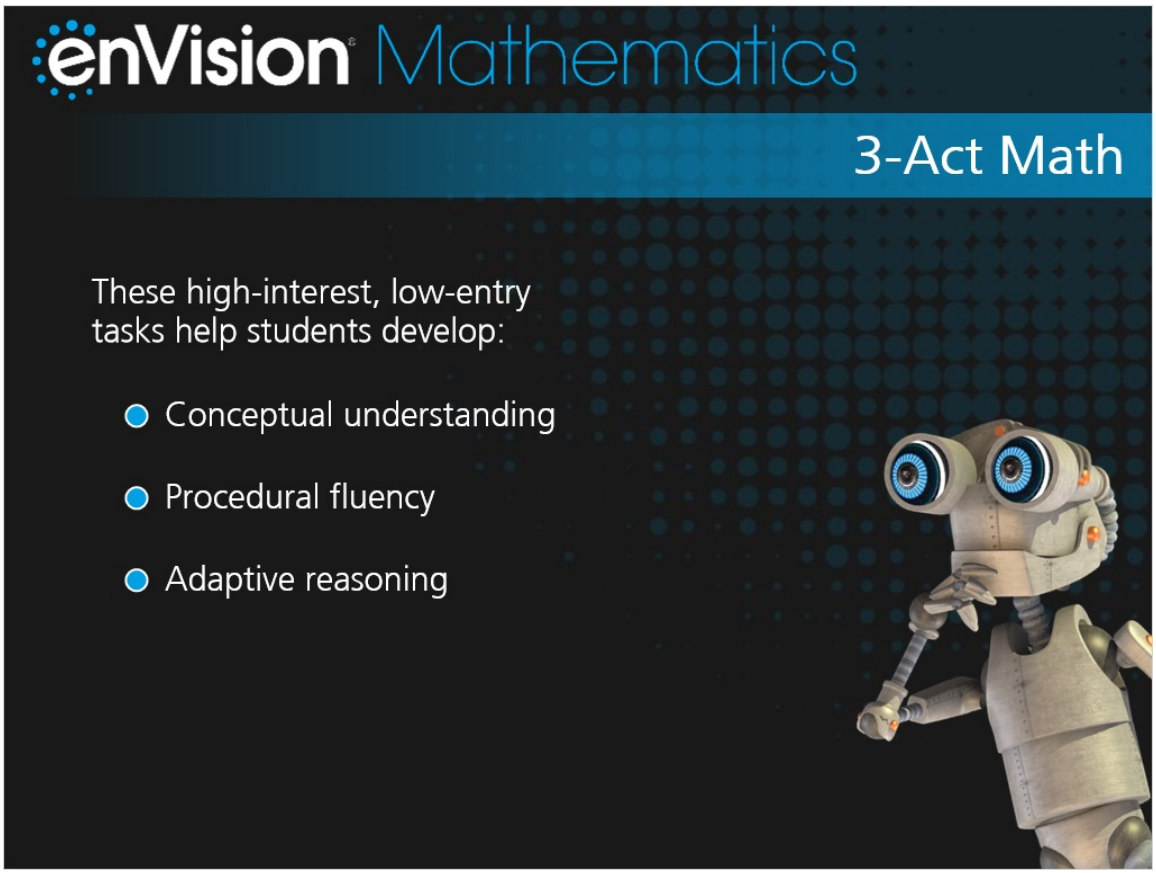
enVision Mathematics
3-Act Math

Introduction



Hi, **enVision** teachers! I'm glad you want to learn about 3-Act Math tasks.

These high-interest, low-entry tasks help all students develop conceptual understanding, procedural fluency, and adaptive reasoning as they test out different models and conjectures.

Let's dig in so you can see how these tasks help students learn to use mathematical models to solve real-world problems.

