



## Program Overview

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**Introduction** This guide introduces the Savvas Algebra 1, Geometry, and Algebra 2 Common Core Edition. It discusses the blended print and digital curriculum and describes how the curriculum is built on the program’s five essential components of learning. This guide also examines how the curriculum is built around the new Common Core State Standards for Mathematics (CCSSM).

Grab your Savvas High School Math Common Core materials so you can follow along here.

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**Guide to Implementing the Common Core State Standards** A good place to start is in your implementation guide—*Implementing the Common Core State Standards*. In this guide, you will find an overview of the Standards for Mathematical Content and the Standards for Mathematical Practice—the two sets of standards that make up the CCSSM.

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**Standards for Mathematical Practice** The Standards for Mathematical Content in high school consist of standards in six conceptual categories that define what students should understand and be able to do.

These conceptual categories are Number and Quantity, Algebra, Functions, Modeling, Geometry, and Statistics and Probability.

When students understand mathematical concepts, they can explain why a mathematical statement is true or where a mathematical rule comes from. *Implementing the Common Core State Standards* has explicit information on how the program teaches and assesses these standards and provides resources to help you teach them.

**As you work through the lessons, consider asking these questions to help your students develop proficiency with this standard:**

- What does your answer mean?
- How do you know that your answer is correct?
- If I told you I think the answer should be [a wrong answer], how would you explain to me why I’m wrong?

## Observation Protocol

For example, find the Observation Protocol that you can use to monitor your students' progress toward developing proficiency with the standards. The exercises with the red Common Core logo indicate opportunities for students to build on the Standards for Mathematical Practice.

Standards for Mathematical Practice Observational Protocol	
Name of Student	Dates of Observations
Suggested rating: P = shows proficiency; D = developing; E = emerging; O = No evidence	
<b>1. Make sense of problems and persevere in solving them.</b> 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	
<b>2. Reason abstractly and quantitatively</b> 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	
<b>3. Construct viable arguments and critique the reasoning of others.</b> a. asks appropriate questions b. compares and contrasts various solutions	c. explains solution and justifies conclusions d. recognizes flaws in logic/thinking
NOTES	
<b>4. Model with mathematics.</b> a. represents a problem situation b. identifies the key quantities c. represents relationships among quantities graphically	d. analyzes relationships of quantities e. explains relationships among quantities f. asks whether the solution is reasonable
NOTES	

Observation Protocol 31

The Observation Protocol provides a list of evident characteristics to look for as you observe your students solving these problems. Reproduce this protocol or download the protocol from PowerAlgebra.com or PowerGeometry.com from the Teacher Resources link. Use this observation tool for daily formative assessment during your instruction.

## Five Essential Components of Learning

Next, examine the five essential components that build the foundation for learning in the curriculum.


### Problem Solving

Problem Solving is the first essential component of learning and one of the foundations of Savvas High School Math Common Core Edition.

Find program features that support problem solving throughout the program in blue boxes. For example, Know-Need-Plan boxes step out the problem-solving process and help students find entry points and decontextualize the problem; they symbolically represent the problem situation.

**Problem 4** Using Factoring to Solve a Real-World Problem

**Photography** You are constructing a frame for the rectangular photo shown. You want the frame to be the same width all the way around and the total area of the frame and photo to be  $315 \text{ in.}^2$ . What should the outer dimensions of the frame be?



**Know**  
The size of the photo is 11 in. by 17 in. The total area is  $315 \text{ in.}^2$ .

**Need**  
The outer dimensions of the frame

**Plan**  
Write the frame's outer dimensions in terms of its width  $x$ . Use these dimensions to write an equation for the area of the frame and photo.

$$\begin{aligned}
 (2x + 11)(2x + 17) &= 315 \\
 4x^2 + 56x + 187 &= 315 \\
 4x^2 + 56x - 128 &= 0 \\
 4(x^2 + 14x - 32) &= 0 \\
 4(x + 16)(x - 2) &= 0 \\
 x + 16 = 0 &\text{ or } x - 2 = 0 \\
 x = -16 &\text{ or } x = 2 \\
 &\text{Solve for } x.
 \end{aligned}$$

The only reasonable solution is 2. So the outer dimensions of the frame are  $2(2) + 11$  in. by  $2(2) + 17$  in., or 15 in. by 21 in.

**Think**  
Why can you ignore the factor of 4? By the Zero-Product Property, one of the factors,  $4$ ,  $x + 16$ , or  $x - 2$ , must equal 0. Since  $4 \neq 0$ , either  $x + 16 = 0$  or  $x - 2 = 0$ .

Reasoning and Error Analysis exercises have students justify their thinking and critique the reasoning of others to help them become proficient thinkers and problem solvers.

