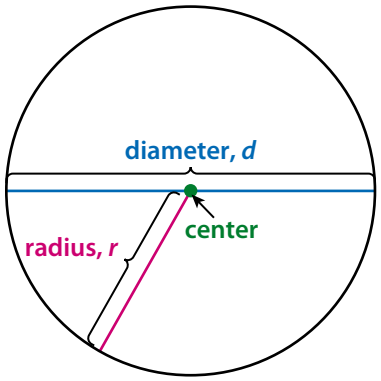
LESSON 6

Dear Family,

This week your student is learning about circumference and area of circles.

Circumference is the distance around a **circle**, or its perimeter. Area is the amount of space inside a circle.

The **radius**, *r*, is the distance from the **center** of a circle to any point on the circle. The **diameter**, *d*, is the distance from one side of the circle to the other, passing through the center of the circle.



A special relationship exists between the circumference of a circle and its diameter. No matter the size of the circle, the quotient of $\frac{\text{circumference}}{\text{diameter}}$ is constant. This quotient is called **pi**, and the symbol for pi is **π**. π represents a decimal that goes on forever without repeating. You can approximate π with a decimal or a fraction.

$\pi \approx 3.14$, or $\frac{22}{7}$

The formulas for the circumference and area of a circle involve π.

Circumference: $C = \pi d$ Area: $A = \pi r^2$

Your student will be solving circumference and area problems like the one below.

A circular traffic sign has diameter 36 inches. How can you measure the traffic sign?

➤ **ONE WAY** to measure the traffic sign is to find its circumference.

$C = \pi d$

$= \pi(36)$

The circumference is 36π in.

➤ **ANOTHER WAY** to measure the traffic sign is to find its area.

The diameter is 36 in. So, the radius is 18 in.

$A = \pi r^2$

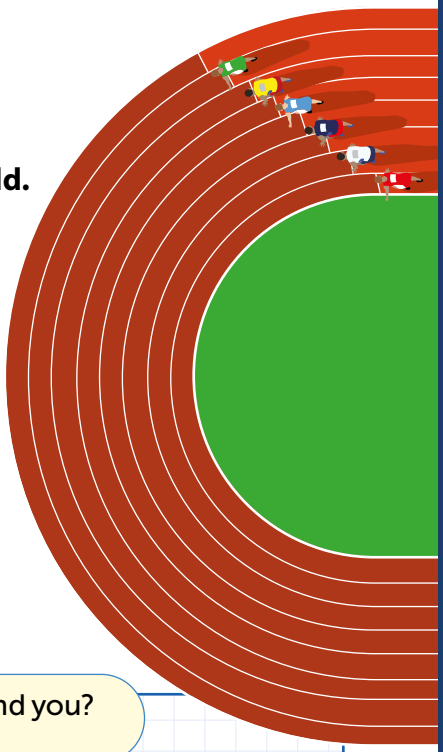
$= \pi\left(\frac{36}{2}\right)^2$

$= \pi(18)^2$

The area is 324π $in.^2$.

Use the next page to start a conversation about circumference and area of circles.

Activity Thinking About Circles Around You



➤ **Do this activity together to investigate circles in the real world.**

Have you ever wondered why runners start at different spots on a track instead of lining up together? This is called a *staggered start*.

Since tracks have semicircles (or half circles) on the ends, if all the runners lined up together, runners in outer lanes would need to run farther than runners in inner lanes. Why? Because the circumference of the outer lane is greater than the circumference of the inner lane.

Staggering starting positions ensures that all runners run the same distance!

? Where do you see circles and semicircles in the world around you? Why could finding the area or circumference be helpful?

LESSON 25

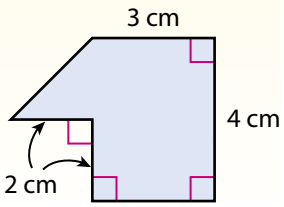
Dear Family,

This week your student is learning how to use area and surface area to solve a variety of problems.

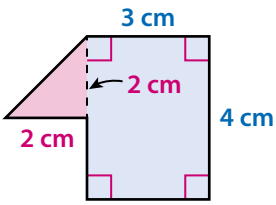
Some figures are made up of two or more other shapes, such as rectangles, squares, and triangles. One way to find the area of a figure like this is to find the area of those other shapes and add the areas together. In places where shapes overlap, you can make adjustments so that no area is added more than once.

The surface area of a three-dimensional figure is the sum of the areas of all its faces. You can find the surface area of any prism by finding the area of each face and then adding the areas. Your student will be solving problems like the one below.

What is the area of the figure at the right?



➤ **ONE WAY** to find the area is to decompose the figure into a triangle and a rectangle.

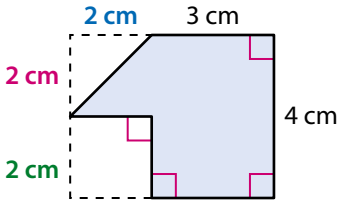


Area of rectangle: $4 \cdot 3 = 12$

Area of triangle: $\frac{1}{2}(2 \cdot 2) = 2$

Area of original figure: $12 + 2 = 14$

➤ **ANOTHER WAY** is to draw a rectangle around the figure and subtract the area of the triangle and square from the area of the rectangle.