Planning and Pacing

Preview, plan, and generate student interest

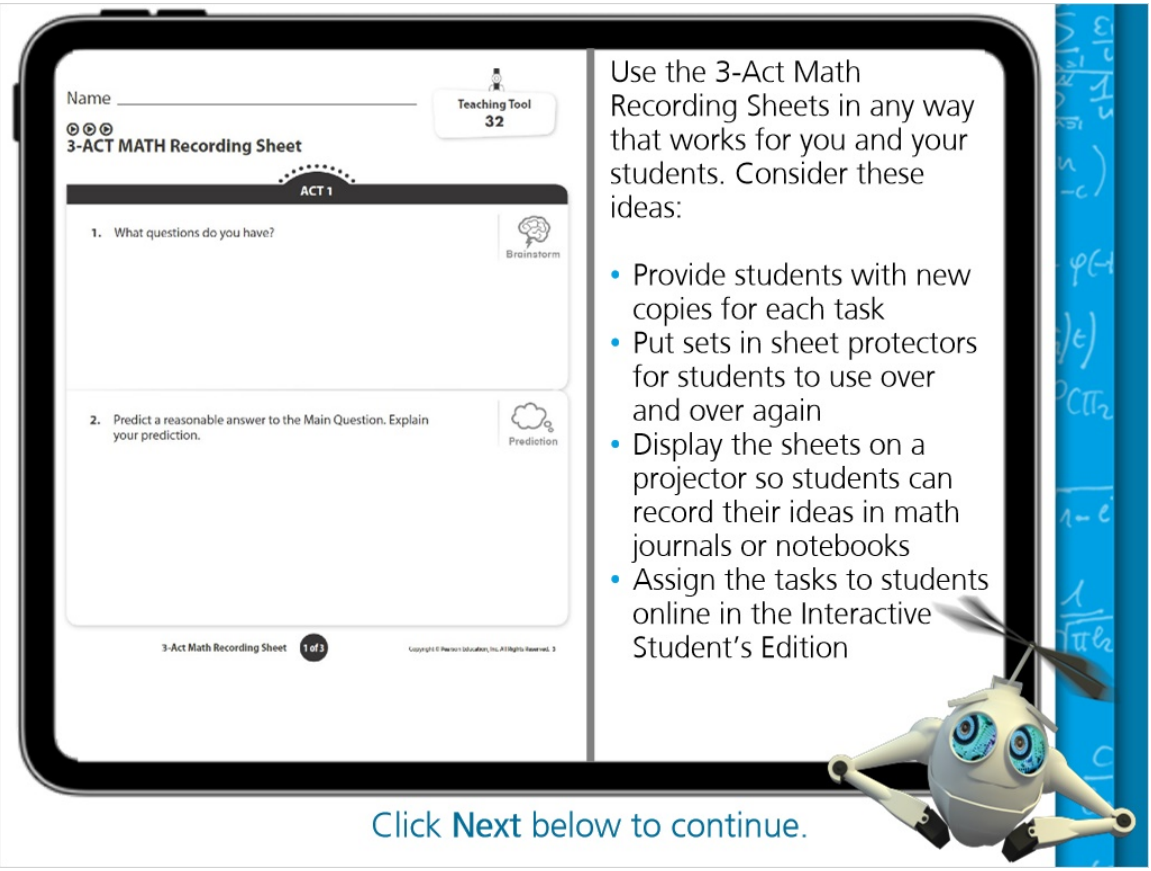
A 3-Act Math task is provided in each odd-numbered topic. Teach this task as the lesson for the day.

The task can be at the beginning, in the middle, or at the end of a topic, depending on when students will have learned the relevant content. Find pacing details in the Table of Contents of your Teacher's Edition.

