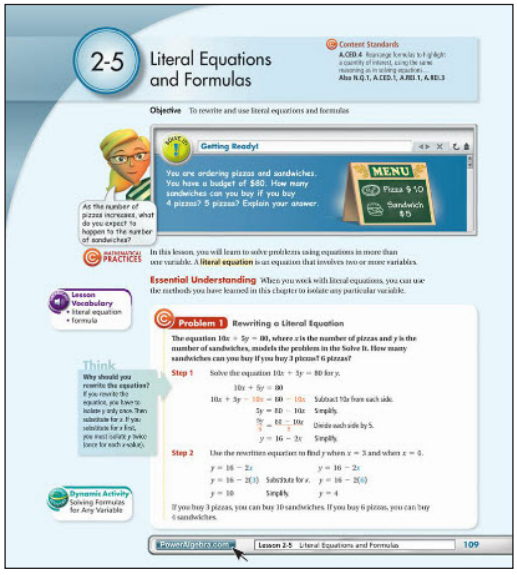
Teaching a Lesson

Introduction

This guide explores teaching a lesson in the Savvas Algebra 1, Geometry, Algebra 2 Common Core Edition. It describes the lesson structure and the many opportunities each lesson presents to help students become proficient with the Standards for Mathematical Practice in the Common Core State Standards for Mathematics (CCSSM).

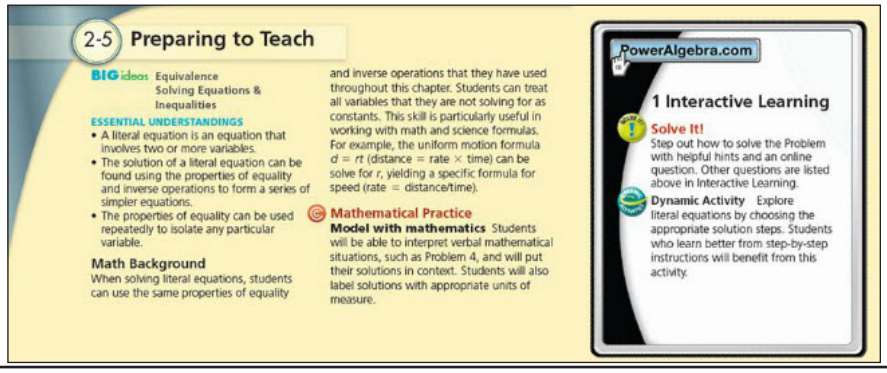
In this guide, the examples shown are from Algebra 1, but you can apply what you learn to any lesson in the course that you teach. Many of the lesson features are also available on the digital path at PowerAlgebra.com and PowerGeometry.com. The digital path offers lessons and a variety of technology tools for instructional use.



Preparing to Teach

Teaching an effective lesson begins with lesson preparation. The Teacher's Edition has the information and resources to help make preparation simple and efficient. Preparing to Teach is a section to help you clarify the Big Ideas and Essential Understandings of the lesson so that you can set clear learning targets for your students.

The Essential Understandings correlate to the Standards for Mathematical Content in the lesson. Built-in professional development supports the Standards for Mathematical Practice.



2-5 Preparing to Teach

BIG ideas Equivalence
Solving Equations & Inequalities

ESSENTIAL UNDERSTANDINGS

- A literal equation is an equation that involves two or more variables.
- The solution of a literal equation can be found using the properties of equality and inverse operations to form a series of simpler equations.
- The properties of equality can be used repeatedly to isolate any particular variable.

Math Background
When solving literal equations, students can use the same properties of equality and inverse operations that they have used throughout this chapter. Students can treat all variables that they are not solving for as constants. This skill is particularly useful in working with math and science formulas. For example, the uniform motion formula $d = rt$ (distance = rate × time) can be solve for r, yielding a specific formula for speed (rate = distance/time).