**57. Reasoning** The diagram at the right shows the dimensions of a kite. The length of the vertical blue crosspiece is  $s$ . What is the length of the horizontal red crosspiece in terms of  $s$ ?

The exercises with blue headings are multidisciplinary problem situations, many of which have a science, technology, engineering, and math (STEM) focus. Application problems with the STEM label require students to apply their knowledge to solve real-world problems that focus on STEM topics.

**Problem 4** Rewriting a Formula **STEM**

**Biology** The monarch butterfly is the only butterfly that migrates annually north and south. The distance that a particular group of monarch butterflies travels is shown. It takes a typical butterfly about 120 days to travel one way. What is the average rate at which a butterfly travels in miles per day? Round to the nearest mile per day.

**Think**  
How do you know which formula to use? Read the information given in the problem. This problem gives you a measure of time and a distance. You need to find the rate, so use  $d = rt$ .

$$d = rt$$

Write the appropriate formula.

$$\frac{d}{t} = \frac{rt}{t}$$

Divide each side by  $t$ .

$$\frac{d}{t} = r$$

Simplify.

$$\frac{1700}{120} = r$$

Substitute 1700 for  $d$  and 120 for  $t$ .

$$14 \approx r$$

Simplify.

The butterflies travel at an average rate of about 14 mi per day.

**Got It?** 4. Pacific gray whales migrate annually from the waters near Alaska to the waters near Baja California, Mexico, and back. The whales travel a distance of about 5000 mi each way at an average rate of 91 mi per day. About how many days does it take the whales to migrate one way?

## Visual Learning

Visual Learning is the second essential component of learning, because it is a powerful method for making abstract ideas concrete.

Look at a few examples of visual learning in your curriculum resources. The Solve It! feature in each lesson makes use of engaging visuals to help students tap into their prior knowledge and connect to key concepts in the lesson.

Callouts draw students' attention to the important aspects of the problem that will help them develop solution plans.

Through visual learning, students make sense of problems more readily. This helps them make connections between real-life situations and mathematical models that represent the problems, all leading to mathematical proficiency.

The third essential component of learning is the Big Ideas. The Big Ideas in Savvas High School Math Common Core Edition align closely to the conceptual categories and domains of the Standards for Mathematical Content in the CCSSM.

## Big Ideas

Each Chapter Opener introduces the Big Ideas and Essential Questions. In the Chapter Review, students find answers to the Essential Questions for the Big Ideas.

Big Ideas and Essential Questions are based on the Understanding by Design® framework (the UbD™ framework). The UbD™ framework uses a backward design approach to develop curriculum. The program is built with the end result in mind which makes the curriculum more focused and more coherent.

**7 Chapter Review**  
Connecting BIG ideas and Answering the Essential Questions

**1 Equivalence**  
One way to represent numbers is in scientific notation. This form uses powers of ten to write very large or very small numbers.

**2 Properties**  
Just as there are properties that describe how to rewrite expressions involving addition and multiplication, there are properties that describe how to rewrite and simplify exponential expressions.

**3 Functions**  
The family of exponential functions has equations of the form  $y = a \cdot b^x$ . They can be used to model exponential growth or decay.

**Zero and Negative Exponents (Lesson 7-1)**  
 $10^0 = 1$   
 $10^{-3} = \frac{1}{10^3}$

**Scientific Notation (Lesson 7-2)**  
 $175,000,000,000,000 = 1.75 \times 10^{14}$   
 $0.0000568 = 5.68 \times 10^{-5}$

**Properties of Exponents (Lessons 7-3, 7-4, and 7-5)**  
 $5^2 \cdot 5^4 = 5^{2+4} = 5^6$   
 $(3^2)^4 = 3^{2 \cdot 4} = 3^8$   
 $(6a^3)^4 = 6^4 a^{12}$   
 $\frac{2^8}{2^5} = 2^{8-5} = 2^3$   
 $\left(\frac{7}{5}\right)^5 = \frac{7^5}{5^5}$

**Exponential Functions (Lesson 7-6)**  
 $y = 3 \cdot \left(\frac{1}{2}\right)^x$

**Exponential Growth and Decay (Lesson 7-7)**  
Exponential growth is modeled by the function  $y = a \cdot b^x$ , where  $a > 0$  and  $b > 1$ . Exponential decay is modeled by the function  $y = a \cdot b^x$ , where  $a > 0$  and  $0 < b < 1$ .

## Interactive Learning

The fourth essential component is Interactive Learning. This refers to the digital technologies that the program integrates into the curriculum.

