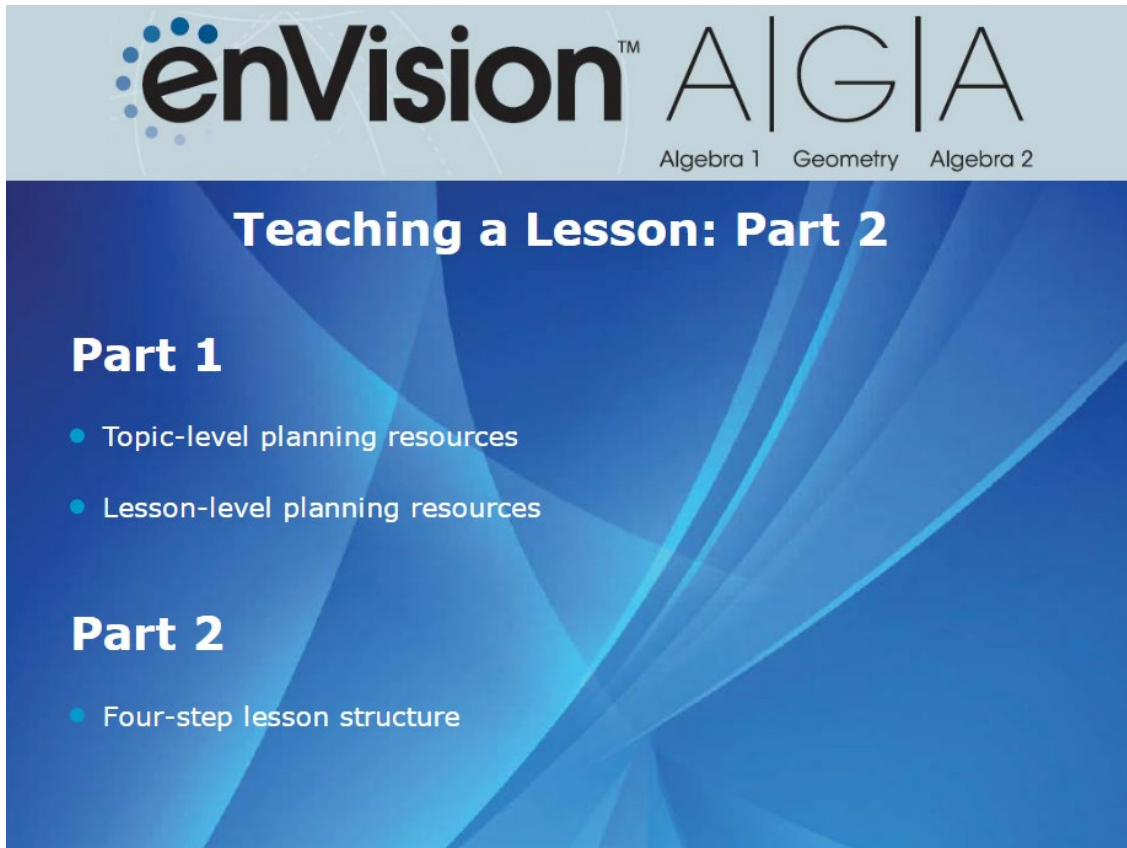


# enVision A|G|A

## Teaching a Lesson: Part 2

### *Introduction*



Thank you for watching Part 1 of the *enVision A|G|A Teaching a Lesson* tutorial.

In this tutorial, we explored the print and digital resources that help you plan your instruction at the topic and lesson level.

In this two-part tutorial, we'll explore how to teach a lesson using enVision A|G|A.

In Part 1 of this tutorial, we reviewed the print and digital planning resources at the topic and lesson level. We recommend viewing Part 1 prior to viewing this tutorial.

In this tutorial, we'll examine the instructional design of enVision A|G|A and how to teach using the four-step lesson structure.

You can follow along in the print or digital version of your Teacher's Edition.

There's a lot to explore in Part 2, so let's get started!