Mathematical Practice
Model with mathematics Students will be able to interpret verbal mathematical situations, such as Problem 4, and will put their solutions in context. Students will also label solutions with appropriate units of measure.

PowerAlgebra.com

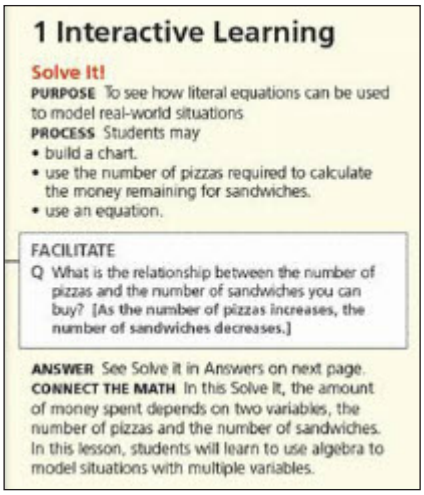
1 Interactive Learning

Solve It!
Step out how to solve the Problem with helpful hints and an online question. Other questions are listed above in Interactive Learning.

Dynamic Activity Explore literal equations by choosing the appropriate solution steps. Students who learn better from step-by-step instructions will benefit from this activity.

Interactive Learning

Next, launch the Interactive Learning phase of the lesson by introducing a Solve It! problem.



1 Interactive Learning

Solve It!
PURPOSE To see how literal equations can be used to model real-world situations
PROCESS Students may

- build a chart.
- use the number of pizzas required to calculate the money remaining for sandwiches.
- use an equation.

FACILITATE
Q What is the relationship between the number of pizzas and the number of sandwiches you can buy? **[As the number of pizzas increases, the number of sandwiches decreases.]**

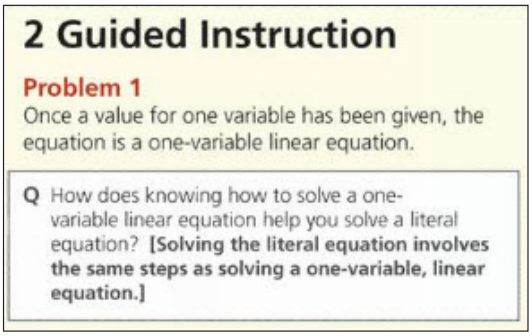
ANSWER See Solve it in Answers on next page.
CONNECT THE MATH In this Solve It, the amount of money spent depends on two variables, the number of pizzas and the number of sandwiches. In this lesson, students will learn to use algebra to model situations with multiple variables.

The Solve It! presents a problem situation that relates to the math concepts of the lesson. Students interact with these concepts as they work individually or cooperatively to make sense of the problem and then come up with a solution plan.

Use the Facilitate questions and Connect the Math suggestions in the side notes to elicit student thinking. This support feature helps students activate prior knowledge and make connections with new concepts presented in the lesson.

Guided Instruction

After your students have engaged in interactive problem solving with the Solve It!, focus their learning toward grasping the Essential Understanding in the Guided Instruction phase of the lesson.



2 Guided Instruction

Problem 1

Once a value for one variable has been given, the equation is a one-variable linear equation.

Q How does knowing how to solve a one-variable linear equation help you solve a literal equation? **[Solving the literal equation involves the same steps as solving a one-variable, linear equation.]**

Your Teacher's Edition provides point-of-use support to help you guide your students' understanding and develop their mathematical proficiency.

During the Guided Instruction, you can encourage your students to communicate precisely about mathematics by directing their attention to the Take Note feature, which presents clear explanations of key terms and concepts in many of the lessons.

As you introduce the worked-out example problems to your students, you will find guiding questions that offer prompts to help students reason quantitatively and persevere in finding a workable entry point for the problem.

