PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

Volume of Prisms and Cylinders

Video Script

Scene		Full Transcript
1	**Hallie:**	Hallie here, I'm at Gail's pet shop picking out aquariums. I've selected one fish, Bubbles. Now I'm looking for more fish and a new aquarium! Fish tanks come in several different shapes and sizes. The experts at the pet store said that the number of fish I can have depends on the volume of tank that I choose. Volume is the amount of space that a three-dimensional shape, like a fish tank, occupies. You wait here Bubbles. One way to measure volume, is to determine the number of cubes it takes to fill a three dimensional shape. Lets start with this aquarium, which is a rectangular prism! How many of these cubes will it take to fill the aquarium? This doesn't work. We will need to stack the cubes so they fill the aquarium without any gaps. The dimensions of each cube are one inch, by one inch, by one inch. So the volume of one cube is one cubic inch. The total number of cubes that will fit in the aquarium equals the volume of the aquarium in cubic inches. Lets first determine the number of cubes that will cover the bottom of the aquarium.
2	**Voice-Over Hallie:**	Each row contains six cubes, and there are a total of twelve rows. One layer is made up of seventy-two cubes. The bottom of the aquarium, or base of the prism, measures six inches by twelve inches so the area of the base is seventy-two square inches. If the aquarium were only one inch tall, the volume would be seventy-two cubic inches. But, it takes eight layers of seventy-two cubes to fill this aquarium. That is, five hundred seventy-six cubes. Since each layer is one inch tall, the height of the prism is eight inches, so the volume is five hundred seventy-six cubic inches. Lets describe what we did with a formula. We found the volume of this aquarium by taking the area of the base times the height of the prism. We usually represent area of the base with a capital B and height with a lower case h (V=Bh). For a rectangular prism, the area of the base equals the length of the base times the width of the base. This aquarium measures six inches by twelve inches by eight inches (V = (6in x 12in) 8in), so the volume is five hundred seventy six cubic inches.
3	**Hallie:**	Like I said, fish tanks come in all shapes and sizes. How would you like your cool new home to be a triangular prism? Or a cylinder? Lets try a triangular prism. The volume is found in the same way as a rectangular prism, by multiplying the area of the base by the height of the prism.

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4	**Voice-Over Hallie:**	As you know, the base of this prism is a triangle. Again, we can cover the base using cubes. But the cubes do not fit exactly like in the rectangular prism. How many cubes cover the base of the triangular prism? Here's six, seven, eight! Since each cube covers one square inch of the base, the area of the base of the triangular prism is eight square inches. If the aquarium were only one inch tall, the volume would be eight cubic inches, but it takes five layers to fill it. The volume of this triangular prism is eight times five or forty cubic inches. The formula, volume equals area of the base times height (V=Bh) still works!
5	**Hallie:** **Voice-Over Hallie:**	This time the base is a triangle. Remember, we find the are of a triangle by taking one half the base times the height. We find the area of the base by taking one half times four, the base of the triangle, times four, the height of the triangle. For this prism, we found that the area of the base was eight square inches and the height of the prism is five inches, so the volume is forty cubic inches.
7	**Hallie:**	Figuring out the volume of a cylinder is very similar!
8	**Voice-Over Hallie:**	The formula is still volume equal the area of the base times the height. First, we find the area of the circular base. Remember, the formula for the area of a circle is pi times the radius squared. Lets use three and fourteen hundredths to approximate pi. The radius of the base is four inches. Four squared is sixteen, so the area of the base is approximately three and fourteen hundredths time sixteen square inches or about fifty square inches. To approximate the volume, take the area of the base, times the height. The height of the cylinder is ten inches. So, the volume is approximately five hundred cubic inches.
9	**Hallie:**	What if I choose a tank for my fish that has an odd shaped base? Can I still determine the volume using the same method? No problem!
10	**Voice-Over Hallie:**	The formula for finding the volume of any prism or cylinder is always volume equals the area of the base times the height. The area of this base is equal to twenty square inches. Next, we take twenty square inches times the height, which is ten inches. The volume is two hundred cubic inches!

10	**Hallie:**	This tank is too big for just you Bubbles! To find the volume of cylinders and prisms, you just need to multiply the area of the base times the height! Congratulations, you have just been schooled in volume. Problem solved!