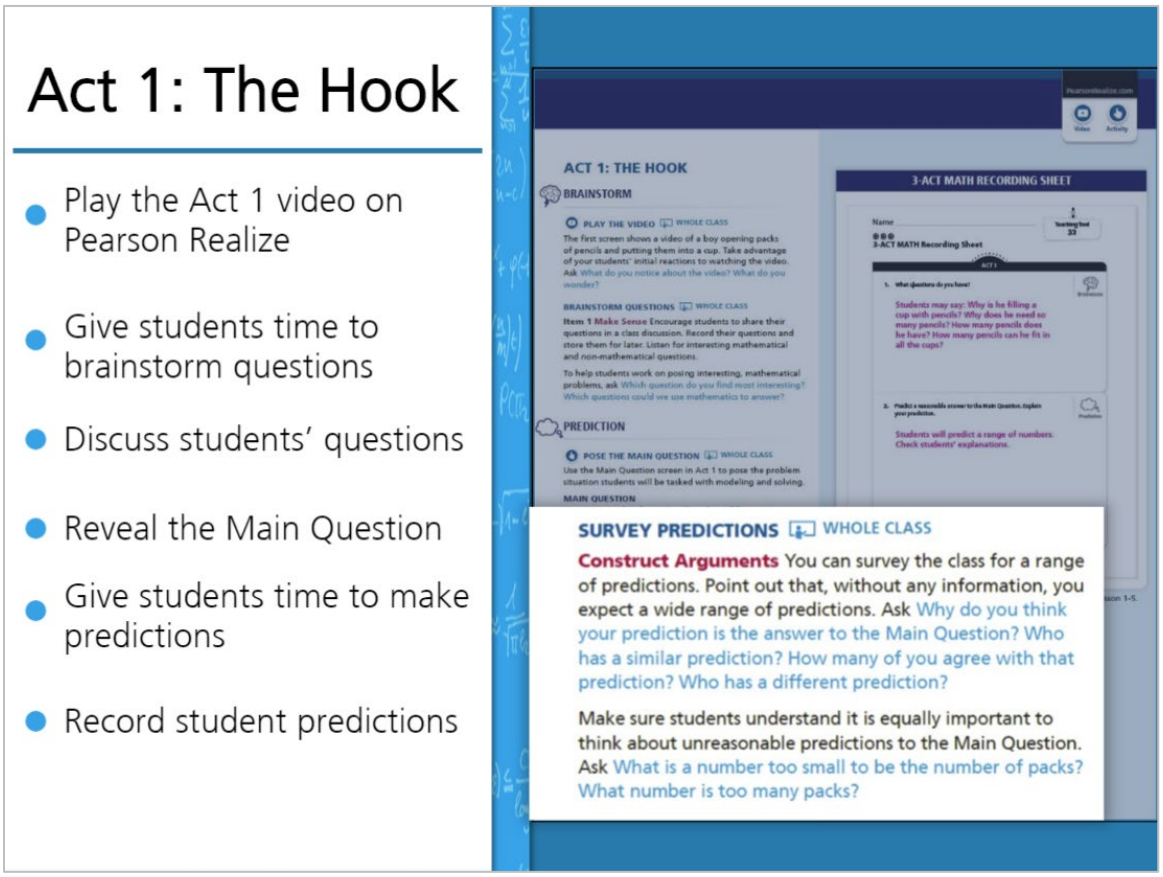
Use the Topic Overview to preview and plan for the task. Use the 3-Act Math Preview page in the Student's Edition to generate student interest at the beginning of the topic.

When teaching the task, give students the 3-Act Math Recording Sheets so they can record their ideas at each step. Find the sheets in the Teaching Tools section of your *Teacher's Resource Masters* book or online on Savvas Realize™. Open the **Teacher Resources** menu and select **Teaching Tools** to download the masters.

Quick Tip


Name _____
Teaching Tool 32
3-ACT MATH Recording Sheet
ACT 1
1. What questions do you have?
Brainstorm
2. Predict a reasonable answer to the Main Question. Explain your prediction.
Prediction
3-Act Math Recording Sheet 1 of 3
Use the 3-Act Math Recording Sheets in any way that works for you and your students. Consider these ideas:
• Provide students with new copies for each task
• Put sets in sheet protectors for students to use over and over again
• Display the sheets on a projector so students can record their ideas in math journals or notebooks
• Assign the tasks to students online in the Interactive Student's Edition
Click Next below to continue.