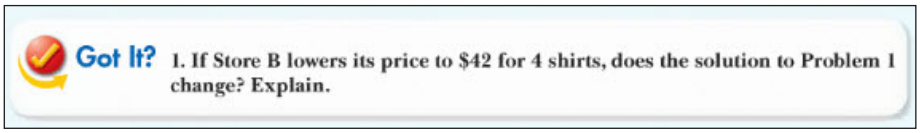
The Think and Plan boxes model thinking to represent problem situations symbolically. They remind students to look for similar problem situations that they previously solved, and help to recognize the structure of a mathematical solution.

The Know-Need-Plan boxes guide students to make a solution plan. This stepped out problem-solving process is an effective, key feature in Savvas High School Mathematics, and is utilized in both the print and digital lessons.

Got It?

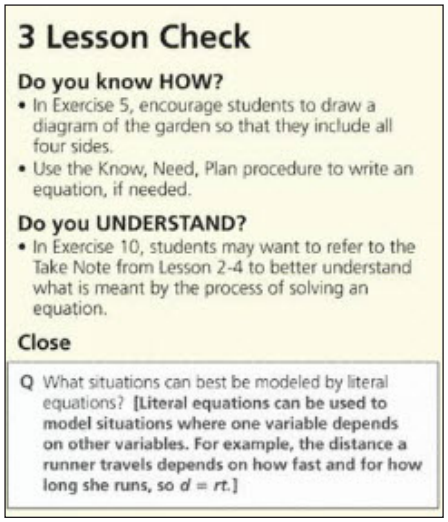
While students build comprehension during Guided Instruction, the Got It? questions offer formative assessment for each concept. Every problem ends with a Got It? question, in which students are asked to explain their thinking and justify their conclusions.

The Got It? helps you gauge understanding, adjust pacing if needed, and catch possible misconceptions with the help of the Error Prevention tips in the teacher's side notes. When you discern your students have *got it,* you are ready to move to the next phase of the lesson, the Lesson Check.



Lesson Check

The Lesson Check gives you another opportunity to assess your students' understanding of the lesson content. The questions in Do You Know How? assess students' procedural fluency, while the questions in Do You Understand? focus on students' conceptual understanding of the lesson content and elicit students' ability to apply the Standards for Mathematical Practice.



3 Lesson Check

Do you know HOW?

- In Exercise 5, encourage students to draw a diagram of the garden so that they include all four sides.
- Use the Know, Need, Plan procedure to write an equation, if needed.

Do you UNDERSTAND?

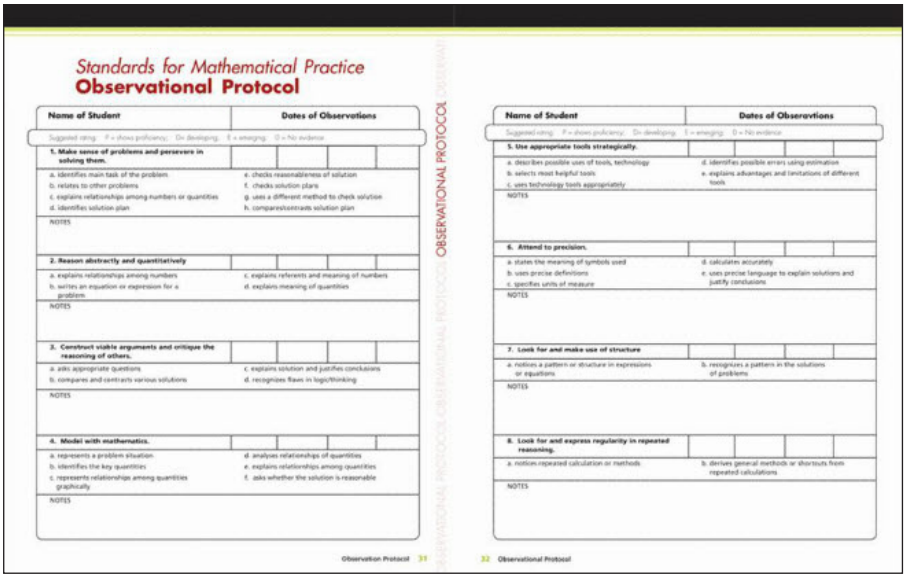
- In Exercise 10, students may want to refer to the Take Note from Lesson 2-4 to better understand what is meant by the process of solving an equation.

