STEM

enVision K12 Math Series

The **enVision** K12 Math Series presents STEM Projects ("Math and Science Project" for grades K-5) in every topic, at every grade level. The objective of each project connects math to real social, economic, and environmental issues through a scientific lens—from Earth sciences to biology, engineering to physics, or astronomy to anatomy, just to name a few.

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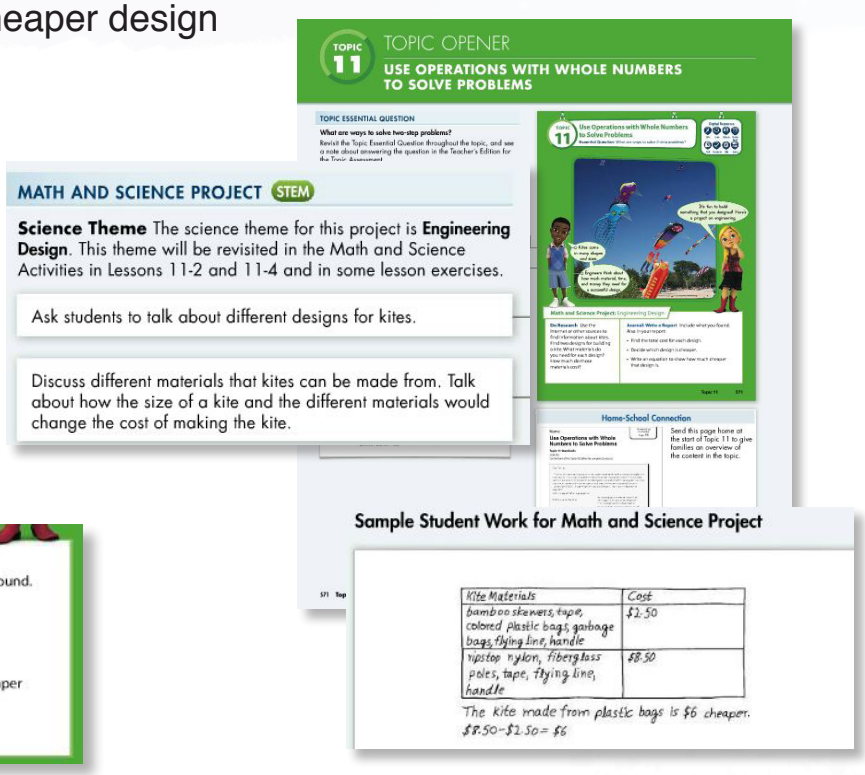
Engineering

Grade 3: Students are introduced to engineering design:

- Discuss different kite designs
- Discuss different kite materials and varying costs per material
- Find total cost per design
- Determine the cheaper design
- Write equation to show the cheaper design