PowerAlgebra.com and PowerGeometry.com serve as the portals into the digital world of Savvas High School Math Common Core Edition. Use these two Web sites as a stand-alone digital course or integrate them with print materials to provide a blended learning experience for students. This online learning environment also allows you to easily access resources, plan lessons, assign student work, and support students' understanding.

Your students have the opportunity to contribute their own digital content on PowerAlgebra.com and PowerGeometry.com with My Math Videos. These are student-produced videos that engage students in math concepts in settings that are relevant to their lives. Students can create and submit their own videos through the Pearson Video Challenge.

In addition to the full digital course access, there is also the Portable Study Center where students can download audio, video, and key lesson concepts to support their learning.

The digital features in the program help students make strategic decisions about using tools appropriately, which is an important skill in the CCSSM.

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**Differentiated Instruction**

The fifth essential component of learning is Differentiated Instruction. The CCSSM insist that all students have the instructional support they need so that they can meet all of the standards. Differentiating instruction helps students achieve this goal.

The Student Companion provides visuals and other learning aids, such as graphic organizers and vocabulary builders that can help all students be successful.

You will also find teaching tips, vocabulary support for English language learners, and built-in lesson support for Response to Intervention.

**ELL Support**

**Connect to Prior Knowledge** Review perfect squares. Write 1, 4, and 9 on the board. Ask students what they have in common. Then encourage students to guide you as you list more perfect squares on the board.

**Use Manipulatives** Model to students how to use grid paper to show a trinomial is a perfect square. One unit on the grid paper is "1", two vertical units is  $x$ , and a  $2 \times 2$  square unit is  $x^2$ .  $4x^2 + 4x + 1$  can be arranged into a perfect square. Challenge students to arrange other trinomials into squares and write the factors.

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**Assessment**

Next, examine how you will assess your students' learning. How will you assess their mastery of the CCSSM and prepare them for standardized tests?

Each lesson in the Teacher's Edition states the specific Standard for Mathematical Content that it addresses. The curriculum offers a wealth of formative and summative assessments that you can use to assess your students' mastery of these standards. You will also find assessments that measure your students' proficiency in the Standards for Mathematical Practice. Look at some examples of assessment options from your program resources.

**Content Standards**

**A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations...

**Also N.Q.1, A.CED.1, A.REI.1, A.REI.3**

This guide already discussed the Observation Protocol tool. Another example is the Pull It All Together task. This rich, layered task applies the Standards for Mathematical Practice and prepares students for performance assessments.

**2 Pull It All Together** ASSESSMENT

**To solve these problems you will pull together more concepts and skills that you have studied about solving equations and working with rates and proportions.**

**Idea: Equivalence**  
You can represent an equation in many ways. Equivalent representations have the same solution as the original equation.

**Performance Task 1**  
The solution of the equation  $3x + 7 = 2x + 10$  is shown. Use mathematical properties to explain your answers in each part below.

$3x + 7 = 2x + 10$	Subtract 7 from each side
$x + 7 = 2x + 10$	Simplify
$x = 2x + 10$	Divide each side by 2
$\frac{x}{2} = x + 5$	Simplify

**Idea: Solving Equations and Inequalities**  
You can use properties of numbers and equality to transform equations into equivalent, simpler equations and find solutions.

**Performance Task 2**  
Solve using two different methods. Explain which method you prefer to use.

a.  $24 = \frac{2}{3}x + 12$       b.  $0.5x + 12 = -2.5x - 8$       c.  $\frac{x^2 - 3}{x} = \frac{2}{3}$

**Idea: Proportionality**  
In a proportional relationship, the ratios of two quantities are equal. You can use this relationship to describe similar figures, scale models, and rates.

**Performance Task 3**  
Solve. Show all your work and explain your steps.  
A family rents a truck to move from Buffalo to Chicago. The rental has a base cost of \$40.95, plus an additional cost of \$1.29 per mile driven. The family also pays for gas, which costs \$3.09 per gallon. The truck's average gas mileage is 16 miles per gallon. What is the total cost of the move? *(Hint: Use the map to estimate the driving distance.)*

Map showing Buffalo, NY, Chicago, IL, and the route between them.

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MathXL for School is a powerful online homework, tutorial, and assessment system. It assigns students homework problems, automatically grades their work, and then provides immediate feedback and tutorial assistance to ensure content mastery before high-stakes tests.

With the Savvas High School Math Common Core Edition, you can be assured that you have all the tools you need to fully embrace the CCSSM and help your students be college and career ready by the completion of high school.

## Review

This guide talked about the Savvas High School Math Common Core Edition and discussed the blended print and digital curriculum. It introduced the five essential components of learning and discussed how to assess your students' knowledge and proficiency of the CCSSM.

For more information, please watch the other Savvas High School Math Common Core Edition tutorials on this Web site.