Close

Q What situations can best be modeled by literal equations? **[Literal equations can be used to model situations where one variable depends on other variables. For example, the distance a runner travels depends on how fast and for how long she runs, so $d = rt$.]**

Observation Protocol

As your students answer the Lesson Check questions, use the Observation Protocol tool to evaluate their progress in applying the mathematical practices.



Standards for Mathematical Practice
Observational Protocol

Name of Student	Dates of Observations			
Suggested rating: P = shows proficiency; D= developing; E = emerging; O = No evidence				
1. Make sense of problems and persevere in solving them.				
a. identifies main task of the problem b. relates to other problems c. explains relationships among numbers or quantities d. identifies solution plan	e. checks reasonableness of solution f. checks solution plans g. uses a different method to check solution h. compares/contrasts solution plan			
NOTES				
2. Reason abstractly and quantitatively				
a. explains relationships among numbers b. writes an equation or expression for a problem	c. explains referents and meaning of numbers d. explains meaning of quantities			
NOTES				
3. Construct viable arguments and critique the reasoning of others.				
a. asks appropriate questions b. compares and contrasts various solutions	c. explains solution and justifies conclusions d. recognizes flaws in logic/thinking			
NOTES				
4. Model with mathematics.				
a. represents a problem situation b. identifies the key quantities c. represents relationships among quantities graphically	d. analyses relationships of quantities e. explains relationships among quantities f. asks whether the solution is reasonable			
NOTES				

OBSERVATIONAL PROTOCOL

Name of Student	Dates of Observations			
Suggested rating: P = shows proficiency; D= developing; E = emerging; O = No evidence				
5. Use appropriate tools strategically.				
a. describes possible uses of tools, technology b. selects most helpful tools c. uses technology tools appropriately	d. identifies possible errors using estimation e. explains advantages and limitations of different tools			
NOTES				
6. Attend to precision.				
a. states the meaning of symbols used b. uses precise definitions c. specifies units of measure	d. calculates accurately e. uses precise language to explain solutions and justify conclusions			
NOTES				
7. Look for and make use of structure				
a. notices a pattern or structure in expressions or equations	b. recognizes a pattern in the solutions of problems			
NOTES				
8. Look for and express regularity in repeated reasoning.				
a. notices repeated calculation or methods	b. derives general methods or shortcuts from repeated calculations			
NOTES				

Observation Protocol 31 32 Observational Protocol

In the Vocabulary exercises, do your students use precise language in communicating mathematical concepts?

In the Compare and Contrast exercises, can your students generalize methods or find efficient shortcuts as they focus on mathematical structures?

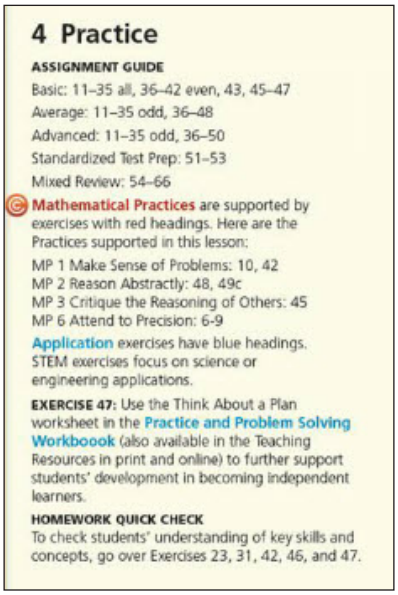
In the Reasoning and Writing exercises, do your students construct viable arguments and justify their conclusions?

Finally, in the Close question in the side margin, can your students connect their knowledge and understanding of the math content back to the Essential Understandings of the lesson?