## Instructional Design

**Four-step lesson structure:**

- Step 1: Explore
- Step 3: Practice & Problem Solving
- Step 2: Understand & Apply
- Step 4: Assess & Differentiate

The collage displays various components of the lesson plan, including:

- STEP 1: Explore**: Critique & Explain, Instructional Focus, Student Companion, Before, Implement Tasks, Problem Solving, During, Support Productive Mathematics, For Early Finishers, After.
- STEP 2: Understand & Apply**: Introduce the Essential Question, Establish Mathematics, Implement Tasks, Problem Solving, Try It! Answer, Habits of Mind, Generalize, Additional Examples.
- STEP 3: Practice & Problem Solving**: Lesson Practice, Lesson Adaptation, Assignment Guide, Engage Through Student Agency, Item Analysis table.
- STEP 4: Assess & Differentiate**: Lesson Quiz, Assessment Resources.

Item	DOK	Skills Review and Practice
1	1	NS01
2	2	NS01
3	2	NS01
4	2	NS12
5	2	NS01

The enVision A|G|A instructional model is built on the interaction between problem-based learning and explicit visual instruction. These components are reflected in the four-step instructional design of each lesson: Explore, Understand & Apply, Practice & Problem Solving, and Assess & Differentiate. Please keep in mind that although lesson activities will vary, the four-step instructional design is the same for each course.

Next, let's dig in to each step.

## Step 1: Explore

**STEP 1 Explore**

**CRITIQUE & EXPLAIN**

**INSTRUCTIONAL FOCUS** Students use their knowledge of number classification to focus on characteristics that groups of real numbers have in common. They consider sets of real numbers and the relationship between rational and irrational numbers.

**STUDENT COMPANION** Students can complete the Critique & Explain activity in their Student Companion.

**Before** **WHOLE CLASS**

**Implement Tasks that Promote Reasoning and Problem Solving** **ETP**

**Q:** What do you notice about the numbers shown on the game cards? [They include whole numbers, decimals, fractions, integers, square roots.]

**During** **SMALL GROUP**

**Support Productive Struggle in Learning Mathematics** **ETP**

**Q:** In what ways are Cindy's numbers similar? Different? [Cindy's numbers are all rational numbers. One number is a decimal, one is a fraction, and one is a whole number.]

**Q:** In what ways are Victor's numbers similar? Different? [Victor's numbers are also all real numbers; two are irrational and one is rational.]

**For Early Finishers**

Have students make cards similar to those shown. They can make additional rules and play the game.

**Q:** Were you successful in getting three in a row? What type of numbers did you use? [Answers will vary.]

**After** **WHOLE CLASS**

**Facilitate Meaningful Mathematical Discourse** **ETP**

Facilitate a discussion about the characteristics of types of numbers and how they impact the game.

**Q:** If you could only win the game with three irrational numbers in a row, how could you use the number cards shown to win the game? [You could replace 1.3 with  $\sqrt{8}$ .]

**HABITS OF MIND** Use with CRITIQUE & EXPLAIN

**Construct Arguments** Cindy says that  $\frac{1}{3}$  is an irrational number because the decimal form doesn't terminate. Construct an argument to support or refute Cindy's position.

[It is true that the decimal form doesn't terminate. However, repeating decimal representations have a rational form.]

**Activity**

Critique & Explain is available at SavvasRealize.com.

**CRITIQUE & EXPLAIN**

**Q:** Cindy and Victor are playing a math game. The winner must get three in a row of the same type of real number and justify how the numbers are alike. Cindy said she won because she was able to get three rational numbers on a diagonal. Victor said he won with three positive numbers in a column.

**A:** Can both players say they won, to different answers? Explain.

Enter your answer.

**STUDENT EDITION**

**1-1 Operations on Real Numbers**

**CRITIQUE & EXPLAIN**

Cindy and Victor are playing a math game. The winner must get three in a row of the same type of real number and justify how the numbers are alike. Cindy said she won because she was able to get three rational numbers on a diagonal. Victor said he won with three positive numbers in a column.

**A:** Can both players say they won, to different answers? Explain.

**B:** Reason: Can you make other groups using the numbers shown that are all the same type of real number? How many ways can you do that?

**SAMPLE STUDENT WORK**

**A:** Yes, Cindy used a subset of real numbers called the rational numbers, while Victor chose "positive numbers" as a type of real number. He did not attach any special meaning to the word type.

**B:** Yes, you could group the numbers as rational and irrational. The number of ways you can make groups is only limited by the number of "kinds" of numbers you can think of. Examples include positive and negative numbers, numbers written with a radicand and those without, numbers whose square is an integer, and those that do not have integers as squares.

