

Grades K-12

**enVision<sup>®</sup>**

# Mathematical Modeling in 3 Acts



## In Typical Textbook Problems...

Students are given a problem to solve.  
The problem is already defined for students.

21. The principal at Concord High School's graduation reads names off a list at an average rate of eight names per minute. There are 288 students in the graduating class. **How long will the ceremony last?**

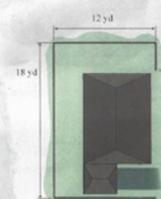
Students are given all the information required to solve the problem. Students are rarely required to determine all the information necessary to solve the problem because all the data needed to solve the problem is already provided for them.

21. The principal at Concord High School's graduation reads names off a list at an average rate of **eight names per minute**. There are **288 students** in the graduating class. How long will the ceremony last?

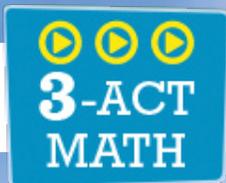
Students flip to the back of the book to see if they got the right answer. If students don't get the correct answer, they ask for the formula to use (or where they went wrong with the formula) to solve the problem.

17. Michael, then Roy  
19. 15 Inches  
**21. 36 Minutes**  
23. 47.5 Feet  
25. Allison shoots ball

Students move onto another word problem that's just like the word problem they just solved.



Kiri needs to replace the wooden fence that surrounds her yard. She measured her property, and it was 18 yards wide and 12 yards deep. There is no fence in front of her house, and the gap in the fence at the front of the property is 42 feet, as shown in the diagram. Kiri plans to replace the existing fence pickets with 5-foot long cedar boards placed vertically. The boards are 5 1/2 inches wide and will be spaced 1/4 inch apart. She placed an order for 275 boards. Did she order enough?



# In Mathematical Modeling in 3 Acts...



Grade 6 Act 1 Video

## The Hook:

Students watch a video that prompts them to ask questions—in this case, “How many shoes can he pack?” Rather than being given all information up front, students actively define the word problem they are going to solve. **Act One** provides an entry point for every student, no matter their level of mathematical proficiency.



Grade 6 Act 2 Video

## The Model:

Students model with mathematics. Here, students figure out how they can determine how many pairs of shoes can be packed while remaining within the suitcase weight limit. Students apply the mathematical concepts learned in the chapter and select the appropriate tools to solve the problem they defined in **Act One**. This is closer to the work of STEM professionals—it’s both more challenging, and more fun.



Grade 6 Act 3 Video

## The Solution:

Students watch a video where the answer to the problem is revealed. In **Act Three**, students root for their conjectures and analyze their results. This act of analyzing and justifying solutions embodies the spirit of the Standards for Mathematical Practice.

### Pose the Sequel

**Be Precise** Use **Question 15** to present a similar problem situation involving inequalities. You can assign to early finishers or as homework so students can test the usefulness of their models.

**Q:** A different airline has a weight limit of 40 pounds for a checked bag. Explain how the answer would change for this airline.

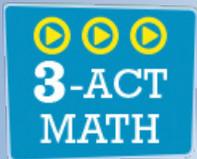
Using their models and the answer in the video, look for student solutions around 13 or 14 pairs of shoes.

**Q:** If the weight limit were 100 pounds, would your answer be twice the answer in the video? **[No; Sample answer: Twice as many pairs of shoes wouldn't fit in the suitcase.]**

## Sequel:

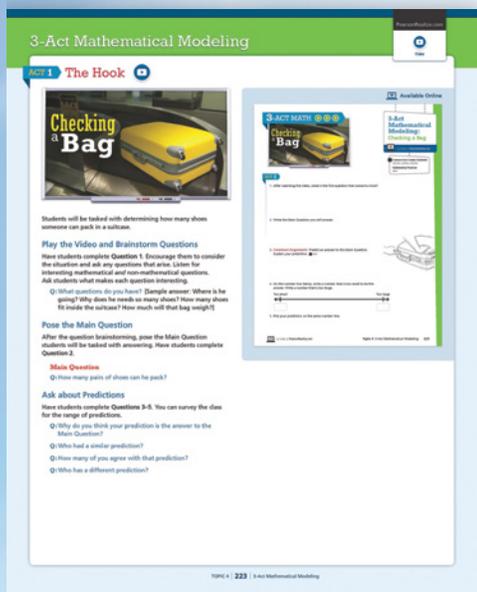
Students can extend their learning with a **Sequel** problem. The **Sequel** is a reimagined word problem related to the original problem, which requires students to model with mathematics.

Grade 6 Sequel Problem



## 3-Act Math Modeling

Teacher and student support is available in print. Or, you can access everything online, including multimedia, at [Savvas Realize.com](https://www.savvasrealize.com).



Sample of Teacher Support

## Components

- **Engaging Multimedia**  
3-Act Math Modeling Video for every 3-Act Math problem.
- **Robust Teacher Support**  
Teacher support for every 3-Act Math Modeling Task.
- **Student Support**  
Accompanying student support for every 3-Act Math Modeling Task is available to help with solution planning, analyzing conjectures, and justifying results.

**We are privileged ambassadors of a message that math models your world. We're in a privileged position, and we've got to make good on it.**

– Dan Meyer, 2012  
“Why Students Hate Word Problems”  
MISA talk

**An overarching goal of including 3-ACT MATH Tasks in classrooms is to engage students in being both problem posers and problem solvers as they determine solutions to authentic questions.**

– Zak Champagne,  
enVision K-8 Author



For Grades K-12, visit [SavvasRealize.com](https://www.savvasrealize.com). Download additional lesson resources and videos at [Savvas.com/3am](https://www.savvas.com/3am)

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