Area of the rectangle around figure: $4(2 + 3) = 20$

Area of unshaded square: $2 \cdot 2 = 4$

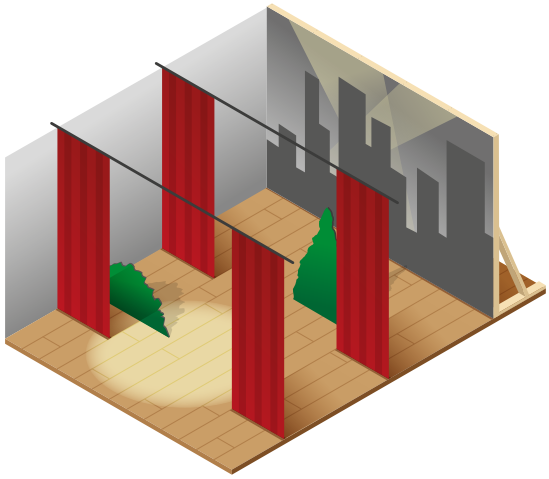
Area of unshaded triangle: $\frac{1}{2}(2 \cdot 2) = 2$

Area of original figure: $20 - 4 - 2 = 14$

Both methods show that the area of the figure is 14 cm^2.

Use the next page to start a conversation about area.

Activity Thinking About Area



➤ **Do this activity together to investigate area in the real world.**

Have you ever seen a play or a musical?

Sometimes theater productions have elaborate sets that transform the stage into a particular setting.

The set designer has the challenge of designing all the pieces of the set so they not only help to tell the story but are also practical and affordable to build.

Set designers sometimes need to figure out the total amount of wallpaper or paint needed to cover an unusually shaped set piece. They can use the areas of smaller shapes that make up the area of the set piece to calculate how much wallpaper or paint they will need.

? When else would you want to know the area of something in the real world?

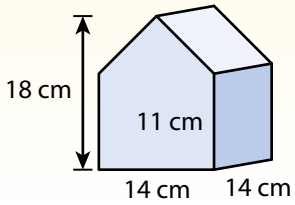
LESSON 26

Dear Family,

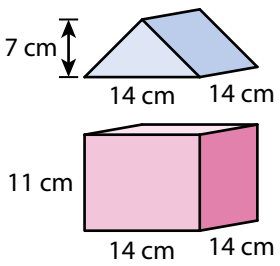
This week your student is learning to solve problems involving volumes of three-dimensional figures. The volume of a three-dimensional figure can mean the amount of space the figure occupies or the amount of space inside the figure. Volume is measured in cubic units, like cubic inches (in.^{3}) or cubic centimeters (cm^3).

You can find the volume of a right prism by multiplying the area of its base by its height. You can also use the volume of a figure to find an unknown dimension. Your student will be solving problems like the one below.

The drawing shows a birdhouse Fernando built. What is the volume the birdhouse occupies?



➤ **ONE WAY** to find the volume is to decompose the figure into other prisms and add the volumes of those prisms.

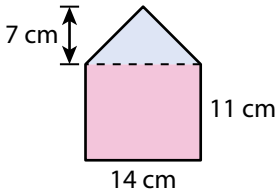


Volume = **triangular prism volume** + **rectangular prism volume**

$= \frac{1}{2}(14)(7)(14) + (14)(11)(14)$

$= 2{,}842$

➤ **ANOTHER WAY** is to find the area of the base of the prism and then multiply it by the height of the prism.



Area of base = **area of triangle** + **area of rectangle**

$= \frac{1}{2}(14)(7) + (14)(11)$

$= 203$

Now multiply the area of the base by the height of the prism, 14.

Volume of prism: $(203)(14) = 2{,}842$

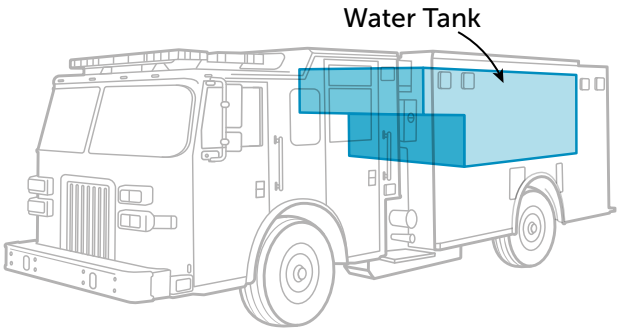
Both methods show that the volume the birdhouse occupies is 2,842 cm^3.

Use the next page to start a conversation about volume.

Activity Thinking About Volume

➤ **Do this activity together to investigate volume in the real world.**

Have you ever wondered where firefighters get the water they use to put out fires? Some fire engines have a water tank to store water. When the water supply in the tank runs out, firefighters can use other sources of water, like fire hydrants.



Water tanks need to hold as much water as possible while fitting in the space available in the fire engine.

Not all fire engines use tanks with the same shape. The most common shape is a rectangular or T-shaped tank, which is made of right rectangular prisms.

Some water tanks can hold 134 cubic feet, or 1,000 gallons, of water!

? Where else do you use volume in the real world?