Problem-based launch activity

In Step 1: Explore, each lesson opens with a problem-based launch activity in which students work collaboratively to draw on their existing math knowledge.

Students can solve the problem in math journals, in the optional *Student Companion*, or online when you assign the task via Savvas Realize™.

Use questioning strategies to facilitate the Explore problem. The Teacher's Edition provides support to facilitate these question-driven conversations before, during, and after the activity. Throughout each lesson, the Effective Teaching Practice (ETP) icons alert you to questions and strategies that focus on the eight Effective Mathematics Teaching Practices.

As students work on the problem, determine which student work examples you want to share with the class. For students who have mastered the problem, provide differentiation by asking them to explore the For Early Finishers question.

Encourage your students to talk to each other about their methods and to evaluate the problem-solving process. Consider presenting some of the sample student work examples as additional strategies.

Finally, pose the Habits of Mind question (also available online) to encourage students to pause and reflect on their learning, and to make content connections.

## Step 2: Understand & Apply

The screenshot shows the Savvas Realize interface for Step 2: Understand & Apply. The interface is divided into several sections:

- INTRODUCE THE ESSENTIAL QUESTION:** Establish Mathematics Goals to Focus Learning. Introduce students to real numbers as the group of numbers that includes both rational and irrational numbers as subsets. Discuss their knowledge of properties of operations for rational numbers. Explain that they will build on this understanding and also expand it to include all real numbers.
- EXAMPLE 1 Understand Sets and Subsets:** Implement Tasks that Promote Reasoning and Problem Solving. Q: What do you notice that is common to both a set and its subsets? [The elements in the subset are also part of the set.] Q: In what other ways could you make subsets for set A? [Examples:  $F = \{1, 2, 3, 4, 5, 6, 7\}$ ] Try It! Answer: 1, 3, 9
- ADDITIONAL EXAMPLE 1:** In the given set of numbers, which elements are in both the subset of numbers divisible by 2 and the subset of numbers divisible by 3?  $A = \{5, 6, 7, 8, 9, 10, 11, 12\}$
- ADDITIONAL EXAMPLE 2:** The number  $\sqrt{25}$  is rational or irrational? [At first glance, it may seem like it is irrational because of the square root, but  $\sqrt{25}$  is a perfect square; its square root is 5. This is a decimal that terminates, so  $\sqrt{25}$  is irrational.]

Make the important mathematics of the lesson explicit through direct instruction

In Step 2: Understand and Apply, you will make the important mathematics of the lesson explicit with enhanced direct instruction that connects back to the problem in Step 1.

Begin by introducing the Essential Question to focus students' thinking on the key concepts of the lesson. Then use visual learning examples to connect students' thinking from the Explore section to the new mathematical ideas of the lesson.

Students can interact with these examples in their Student Editions or online through Savvas Realize. Use these visual examples to engage students in rich classroom conversations about multiple representations to deepen their conceptual understanding.

Every lesson has additional examples to extend students' learning and help make explicit the mathematical concepts presented. This includes Conceptual Understanding examples.

Many examples have embedded interactivities on Savvas Realize, powered by Desmos, to allow students to interact with modeling tools digitally.

In addition, specific examples are designed to help students develop procedural fluency and application skills. Please note that Geometry also has Proof examples.

As you teach Step 2, check for understanding by posing the Try It! and Habits of Mind questions to your students. Then use the results to guide your instruction. Use the Response to Intervention (RTI) notes in your Teacher's Edition to differentiate instruction for your struggling students.

The English Language Learners section provides strategies to support the development of your students' English language proficiency. Here you'll find specific guidance for the three levels of English language proficiency: Beginning, Intermediate, and Advanced.

Note that throughout Step 2, support for differentiated instruction is provided at point-of-use for all students, including your advanced learners.

At the end of Step 2, a Concept Summary presents a summary of the main math concepts in the lesson, along with guiding questions to help you monitor students' understanding.

Note that enVision A|G|A lessons are designed to span two days of instruction, and have natural breaks that occur at different places within the lesson. These breaks will not be in the same place for every lesson, but before or after the Step 2 Concept Summary may be a good stopping point.