Act 1: The Hook

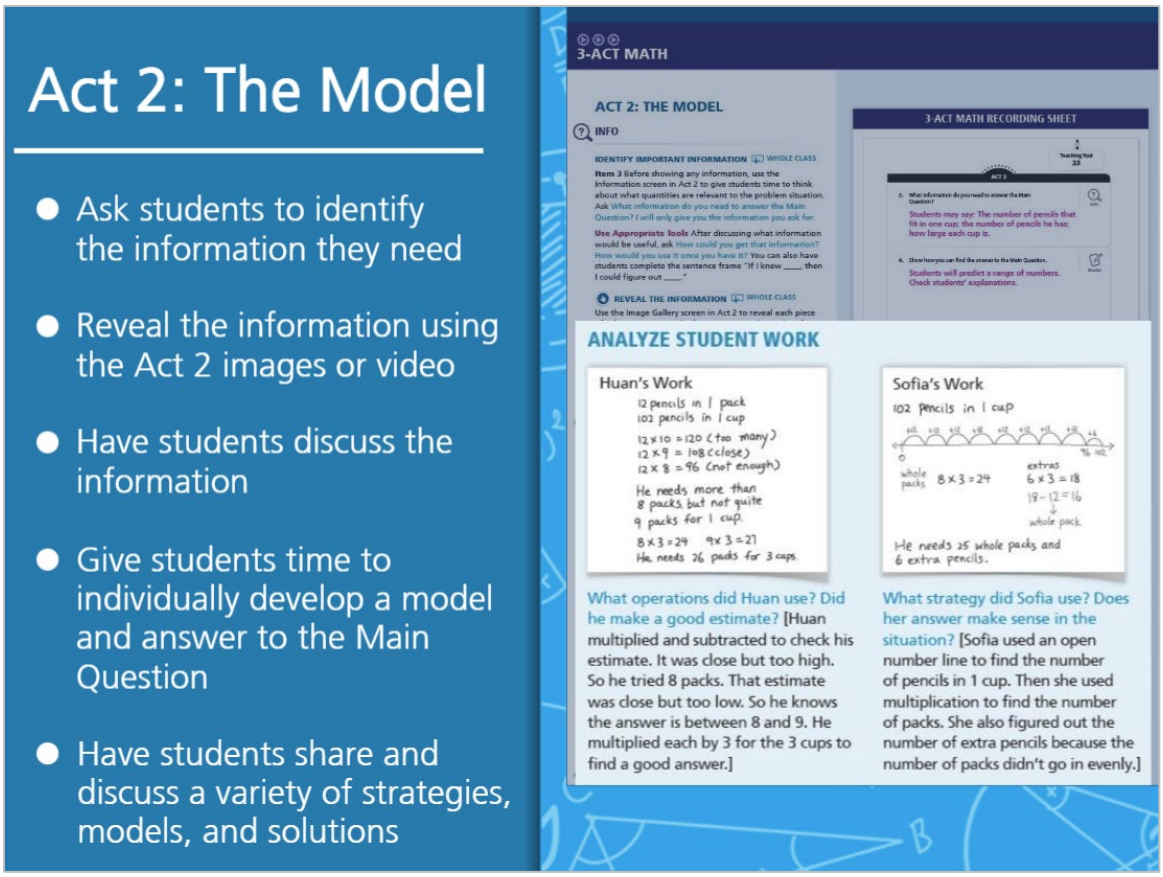


In Act 1: The Hook, play the Act 1 video. The video presents a problem situation and provides just enough information to get students thinking and talking.

Give students time to brainstorm possible questions they have about the video. Students can write their questions on the recording sheets.

Have students share some of their questions, and then reveal the Main Question. Give students time to predict answers to the Main Question. Finally, ask them to share their ideas and record their predictions for the whole class to see.

