

## Program Overview

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### Introduction

Savvas Chemistry © 2012 combines proven and tested content with cutting-edge digital support and hands-on learning opportunities. This program provides instruction that teachers need to engage and motivate students, as well as the tools to support the varied types of learners in each classroom.



### Background

The program was designed using the Understanding by Design® framework (the UbD™ framework), a disciplined way of thinking about curriculum design, instruction, and assessment that moves teaching from simply covering the content to ensuring a deep understanding of the Big Ideas of the concepts of what is being learned. The program design offers opportunities for full integration with technology via SavvasChem.com or the Classroom Resource DVD-ROM. Learning opportunities offer lab investigations and study tools that help students extend their understanding of chemistry concepts through hands-on practice and extra study support. Support materials and tools help students as they build problem-solving skills and apply mathematical skills to the context of chemistry. In addition, the program offers a variety of support for differentiated instruction for struggling learners, struggling readers, and those who need remedial math instruction.

### Big Ideas and Essential Questions

The UbD™ framework emphasizes the teaching of the Big Ideas or overall concepts of the subject being taught. Each chapter begins with an introduction to the Big Ideas that students will learn during the chapter.



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By focusing on the Essential Questions during the chapter, students are alerted to the concepts they must understand by the end of the chapter.


To help students make real connections to the Big Ideas and Essential Questions, each chapter begins with a mystery problem. The CHEMystery presents the concepts in a real-world context that practical and relatable for all students.

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**Key Questions** Each lesson builds on the Big Ideas and Essential Questions through the use of Key Questions. Key Questions provide students with a focus and a purpose for learning the concepts presented in the chapter. They also assist students in unlocking clues that help them solve the CHEMystery.

**Key Questions**


 *How do chemists use balanced chemical equations?*

 *In terms of what quantities can you interpret a balanced chemical equation?*

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**Chemistry & You**

Chemistry & You is part of the introduction for each lesson. This feature presents an engaging question that relates to a problem that students can understand in their everyday lives. These questions help students activate prior knowledge, build background, spark curiosity, and guide their learning during each lesson.



**CHEMISTRY & YOU**

**Q:** *How do you figure out how much starting material you need to make a finished product?* Whenever you make something, you need to know the amounts of the parts that make up the desired product. When making bicycles, you need parts such as wheels, handlebars, pedals, and frames. If you need to make 200 bikes, then the workers would need to calculate the amount of each part they need to produce the 200 bikes. In this lesson,

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**Integrated Technology**

Savvas Chemistry © 2012 provides teachers and students with many ways to integrate chemistry and technology via SavvasChem.com and the Classroom Resource DVD-ROM. Student tools include additional practice, tutorials, online labs, interactive art, animations, and eTexts. Throughout the textbook, various icons notify students of virtual content.



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**Lab Investigations**

Savvas Chemistry © 2012 encourages students to develop inquiry skills through activities that provide teacher-guided support and open-ended investigations. Teacher Demo activities, Quick Labs, and Chapter Labs are included in the chemistry textbook. Flexible lab activities allow teachers to address all types of learners and accommodate time and equipment requirements.

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**Online Editable Labs**

Teachers have access to lab activities online. These labs are available in an editable format so that teachers may tailor activities to fit their needs. These labs include traditional labs, Small-Scale Labs, lab practicals, and probeware labs.

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**Virtual ChemLab**

The Virtual ChemLab CD-ROM contains lab activities in a simulated lab environment. This resource provides thirty additional activities that correlate to the existing labs, the student edition, and the online lab manual.



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**Problem Solving and Math Support**

In chemistry, problem solving is an important set of skills that students must learn, develop, and practice. Through the program, students are taught an approach to problem solving that applies both numeric and conceptual problems. Students learn to solve problems of varying levels of difficulty that require multiple steps. Students gain the ability to apply mathematical concepts to new situations and determine if their solutions make sense.



In addition to digital tools like Math Tutor, Chem Tutor, and Online Problems, the student edition provides a variety of in-text tools that assist students with problem solving and math concepts.