## Formative Assessment Opportunities

STEP 2 Understand & Apply

### CONCEPT SUMMARY Operations on Real Numbers

**Q:** How do the examples in the middle row relate to the concepts in the first and third rows?  
[The examples in the *Numbers* row are specific values for  $a$ ,  $b$ ,  $c$ , and  $d$  that demonstrate that the equality in the *Algebra* row holds true for this particular set of values. The right side of the equality demonstrates the truth of the statements in the *Words* row.]

Do You UNDERSTAND? | Do You KNOW HOW?

Common Error

**Exercise 12** Students may assume that the side-length would need to be a rational number. Have students try a simpler problem where the area of a square is 8 square feet. Ask if the side length is rational. When students apply the area formula and use a calculator to solve, they recognize that the square root of 24,200 is irrational.

Formative assessment activities are available in print and online

product of rational numbers is a rational number. The sum of a rational and an irrational number is an irrational number. The product of a nonzero rational and an irrational number is an irrational number; the product of 0 and an irrational number is 0, which is rational.

2. Recall that the sum (or difference) of two rational numbers is always rational. Assume that the sum of a rational number and an irrational number is rational. That is,  $\text{rational number} + \text{irrational number} = \text{rational number}$ . Then,  $\text{irrational number} = \text{rational number} - \text{rational number}$ . This is always a false statement, so the assumption is also false. Therefore, the sum of a rational number and an irrational number is irrational.

SavvasRealize.com

#
Concept Summary, Do You Understand, and Do You Know How are available at SavvasRealize.com.

CONCEPT SUMMARY Operations on Real Numbers

<p><b>WORDS</b> The sum of two rational numbers is always rational. The product of two rational numbers is always rational.</p>	<p>The sum of a rational number and an irrational number is always irrational. The product of a nonzero rational number and an irrational number is always irrational.</p>
<p><b>NUMBERS</b> Sum: <math>\frac{2}{3} + \frac{4}{5} = \frac{22}{15}</math> Products: <math>\frac{2}{3} \cdot \frac{4}{5} = \frac{8}{15}</math></p>	<p>Sum: <math>\sqrt{3} + \frac{1}{2} = \frac{2\sqrt{3} + 1}{2}</math> Products: <math>\sqrt{3} \cdot \frac{1}{2} = \frac{\sqrt{3}}{2}</math></p>
<p><b>ALGEBRA</b> Sum: <math>\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}</math> Products: <math>\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}</math></p>	<p>Sum: <math>\frac{a}{b} + c \neq \frac{a+c}{b}</math>, when <math>c</math> is irrational Products: <math>\frac{a}{b} \cdot c \neq \frac{ac}{b}</math>, when <math>c</math> is irrational</p>

**Do You UNDERSTAND?**

- Essential Question** What are real numbers, and how can you describe the results of operations on real numbers?
- Communicate Precisely** Explain why the sum of a rational number and an irrational number is always irrational.
- Vocabulary** Are the rational numbers a subset of the set of all real numbers? Are the irrational numbers a subset of the irrational numbers? Explain.
- Error Analysis** Jacinta says that the product of a rational number and an irrational number is always irrational. Explain her error.
- Reason** Set C contains 5 elements. Set D contains 8 elements. Can D be a subset of C? Explain.

**Do You KNOW HOW?**


Determine whether set B is a subset of set A.

6.  $A = \{9, 1, 2, 4\}$     7.  $A = \{2, 3, 5, 7, 11\}$   
 $B = \{1, 2\}$             8.  $B = \{2, 5, 7, 9, 11\}$

For each number, describe the subsets of the real numbers it is an element of.

9. -8.1555  
 10. 17  
 11.  $\sqrt[3]{16}$

12. The park shown is in the shape of a square. Is the perimeter rational or irrational?  
 Area = 24,200  $\text{yd}^2$



TOPIC 1 Solving Equations and Inequalities

Each lesson contains formative assessment activities after the Concept Summary. These activities-called Do You Understand? and Do You Know How? - are available in print and online. Explore each area of the page to learn more.



## Step 3: Practice & Problem-Solving

**STEP 3 Practice & Problem Solving**

**PRACTICE & PROBLEM SOLVING**

Lesson Practice You may opt to have students complete the automatically scored Practice and Problem Solving items online powered by MathXL for School.