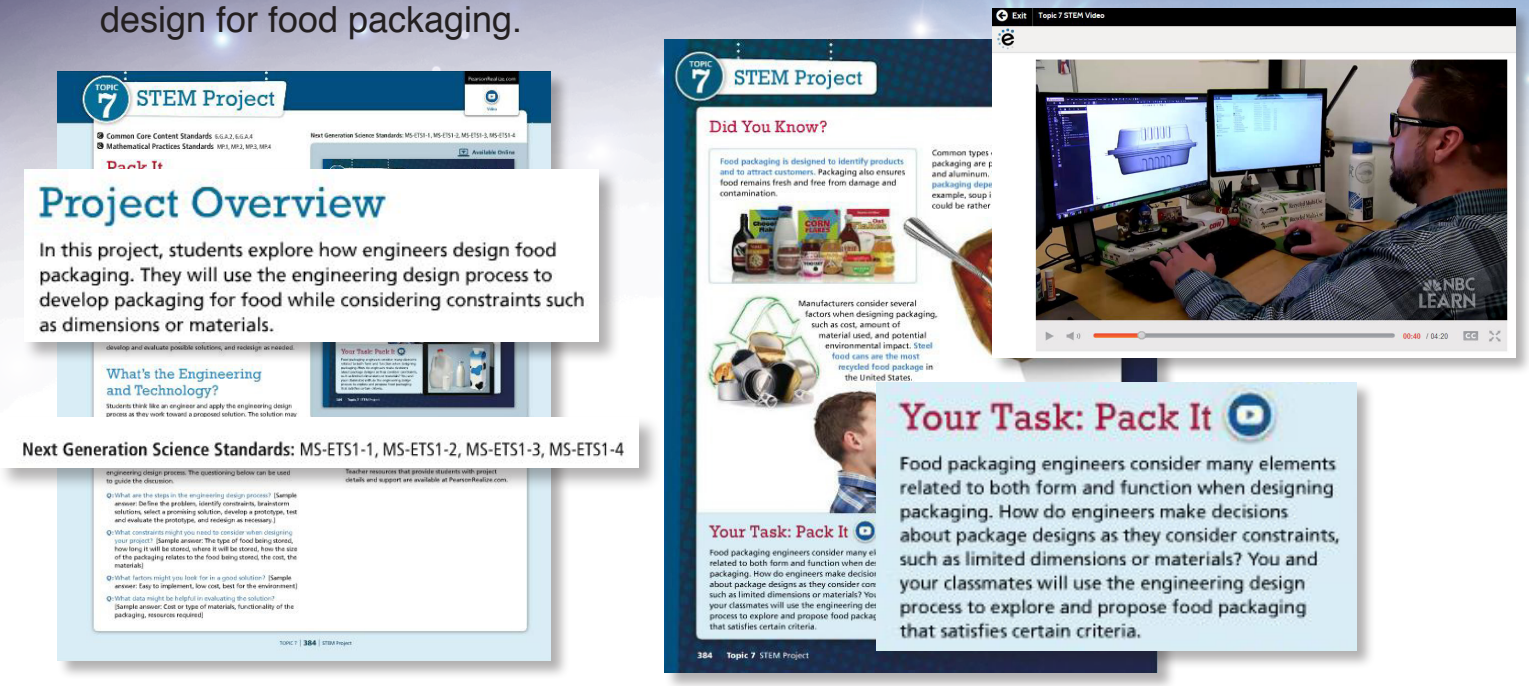
Where's the Math?

Students examine relationships between quantities in a two-step word problem by writing equations. They draw diagrams and write equations using different operations.

Where's the Science?

Students apply engineering design as they research possible kite construction solutions and modify as necessary. They determine which materials are most efficient yet cost effective.

Grade 6: Students revisit engineering design in “Pack It,” which explores design for food packaging.



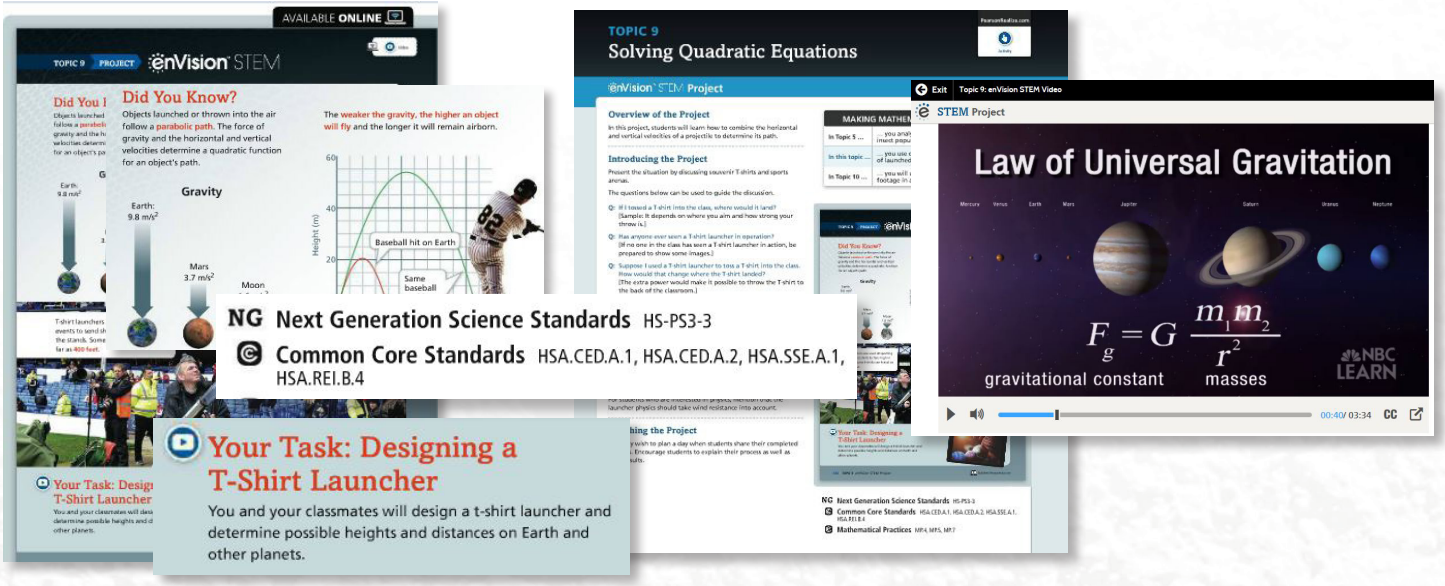
Where’s the Math?