## Sample Problems

Each chapter provides stepped-out sample problems. These samples show students how to solve the problems and provide hints to help students as they work through the samples. Each sample shows the student how to analyze the problem, calculate an answer, and evaluate the solution.

**Sample Problem 12.1**  
**Using a Balanced Equation as a Recipe**  
In a five-day workweek, Travel Time is scheduled to make 640 tricycles. How many wheels should be in the plant on Monday morning to make these tricycles?

**1 Analyze** List the knowns and the unknowns. Use the balanced equation to identify a conversion factor that will allow you to calculate the unknown. The conversion you need to make is from tricycles (FSW<sub>3</sub>HP<sub>2</sub>) to wheels (W).

**2 Calculate** Solve for the unknown.

Identify a conversion factor that relates wheels to tricycles. You can write two conversion factors relating wheels to tricycles.

The desired unit is W, so use the conversion factor on the left. Multiply the number of tricycles by the conversion factor.

**3 Evaluate** Does the result make sense? If three wheels are required for each tricycle and more than 600 tricycles are being made, then a number of wheels in excess of 1800 is a logical answer. The unit of the known (FSW<sub>3</sub>HP<sub>2</sub>) cancels, and the answer has the correct unit (W).

**1** Travel Time has decided to make 288 tricycles each day. How many tricycle seats, wheels, and pedals are needed for each day?  
**2** Write an equation that gives your own "recipe" for making a skateboard.

**KNOWN**  
number of tricycles = 640 tricycles = 640 FSW<sub>3</sub>HP<sub>2</sub>  
 $F + 5 + 3W + H + 2P \rightarrow FSW_3HP_2$

**UNKNOWN**  
number of wheels = ? W

When using conversion factors, remember to cancel like units when they are in both the numerator and denominator. This tells you that you are using the correct conversion factor.

$\frac{3W}{1FSW_3HP_2}$  and  $\frac{1FSW_3HP_2}{3W}$

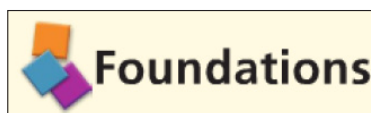
$640 FSW_3HP_2 \times \frac{3W}{1FSW_3HP_2} = 1920W$

## Reaching All Students

The Teacher's Edition also provides features that help the teacher reach students that struggle with math skills, struggling readers, and students who need math remediation.

## Foundations for Learning

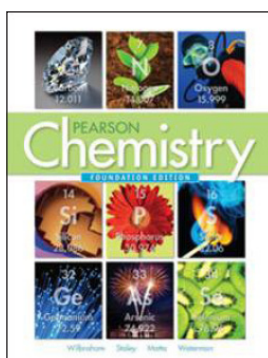
Teacher support for problem-solving and math skills is available in the Teacher's Edition. The Foundations for Math feature provides tips for scaffolding or reteaching the essential math skills needed to solve the chapter chemistry problems.



The Foundations for Reading feature provides teachers with tips to help struggling readers. Suggestions include reinforcement for reading strategies as well as vocabulary development.

## Foundations Program

In addition to the Foundations features found in the Teacher's Edition, there is also a Foundations version of the program available for struggling learners. This version of the program provides enhanced support for math and reading.



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**Review**

This guide provided an overview of Savvas Chemistry © 2012. It explained that the program was designed using the UbD™ framework and focuses on the Big Ideas and Essential Questions of chemistry. This guide provided information on SavvasChem.com and the Classroom Resource DVD-ROM, which both allow teachers to fully integrate the program with technology.

It explained that students extend their understanding of chemistry concepts by doing lab investigations and using the program study tools. This guide introduced Foundations materials and tools that support students as they build problem-solving skills, apply math skills, increase comprehension, and build vocabulary. In addition, it mentioned the Foundations program, which offers a variety of support for differentiated instruction for struggling learners, struggling readers, and those who need remedial math instruction.