Family Guide to CPM CHAPTER 9

In this chapter, students will learn how to:
- Find the volume of three-dimensional solids, known as right prisms.
- Find the surface area and volume of a rectangular prism.
- Calculate percents using pencil and paper as well as mental math strategies.

Chapter 9 Main Ideas

Section 9.1
In this section, students will learn about volume and surface area of three-dimensional solids. They will develop strategies for calculating the volume and the surface area of a prism. Then students will compare how surface area and volume are related by building three-dimensional rectangular prisms. Finally, they will visualize shapes using nets.

Section 9.2
Students will calculate percents to solve problems involving tips, interest, sale prices, and discounts.

Section 9.3
Students will work with their teams to solve challenging problems using what they have learned throughout the entire course.

Key Words

lateral faces- A (flat) side of a polyhedron. It is always a polygon

net- A drawing of each of the faces of a prism or pyramid, as if it were cut along its edges and flattened out.

polyhedron- A three-dimensional figure with no holes for which all faces are polygons.

surface area- The sum of all the area(s) of the surface(s) of a three-dimensional solid. For example, the surface area of a prism is the sum of its top and bottom bases, and its vertical surfaces (lateral faces.)

What's Coming Up in Seventh Grade

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

How You Can Help at Home

Encourage your student by asking them to think about these questions:

"What can I measure?"

"How much will it hold?"

"Am I measuring in one, two, or three dimensions?"

"How can I estimate?"

On the Chapter 9 assessment, students will be expected to show their understanding of the following:

6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent

6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = b\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Sample Problems from the Chapter

Picture in your mind each figure below as a three-dimensional object. What would each shape look like if it were unfolded so that each **face** (flat side) was flat on the table? A flat picture that can be folded up to form a three-dimensional solid is called a **net**. Work with your team to draw a net for each of the shapes below. Listen carefully to your teammates' ideas, because there is more than one way to unfold each shape.

a.   b.
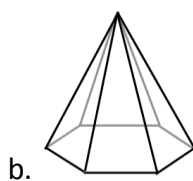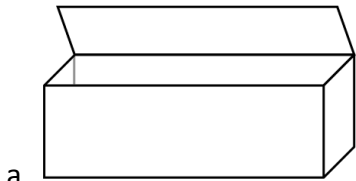
Janet wanted to go to a concert, and the tickets cost $25 each. She found a website advertising that customers could save $7 by purchasing the tickets through the website. She wonders what percent of the original price she would be saving. She drew the diagram below to help her visualize the problem.

$7.00

| $0 | $2.50 | $5 | $7.50 | | | | | | $25 |
| 0% | 10% | 20% | 30% | | | | | | 100% |
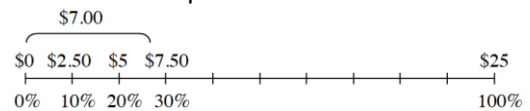
She could see from her diagram that $7.00 is somewhere between 20% and 30% of $25.

Craig looked at Janet's diagram and said, *"First, I think it will be useful for us to know what 1% of $25 is."*
Discuss this with your team.
How could it be useful to know 1% of $25?
Find 1% of $25 and use the result to help Janet figure out what percent of $25 is $7.

WHAT IS THE TIP?

Kendra has three friends who have birthdays during the summer. Every year she buys them dinner to celebrate. This year, the bill for dinner came to $125.

Kendra says, *"I like to leave a tip for our waitperson for good service, but I never know how much money to leave."*
Rhonda replies, *"I always leave a 15% tip."*

Then Shirley says, *"But our service was really good, so I think you should leave 20%."*
Without using a calculator, find two different ways to calculate the 15% tip that Rhonda thinks they should leave.

Find two different ways to compute a 20% tip without using a calculator.
Rhonda and Shirley were not able to convince each other of how much of a tip to leave, so Daijah said, *"Let's compromise and leave an 18% tip."*
Find two different ways to calculate the 18% tip that they will leave.