Students use geometry to determine how the volume of the packaging relates to the volume of the food item being packaged. Student use nets to illustrate possible solutions to the task.

Where’s the Science?

Students investigate solutions through the engineering design process. They define the problem, identify constraints, brainstorm solutions, create prototypes, test, and evaluate.

Algebra 1: Students apply engineering design when asked to design a T-shirt launcher.



Where’s the Math?

Students will learn how to combine the vertical and horizontal velocities of a projectile to determine its path.

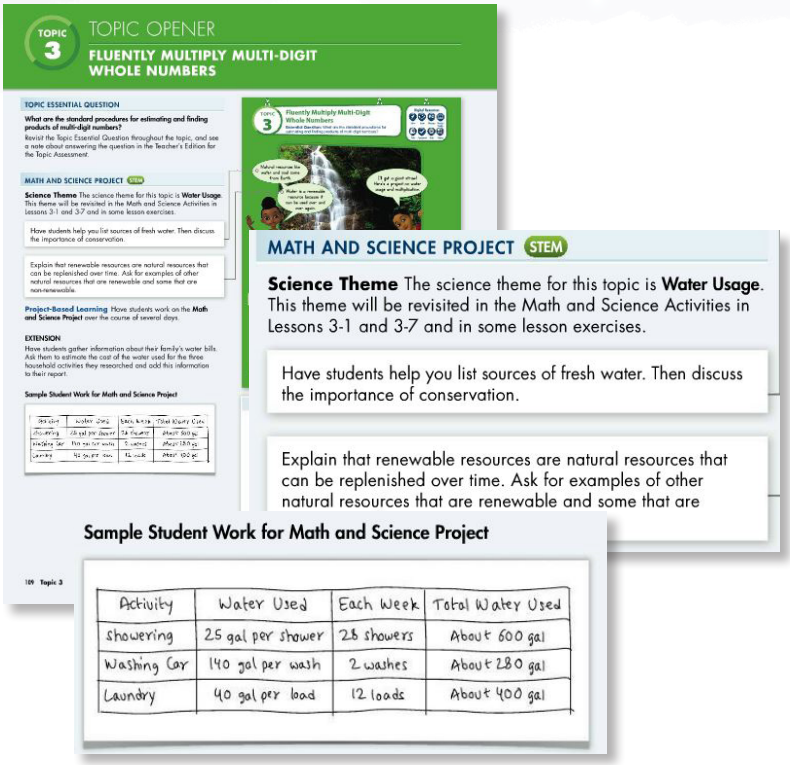
Where’s the Science?

As students design their T-shirt launcher, they must determine possible heights and distances on Earth as they relate to gravity. Students may also consider physics by taking wind resistance into account.

