Unit 7, Lesson 15

Distinguishing Volume and Surface Area

Let's work with surface area and volume in context.

15.1 The Science Fair

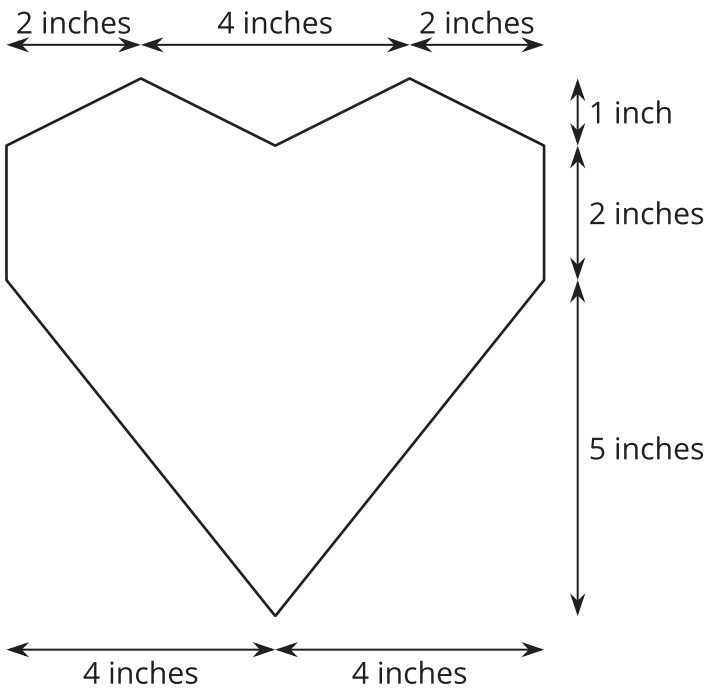
Mai's science teacher told her that when there is more contact between the ice and water in a glass, the ice melts faster. She wants to test this statement so she designs her science fair project to determine if crushed ice or ice cubes will melt faster in a drink.

She begins with two cups of warm water. In one cup, she puts a cube of ice. In a second cup, she puts crushed ice with the same volume as the cube. What is your hypothesis? Will the ice cube or crushed ice melt faster, or will they melt at the same rate? Explain your reasoning.

15.2 Revisiting the Box of Chocolates

In an earlier activity, you calculated the volume of this heart-shaped box.

The depth of the box is 2 inches. How much cardboard is needed to create the box?



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15.3 Card Sort: Surface Area or Volume

Your teacher will give you a set of cards. Take turns with your partner to sort each card based on whether it would make more sense to think about the surface area or the volume of the figure referred to, when answering the question.

1. For each card that you sort, explain to your partner how you know it's in the right category.
2. For each card that your partner sorts, listen carefully to the explanation. If you disagree, discuss your thinking and work to reach an agreement.

Are you ready for more?

A cake is shaped like a square prism. The top is 20 centimeters on each side, and the cake is 10 centimeters tall. It has frosting on the sides and on the top, and a single candle on the top at the exact center of the square. You have a knife and a 20-centimeter ruler.

1. Find a way to cut the cake into 4 fair portions, so that all 4 portions have the same amount of cake and frosting.

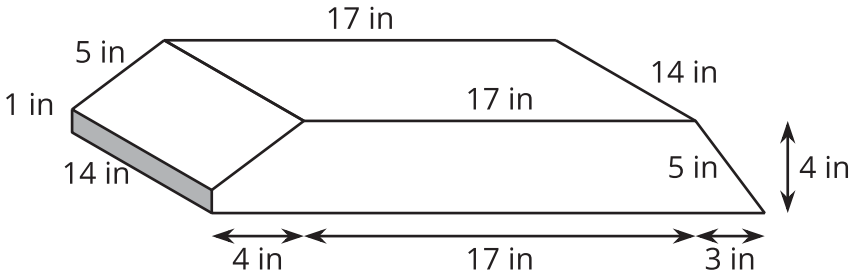
2. Find another way to cut the cake into 4 fair portions.

3. Find a way to cut the cake into 5 fair portions.

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15.4 Building a Bat House

Han wants to build a home for bats to nest in. The plans to build the bat house look like this:



The 1 inch by 14 inch rectangle is left open for the bats to fly into.



1. How much wood does it take to build this bat house?

2. Bat colonies need 4 cubic inches of space per bat. What is the largest number of bats that can fit in this bat house?

Lesson 15 Summary

Sometimes we need to find the volume of a prism, and sometimes we need to find the surface area.

Here are some examples of quantities related to volume:

- How much water a container can hold
- How much material it took to build a solid object

Volume is measured in cubic units, like in^3 or m^3.

Here are some examples of quantities related to surface area:

- How much fabric is needed to cover a surface
- How much of an object needs to be painted

Surface area is measured in square units, like in^2 or m^2.

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