Act 2: The Model



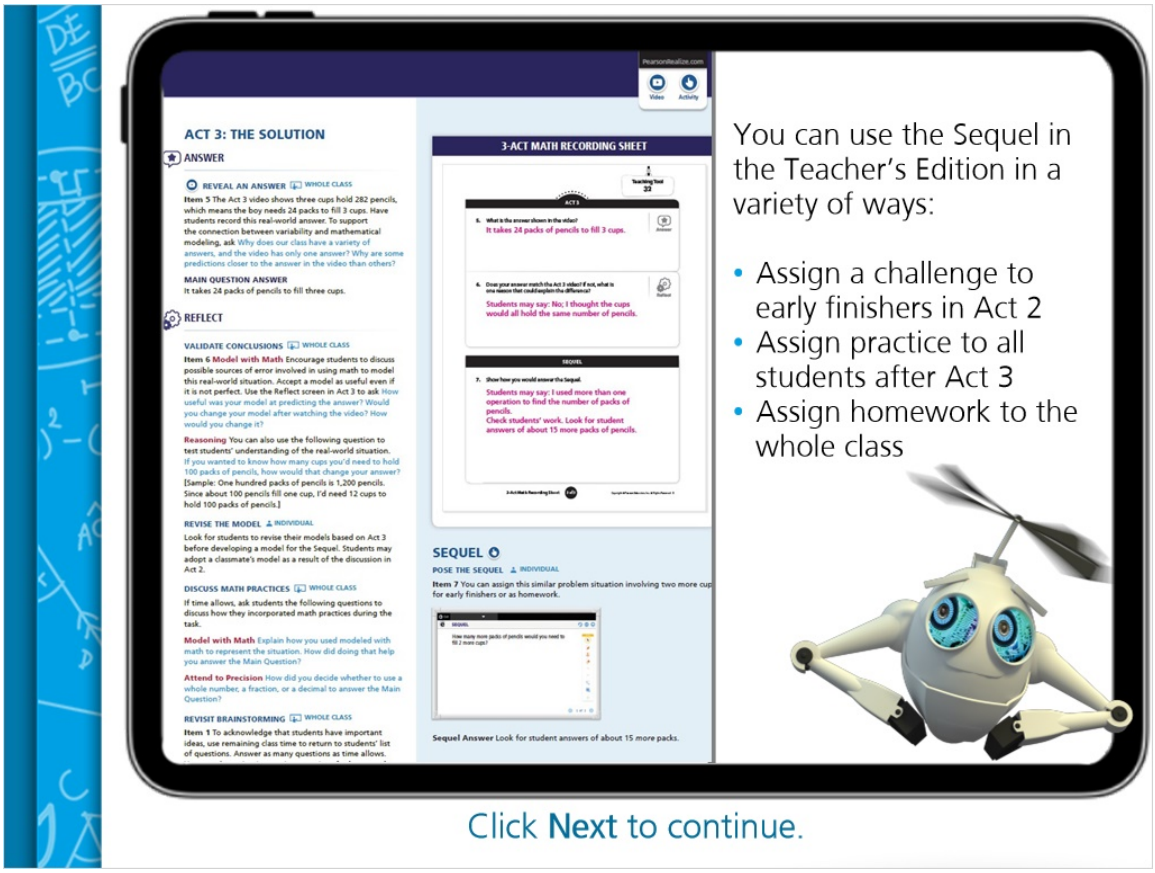
In Act 2: The Model, ask students to identify information they need to answer the Main Question.

After you collect students' ideas, reveal the information in Act 2. Ask students to discuss whether this information matches their expectations and predictions.

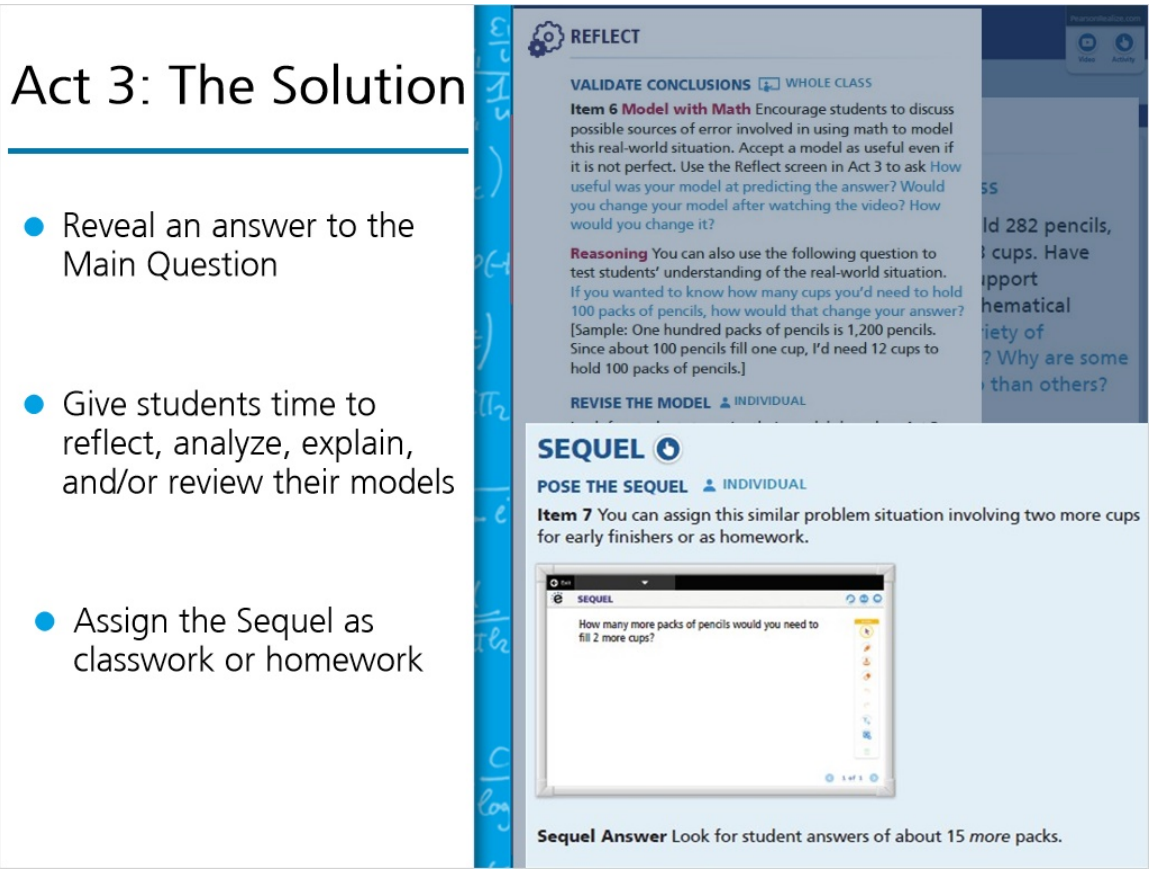
Then ask students to work individually to develop a model and solution to the Main Question. Encourage them to use any model to arrive at a solution that makes sense to them.