Natural Resources

Grade 5: Students explore water usage and the importance of conservation:

- Identify sources of freshwater and the importance of conservation
- Distinguish between renewable and non-renewable resources
- Compare the cost of water in everyday activities and estimate weekly water usage



TOPIC 3 TOPIC OPENER

FLUENTLY MULTIPLY MULTI-DIGIT WHOLE NUMBERS

MATH AND SCIENCE PROJECT STEM

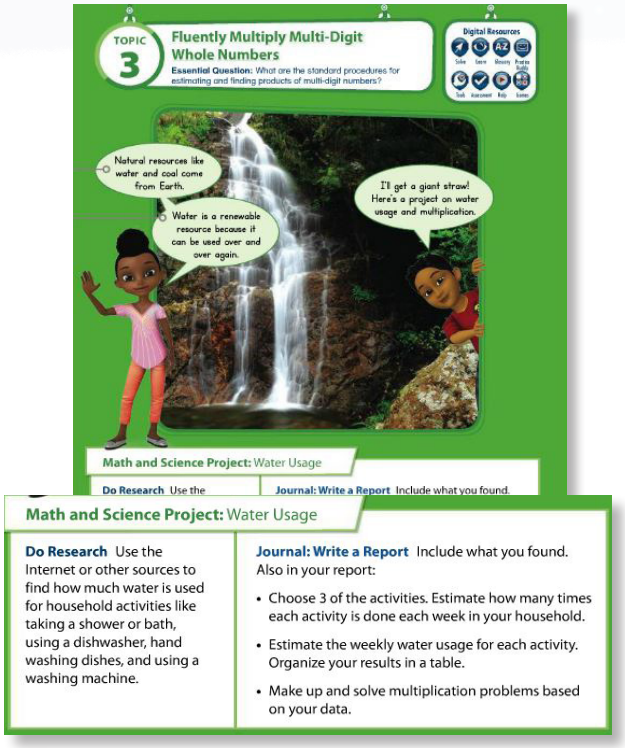
Science Theme The science theme for this topic is **Water Usage**. This theme will be revisited in the Math and Science Activities in Lessons 3-1 and 3-7 and in some lesson exercises.

Have students help you list sources of fresh water. Then discuss the importance of conservation.

Explain that renewable resources are natural resources that can be replenished over time. Ask for examples of other natural resources that are renewable and some that are

Sample Student Work for Math and Science Project

Activity	Water Used	Each Week	Total Water Used
showering	25 gal per shower	28 showers	About 600 gal
Washing Car	140 gal per wash	2 washes	About 280 gal
Laundry	40 gal per load	12 loads	About 400 gal



TOPIC 3 Fluently Multiply Multi-Digit Whole Numbers

Essential Question: What are the standard procedures for estimating and finding products of multi-digit numbers?

Digital Resources

Natural resources like water and coal come from Earth.

Water is a renewable resource because it can be used over and over again.

I'll get a giant straw! Here's a project on water usage and multiplication.

Math and Science Project: Water Usage

Do Research Use the Internet or other sources to find how much water is used for household activities like taking a shower or bath, using a dishwasher, hand washing dishes, and using a washing machine.

Journal: Write a Report Include what you found. Also in your report:

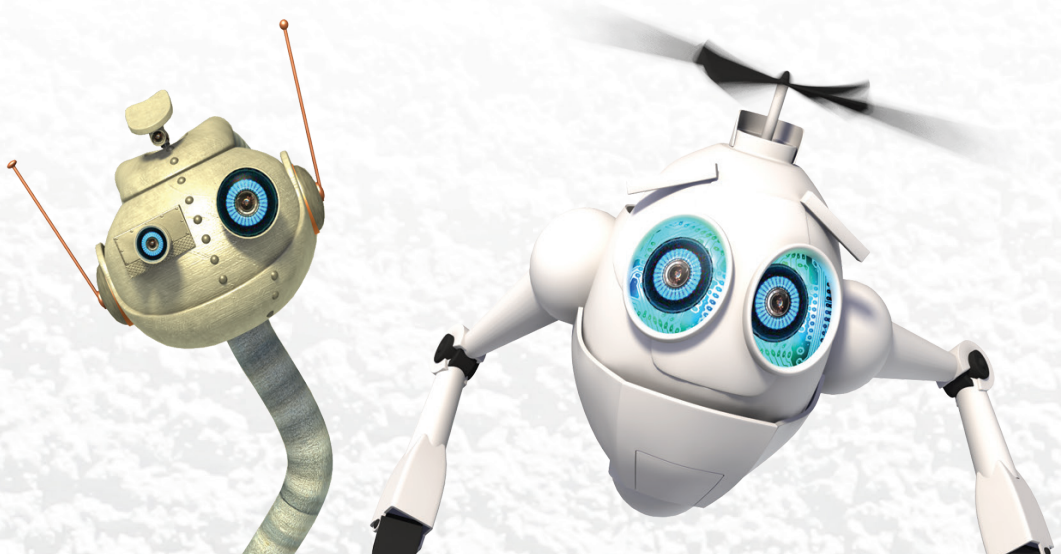
- Choose 3 of the activities. Estimate how many times each activity is done each week in your household.
- Estimate the weekly water usage for each activity. Organize your results in a table.
- Make up and solve multiplication problems based on your data.

