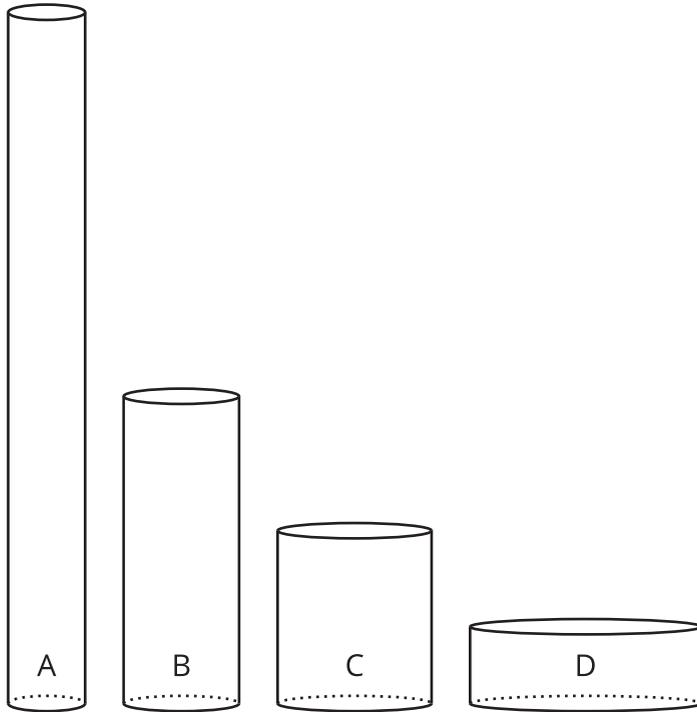


## Unit 2 Lesson 16: Minimizing Surface Area

### 1 The Least Material (Warm up)

#### Student Task Statement

Here are four cylinders that have the same volume.



1. Which cylinder needs the least material to build?
2. What information would be useful to know to determine which cylinder takes the least material to build?

## 2 Figuring Out Cylinder Dimensions

### Student Task Statement

There are many cylinders with volume  $452 \text{ cm}^3$ . Let  $r$  represent the radius and  $h$  represent the height of these cylinders in centimeters.

1. Complete the table.

volume ( $\text{cm}^3$ )	radius (cm)	height (cm)
452	1	
452	2	
452	3	
452	4	
452	5	
452	6	
452	7	
452	8	
452	9	
452	10	
452	$r$	

2. Use graphing technology to plot the pairs  $(r, h)$  from the table on the coordinate plane.
3. What do you notice about the graph?

### 3 Calculating Surface Area

#### Student Task Statement

There are many cylinders with volume  $452 \text{ cm}^3$ . Let  $r$  represent the radius of these cylinders,  $h$  represent the height, and  $S$  represent the surface area.

1. Use the table to explore how the value of  $r$  affects the surface area of the cylinder.

radius (cm)	height (cm)	surface area ( $\text{cm}^2$ )

2. Use graphing technology to plot the pairs  $(r, S)$  on the coordinate plane.
3. What do you notice about the graph?
4. Write an equation for  $S$  as a function of  $r$  when the volume of the cylinder is  $452 \text{ cm}^3$ .