Have students share and discuss their strategies. Make sure to discuss a variety of different models and solutions. You can project sample student work shown in the Teacher's Edition using the last page of Act 2 on Savvas Realize.

Quick Tip


ACT 3: THE SOLUTION
ANSWER
REVEAL AN ANSWER
WHOLE CLASS
Item 5 The Act 3 video shows three cups hold 282 pencils, which means the boy needs 24 packs to fill 3 cups. Have students record this real-world answer. To support the connection between variability and mathematical modeling, ask Why does our class have a variety of answers, and the video has only one answer? Why are some predictions closer to the answer in the video than others?
MAIN QUESTION ANSWER
It takes 24 packs of pencils to fill three cups.
REFLECT
VALIDATE CONCLUSIONS
WHOLE CLASS
Item 6 Model with Math Encourage students to discuss possible sources of error involved in using math to model this real-world situation. Accept a model as useful even if it is not perfect. Use the Reflect screen in Act 3 to ask How useful was your model at predicting the answer? Would you change your model after watching the video? How would you change it?
Reasoning You can also use the following question to test students' understanding of the real-world situation. If you wanted to know how many cups you'd need to hold 100 packs of pencils, how would that change your answer? [Sample: One hundred packs of pencils is 1,200 pencils. Since about 100 pencils fill one cup, I'd need 12 cups to hold 100 packs of pencils.]
REVISE THE MODEL
INDIVIDUAL
Look for students to revise their models based on Act 3 before developing a model for the Sequel. Students may adopt a classmate's model as a result of the discussion in Act 2.
DISCUSS MATH PRACTICES
WHOLE CLASS
If time allows, ask students the following questions to discuss how they incorporated math practices during the task.
Model with Math Explain how you used modeled with math to represent the situation. How did doing that help you answer the Main Question?
Attend to Precision How did you decide whether to use a whole number, a fraction, or a decimal to answer the Main Question?
REVISIT BRAINSTORMING
WHOLE CLASS
Item 1 To acknowledge that students have important ideas, use remaining class time to return to students' list of questions. Answer as many questions as time allows.
3-ACT MATH RECORDING SHEET
It takes 24 packs of pencils to fill 3 cups.
Students may say: No; I thought the cups would all hold the same number of pencils.
Students may say: I used more than one operation to find the number of packs of pencils.
Check students' work. Look for student answers of about 15 more packs of pencils.
SEQUEL
POSE THE SEQUEL
INDIVIDUAL
Item 7 You can assign this similar problem situation involving two more cups for early finishers or as homework.
Sequel Answer Look for student answers of about 15 more packs.
You can use the Sequel in the Teacher's Edition in a variety of ways:
• Assign a challenge to early finishers in Act 2
• Assign practice to all students after Act 3
• Assign homework to the whole class
Click Next to continue.