Where's the Math?

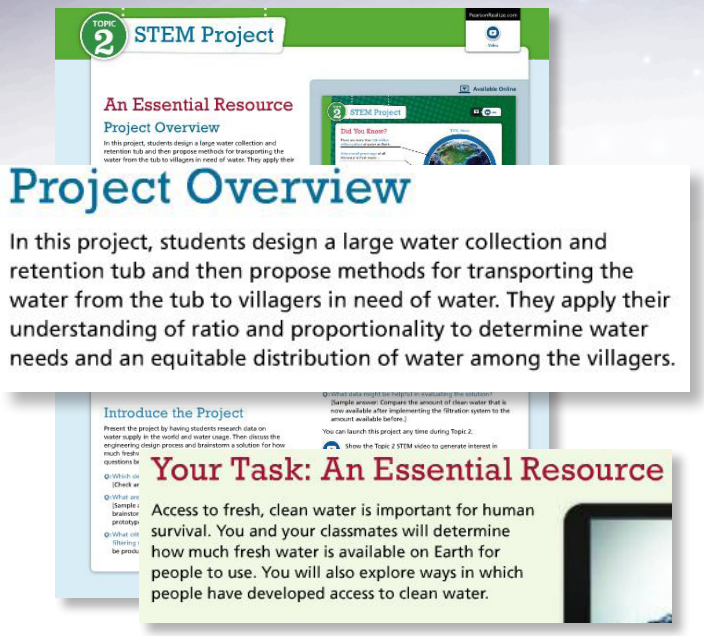
Students will apply the standard procedures for estimating and finding products of multi-digit numbers.

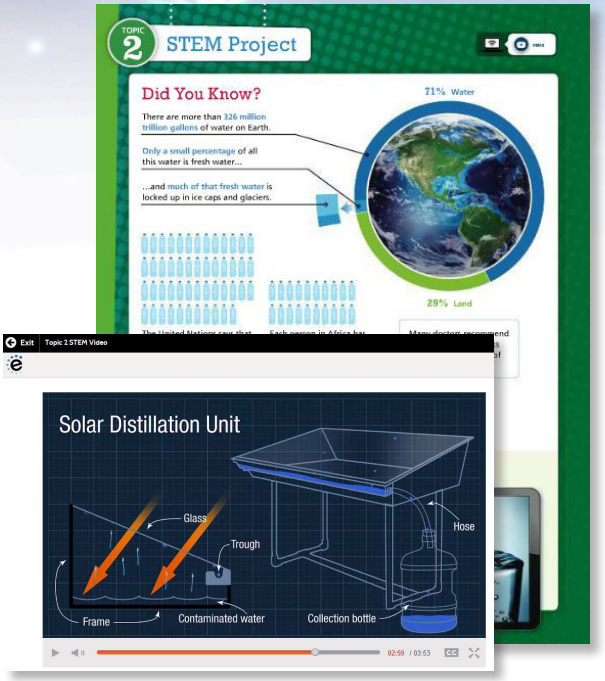
Where's the Science?

Students identify sources of freshwater, learn the importance of water conservation, and natural resources that are renewable or non-renewable.



Grade 7: Students find ways to provide accessibility to clean fresh water for various populations.