When your students have demonstrated sufficient understanding through the Lesson Check, they are ready to practice what they have learned.

Practice

The Practice phase offers students opportunities to solidify their procedural fluency and conceptual understanding of the lesson content. The exercises with red headings and the CC logo indicate opportunities for students to build on the Standards for Mathematical Practice. The side notes specify specific problems that support the practices in the lesson.



4 Practice

ASSIGNMENT GUIDE

Basic: 11–35 all, 36–42 even, 43, 45–47

Average: 11–35 odd, 36–48

Advanced: 11–35 odd, 36–50

Standardized Test Prep: 51–53

Mixed Review: 54–66

Mathematical Practices are supported by exercises with red headings. Here are the Practices supported in this lesson:

MP 1 Make Sense of Problems: 10, 42
MP 2 Reason Abstractly: 48, 49c
MP 3 Critique the Reasoning of Others: 45
MP 6 Attend to Precision: 6-9

Application exercises have blue headings. STEM exercises focus on science or engineering applications.

EXERCISE 47: Use the Think About a Plan worksheet in the **Practice and Problem Solving Workboook** (also available in the Teaching Resources in print and online) to further support students' development in becoming independent learners.

HOMEWORK QUICK CHECK

To check students' understanding of key skills and concepts, go over Exercises 23, 31, 42, 46, and 47.

Error Analysis exercises require students to look for flaws in an argument as they critique the reasoning of others. Exercises with blue headings are multidisciplinary problem situations, including many science, technology, engineering, and mathematics (STEM) related situations.

Graphing Calculator exercises help students refine their strategic understanding of appropriate uses of tools.

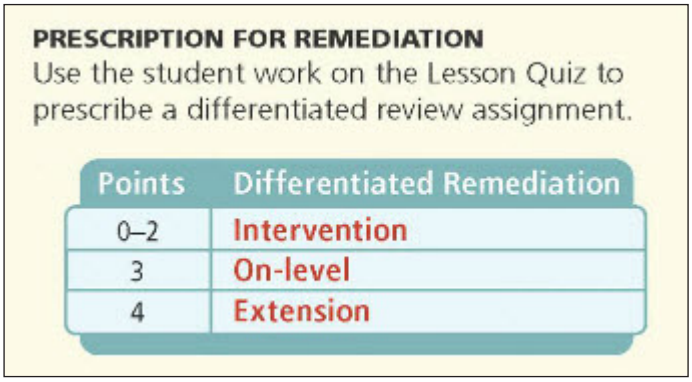
Reasoning exercises call for repeated reasoning about mathematical processes or methods.

The Think About a Plan exercises help students structure their thinking to analyze givens, relationships, and constraints as they look to develop a solution plan. Use the related worksheet to support students' development in problem-solving strategies

The Teacher's Edition provides Practice support in the side margins that includes suggested assignments, information about the mathematical practices and Homework Quick Checks. The Homework Quick Check denotes specific practice problems to go over with students to check their understanding of key skills and concepts.

Assess and Remediate

Each lesson ends with a Lesson Quiz and options for differentiated instruction. On the Lesson Resources pages of the Teacher's Edition, personalized prescriptions are available based on a student's Lesson Quiz results. These prescriptions enable teachers to make data-driven decisions about intervention, on-level, and extension assignments for their students. You can access these in the Teacher Resources print, online, and DVD versions.



PRESCRIPTION FOR REMEDIATION

Use the student work on the Lesson Quiz to prescribe a differentiated review assignment.

Points	Differentiated Remediation
0–2	Intervention
3	On-level
4	Extension

Other options include the Student Companion for scaffolded review and remediation and English Language Learner Support for vocabulary practice.

Review

This guide introduced how to teach a lesson with the Savvas High School Mathematics Common Core Edition. It explored the lesson structure and the lesson features that help students become proficient with the Standards for Mathematical Practice in the CCSSM.