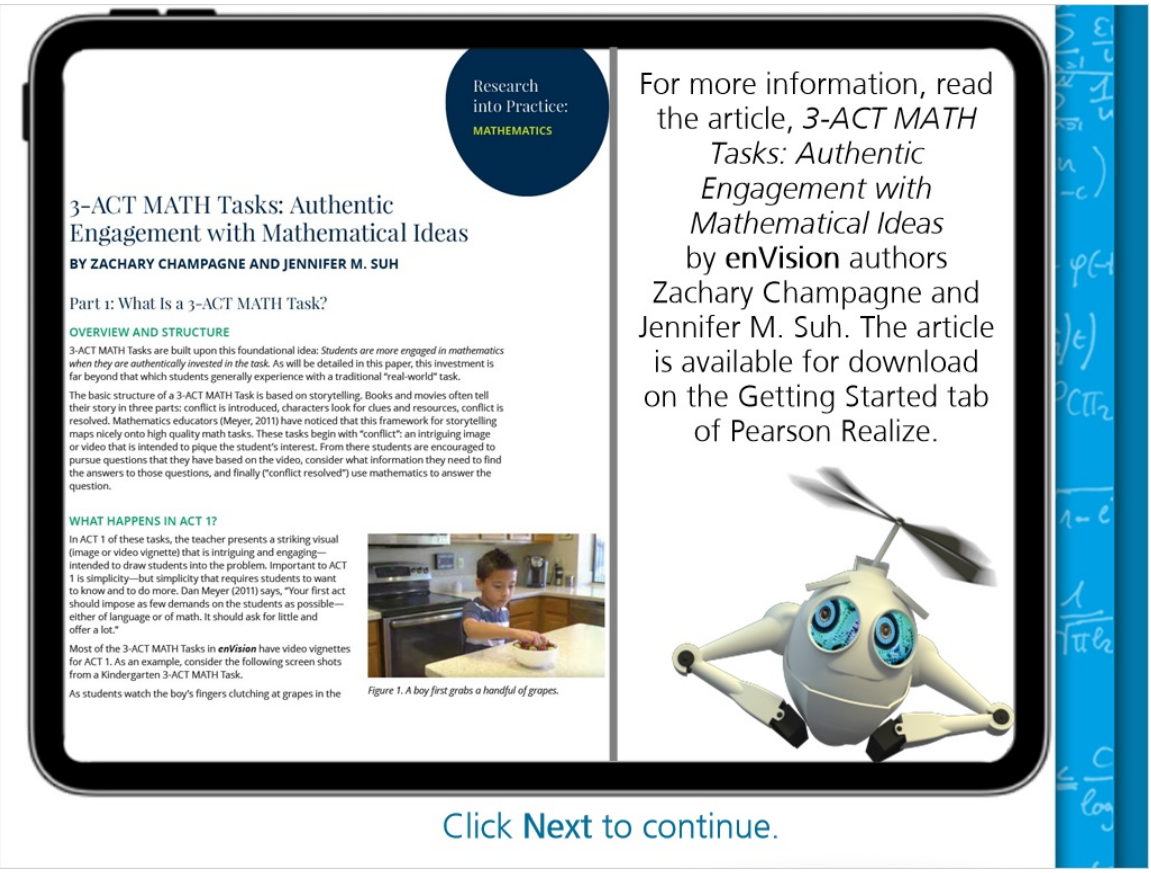
Act 3: The Solution



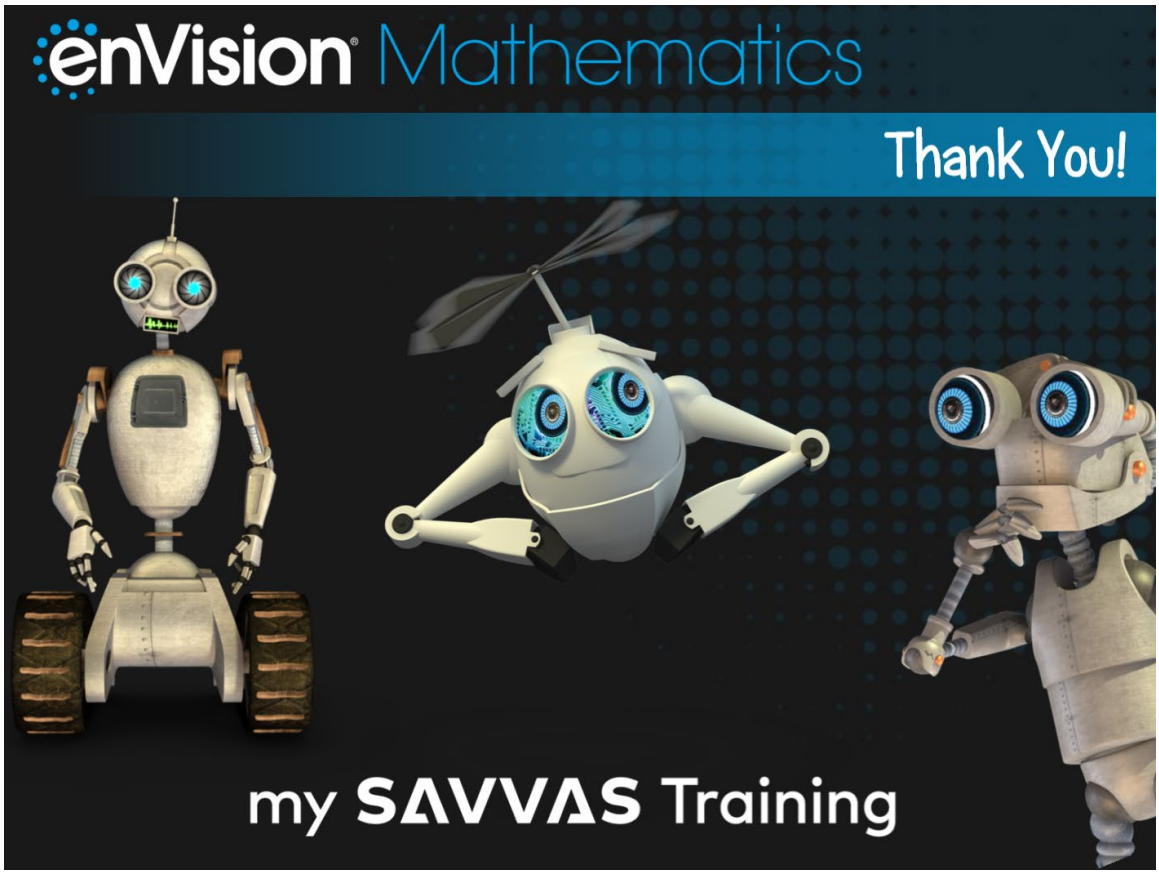
In Act 3: The Solution, play the video to reveal an answer to the Main Question.

Give students time to reflect, analyze, and explain differences between their answers and the actual solution. Lead a discussion to help students develop the math practices and give students time to revise their models or work on the Sequel.

Quick Tip


Research into Practice: MATHEMATICS
3-ACT MATH Tasks: Authentic Engagement with Mathematical Ideas
BY ZACHARY CHAMPAGNE AND JENNIFER M. SUH
Part 1: What Is a 3-ACT MATH Task?
OVERVIEW AND STRUCTURE
3-ACT MATH Tasks are built upon this foundational idea: Students are more engaged in mathematics when they are authentically invested in the task. As will be detailed in this paper, this investment is far beyond that which students generally experience with a traditional "real-world" task.
The basic structure of a 3-ACT MATH Task is based on storytelling. Books and movies often tell their story in three parts: conflict is introduced, characters look for clues and resources, conflict is resolved. Mathematics educators (Meyer, 2011) have noticed that this framework for storytelling maps nicely onto high quality math tasks. These tasks begin with "conflict": an intriguing image or video that is intended to pique the student's interest. From there students are encouraged to pursue questions that they have based on the video, consider what information they need to find the answers to those questions, and finally ("conflict resolved") use mathematics to answer the question.
WHAT HAPPENS IN ACT 1?
In ACT 1 of these tasks, the teacher presents a striking visual (image or video vignette) that is intriguing and engaging—intended to draw students into the problem. Important to ACT 1 is simplicity—but simplicity that requires students to want to know and to do more. Dan Meyer (2011) says, "Your first act should impose as few demands on the students as possible—either of language or of math. It should ask for little and offer a lot."
Most of the 3-ACT MATH Tasks in enVision have video vignettes for ACT 1. As an example, consider the following screen shots from a Kindergarten 3-ACT MATH Task.
As students watch the boy's fingers clutching at grapes in the
Figure 1. A boy first grabs a handful of grapes.
For more information, read the article, 3-ACT MATH Tasks: Authentic Engagement with Mathematical Ideas by enVision authors Zachary Champagne and Jennifer M. Suh. The article is available for download on the Getting Started tab of Pearson Realize.
Click Next to continue.

Closing



Thanks for learning more about 3-Act Math tasks! These tasks provide an engaging way for students to learn mathematical modeling skills that they'll use throughout their lives!

Keep digging in to My Savvas Training to learn more about **enVision** Mathematics!