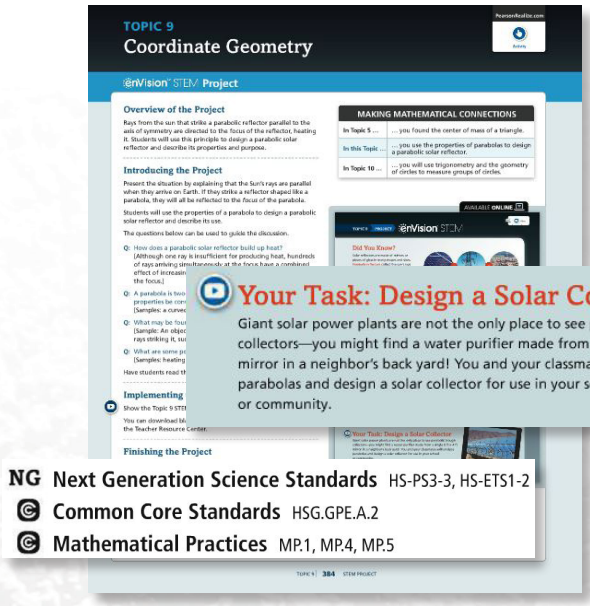
Where's the Math?

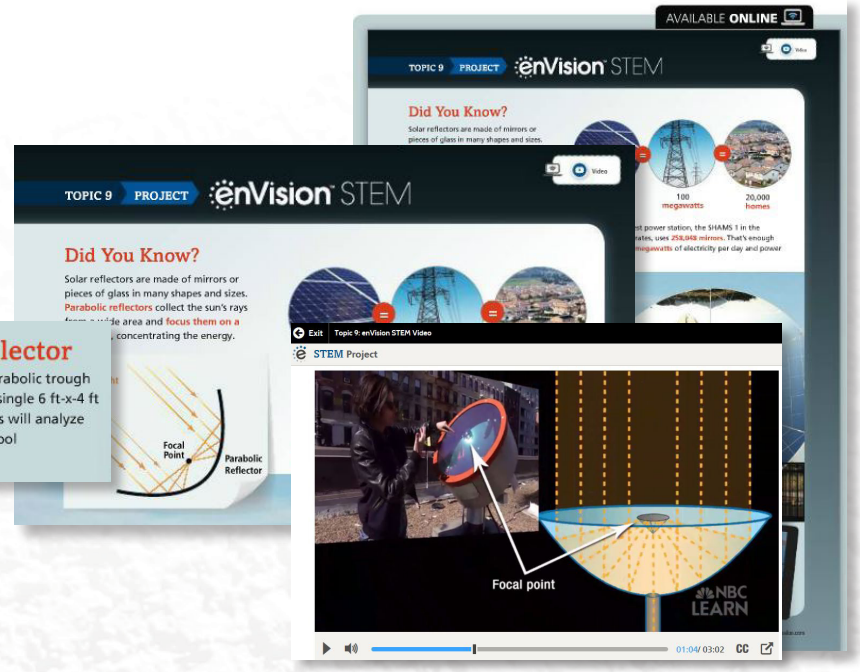
Students use unit rates and analysis of proportional relationships to calculate the average water usage and the minimum amount of water needed for survival everyday.

Where's the Science?

Students use the engineering design process to find possible solutions to the problem identified. They explore ways engineers can provide access to clean, fresh water to more people.

Geometry: Students analyze the properties of a parabola to design a parabolic solar reflector.





NG Next Generation Science Standards HS-PS3-3, HS-ETS1-2

Common Core Standards HSG.GPE.A.2

Mathematical Practices MP.1, MP.4, MP.5

Where's the Math?

Students use the properties of a parabola to design a parabolic solar reflector.