Choose from: Lesson Practice, Adaptive Practice

You may also take advantage of the bank of exercises for assigning additional practice.

**Assignment Guide**

On-Level	Advanced
13, 15, 17-37	13-19, 21, 23, 25-37

Engage Through Student Choice

Promote student agency by allowing students to choose practice items. You may structure this choice in many ways.

For example:

Assign each section a point value. Students choose at least one item from each section and items chosen should have a minimum of 20 total points.

Understand, Apply .....2 points each  
Practice.....1 point each  
Assessment Practice.....1 point each  
Performance Task .....3 points

**Item Analysis**

Example	Items	DOK
1	18, 19	1
	17	2
	16	3
2	20-25, 35, 36	1
	15	2
	34	3
3	13, 14, 26, 27	2
	30, 32, 33, 37	3
	16	1
4	30, 31	2
	31	3

**Answers**

13. a. rational  
b. rational

14. No; an irrational square root times itself gives a rational square.

15. The student incorrectly stated that set B is a subset of set C. All the elements of C are also in B, but B contains elements such as 4 and 7, which are not in C. So C is a subset of B.

16. a. Sometimes true; positive integers and zero are whole numbers, but negative integers are not.  
b. Always true; natural numbers are a subset of rational numbers.  
c. Never true; although integers and irrational numbers are both subsets of real numbers, they have no elements in common.

Assign practice to solidify student understanding

In Step 3: Practice and Problem Solving, you'll assign robust and balanced practice exercises to solidify student understanding.

You can use the Assignment Guide and Item Analysis features to help you decide the type and number of problems to assign in the Student Edition. The problems include conceptual understanding exercises and skill practice tasks as well as application exercises and assessment practice.

Additionally, Digital Resources icons identify the tools and practice options available online at Savvas Realize for each lesson.

You may opt to have students complete the Practice and Problem Solving items online, powered by MathXL for School®. These exercises are auto-scored so you can quickly see how students are doing. A Mixed Review assignment with built-in MathXL for School® learning aids is also provided for extra support and practice.

You can also assign Adaptive Practice and Homework to some or all of your students. The system gathers student performance information from assessments and assignments that students complete on Savvas Realize and uses that information to intelligently prescribe tasks and content to meet each student's learning needs.

## Step 4: Assess & Differentiate

**STEP 4 Assess & Differentiate**

**DIFFERENTIATED RESOURCES** I = Intervention O = On-Level A = Advanced

**Reteach to Build Understanding** I  
Provides scaffolded reteaching for the key lesson concepts.

**Additional Practice** I O  
Provides extra practice for each lesson.

**Enrichment** O A  
Presents engaging problems and activities that extend the lesson concepts.

**Mathematical Literacy and Vocabulary** I O  
Helps students develop and reinforce understanding of key terms and concepts.

**Digital Differentiated Resources**  
The Reteach to Build Understanding, Additional Practice, and Enrichment activities are available as digital assignments. These activities are automatically assigned when students complete the lesson quiz online and are automatically scored.

A library of resources offers opportunities to personalize learning

Finally, in Step 4: Assess and Differentiate, you check for understanding of lesson content and provide differentiation.

First, have students take the Lesson Quiz. The quiz is available in print and online, and you can use the results to assign differentiated interventions. The online version is auto-scored and auto-assigns intervention or enrichment based on students' results.

In the Teacher's Edition, the RtI guidance can help you prescribe differentiated resources to extend intervention, on-level, and advanced support. A library of print and online resources offers opportunities to personalize learning for your students. These resources include Reteach to Build Understanding, Additional Practice, Enrichment, and Mathematical Literacy and Vocabulary.

In addition, you can assign the MathXL for School: Additional Practice and Virtual Nerd™ tutorials for additional differentiated support and to assess your students' understanding.

## ***Closing***



**enVision™** A|G|A  
Algebra 1   Geometry   Algebra 2

### **Teaching a Lesson: Part 2**

- Print and digital planning resources
- Four-step lesson structure

For additional enVision A|G|A tutorials, visit  
**my SAVVAS Training**

Thank you for watching Part 2 of the **enVision A|G|A** Teaching a Lesson tutorial.

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