 4 → Hard

Teacher Preparation—2
Student Setup—2
Concept Level—3
Cleanup—2

SKILLS ACQUIRED

Analyzing data
Applying concepts
Collecting data
Communication
Comparing and contrasting
Experimenting
Identifying patterns
Inferring
Interpreting
Organizing data
Teamwork

PREPARATION

Prior to the lab, heat some water. Assemble all necessary materials.

NOTES ON TECHNIQUE

When each chromatography strip is lowered into a solvent, the dot of dye that was placed on the strip must rest above the surface of the solvent. Do not allow the dot of dye to come into direct contact with, or become submerged in, the solvent.

TIPS AND TRICKS

This lab works best with pairs of students.

CHECKPOINTS

1. By the end of the first class period, have students turn in a detailed one-page plan/procedure for approval.
2. During the second class period, have students revise procedures according to your comments and begin the procedure.

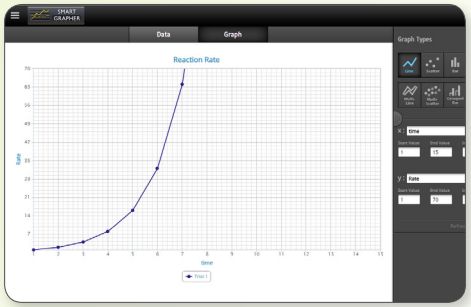
STEM labs

STEM
in the Student Edition

Select STEM features now include an Engineering Design feature in the Student Edition. This feature encourages students to follow the engineering design process and think about problems in an innovative way.

Data Analysis Support for Students

To help students develop the data analysis skills necessary to collect, graph, and analyze data like scientists, HMHScience.com includes resources to support the data analysis lesson in every chapter.



Smart Grapher

A powerful, easy-to-use **online graphing tool** that encourages students to use their own data to create line graphs, circle graphs, and more.

Scientific Reasoning Skill Builder

Over **100 exercises** that strengthen students' scientific reasoning skills. Sample topics include classifying and categorizing, cause-and-effect relationships, hypothesis, generalizations and analogies, and summarizing and reviewing.

Pre-Lab Procedures

This resource provides **Teacher Resource Page**s and worksheets to help students develop the skills necessary to complete chapter labs.

Graphing Calculator Activities

HMH has partnered with Texas Instruments to present nine **graphing activities** for use with the TI-Nspire™ graphing calculator.

Virtual Labs

Students can hone their lab skills in a virtual environment. Fun, safe and highly interactive, these labs focus on experiments for which equipment and materials are often expensive or difficult to acquire.

Modern Chemistry

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Student*** Teacher	Print	Digital
Student Edition	🟢	🟢
Teacher Edition	🟠	🟠
Interactive Reader (and Answer Key for Teacher)** • Online Audio Files (English only)	🟢🟠	🟢🟠
Performance Expectations Guide SE/TE	🟢🟠	🟢🟠
Engineering Design Guide SE/TE	🟢🟠	🟢🟠
CliffsNotes Chemistry Quick Review (with Premium package only)	🟢	
Interactive Online Edition		
• NGSS* Correlation Tool		🟠
• Teacher Guide for Google Expeditions		🟠
• Student eBook: Chapter Summaries Audio files and SE pages**		🟢
• Worksheets (Section Study Guides, Chapter Study Guides, Graphing Calculator Activities)		🟢
• Labs** (STEM, Open Inquiry, QuickLabs, Standard, Challenge, Biotechnology, Probeware, Forensic, Virtual Labs)		🟢
• Lab Resources (Labs with Teacher Notes, Laboratory Manager's Professional Reference, Probeware Instruction Sheet, Pre-Lab Procedures, Comprehensive Materials List, Graphing Calculator Instructions)		🟠
• Student Toolkit (Scientific Reasoning Skill Builder, Project Resources, Smart Grapher, FoldNotes, Periodic Table, Glossary, Scientific Calculator, Graphing Calculator)		🟢
• Teacher Toolkit (Teaching Strategies, Classroom Management Resources, Lesson Plans, Project Resources)		🟠
• Multimedia and Activities (Animated Chemistry, Virtual Labs, Why it Matters Videos, Weblinks)		🟢
• Presentation Tools (Teaching Visuals, Interactive Whiteboard Resources, PowerPresentations)		🟠
• *On the Job* STEM Videos (with Premium package only)		🟢
• Problem Solving Support (Learn It! Videos, Solve It! Cards, Sample Problem Sets, Interactive Demonstrations, Solution Tutor)		🟢
• Interactive Review (Interactive Concept Maps, Interactive Review Games)		🟢
• Online Assessments (ExamView, Section Quizzes, Chapter Tests A&B, Online Assessment with Remediation)		🟠

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**Also available in Spanish. ***All of the student-facing resources are available to the teacher via the Teacher's Interactive Online Edition.

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