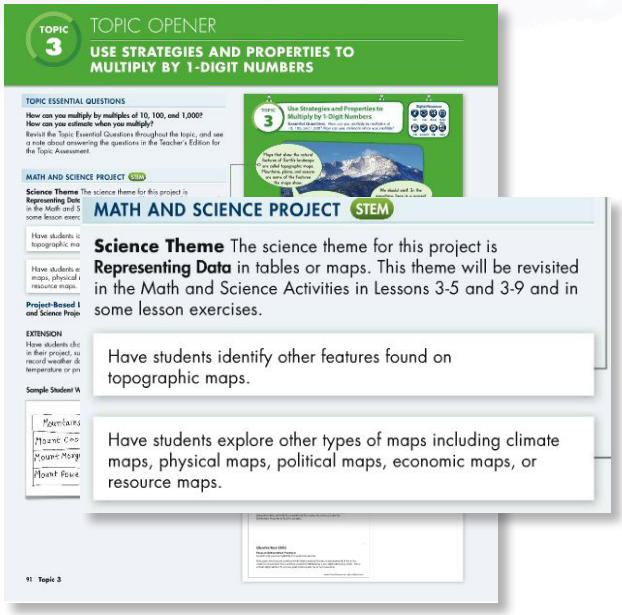
Where's the Science?

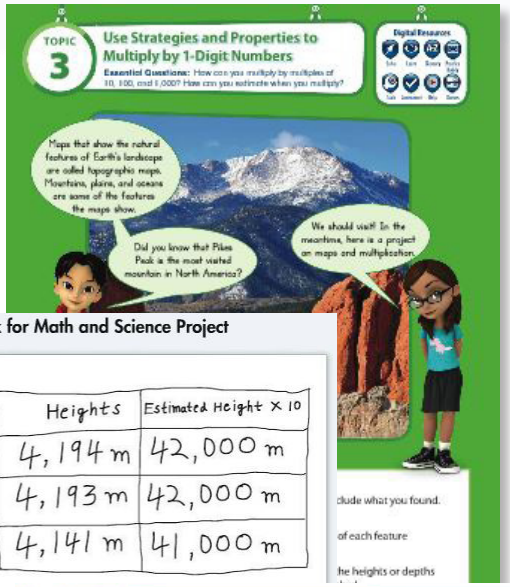
Students learn how parabolic solar reflectors build up heat and possible uses of the reflectors.

Analyzing Data

Grade 4: Students learn data representation:

- Analyze features on various types of maps
- Determine heights and depths of features on topography maps
- Collect data on specific Earth features, such as Pike's Peak, and analyze data, such as precipitation rates





Sample Student Work for Math and Science Project

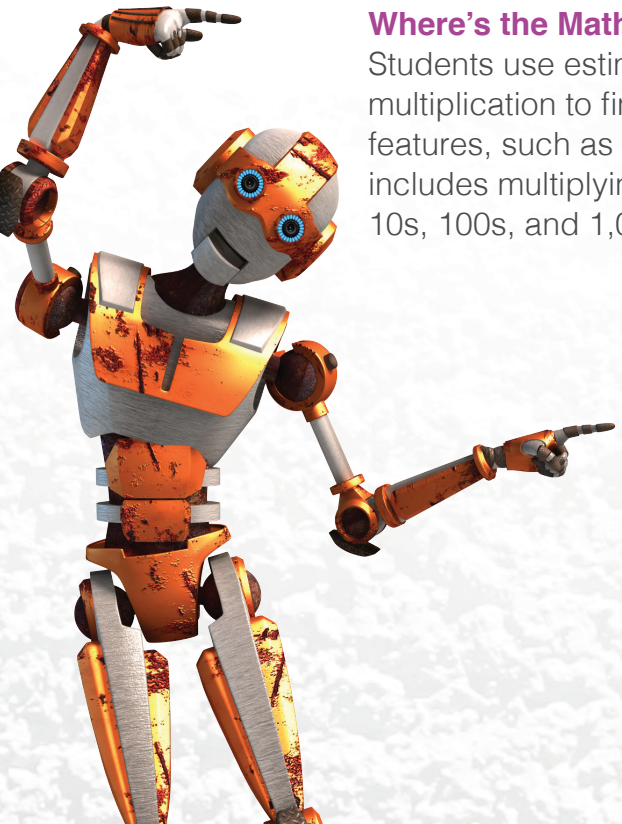
Mountains	Heights	Estimated Height × 10
Mount Cook	4,194 m	42,000 m
Mount Morgan	4,193 m	42,000 m
Mount Powell	4,141 m	41,000 m

Math and Science Project: Maps and Math

Do Research Use the Internet or other sources to find information about three of Earth's features on a topographic map, such as mountains or oceans. Write two facts about each of the features you researched.

Journal: Write a Report Include what you found. Also in your report:

- Write the height or depth of each feature you researched.
- Estimate to find 10 times the heights or depths of the features you researched.



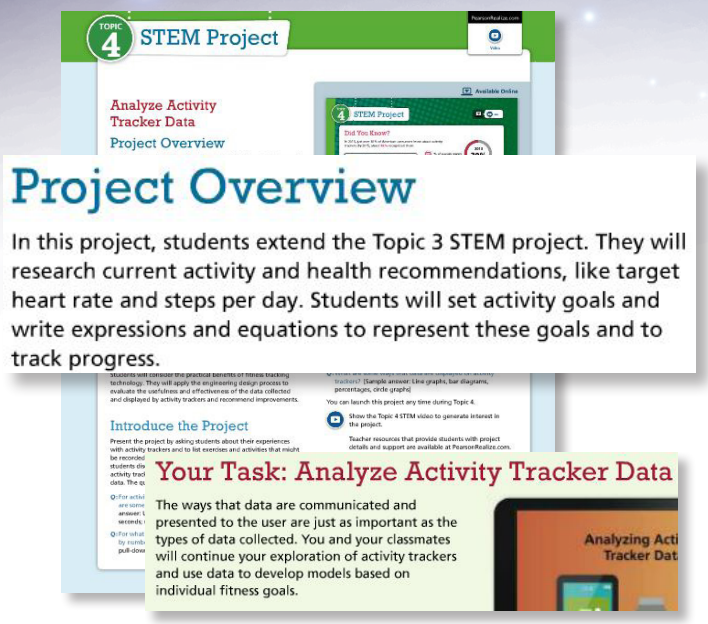
Where's the Math?

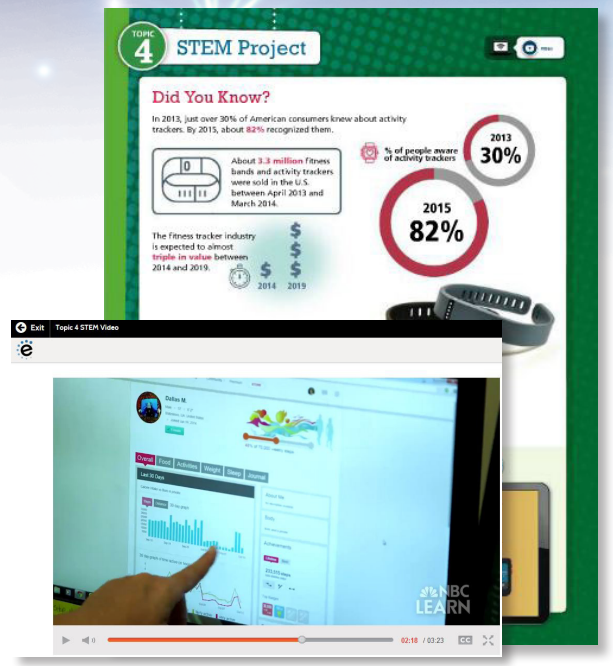
Students use estimation and multiplication to find heights for Earth features, such as mountains. This includes multiplying in multiples of 10s, 100s, and 1,000s.

Where's the Science?

Students learn how to identify features on types of maps and analyze the data represented.

Grade 7: Students analyze data from an activity data tracker to set fitness goals.





Where's the Math?

Students analyze activity data and goals and write linear expressions and equations to represent data. Data is shown in a variety of representations and used to make recommendations for useful and accurate tracker data displays.

Where's the Science?

Students consider how activities relate to physiological responses, including changes in heart rate, blood pressure, breathing rate, and other factors calculated by activity trackers.

Algebra 2: Students analyze election results using Benford's Law.

Where's the Math?

Students use Bedford's Law to analyze election results and determine, if any, are fraudulent.

Where's the Science?

Through the use of Benford's Law, students find a real-world data set to analyze, such as the masses of objects in space or the area of lakes and rivers.

enVision The K12 Series

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