LESSON MAKER PRO

Slice and Size

Connect cross sections to area and volume.

GRADE 7 · 7.GR.A.2

7.GR.A.2 "Describe the two-dimensional figures that result from slicing three-dimensional figures (e.g., right rectangular prisms, right cylinders) with a plane..."

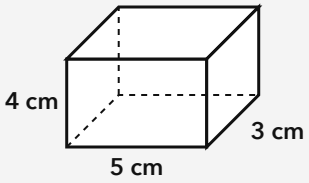
NAME _____ DATE _____

THE BIG IDEA

A slice parallel to the base of a right prism or cylinder has the same shape and area as the base. Multiply the base area by the height to find volume. A cut all the way through also makes two new faces, each with the slice's area.

WORKED EXAMPLE

The prism shown is sliced parallel to its base. Name the slice, find its area, and find the prism's volume.



1. The base is a rectangle, so the slice is a rectangle.
2. Slice area = $5 \times 3 = 15$ cm^2.
3. Volume = $15 \times 4 = 60$ cm^3.

Answer: Rectangle; 15 cm^2; 60 cm^3

PRACTICE 4 problems

1 A 6 cm by 2 cm by 7 cm prism is sliced parallel to its 6 cm by 2 cm base. Name the slice and find its area.

ANSWER _____

2 A cylinder has radius 2 cm and height 9 cm. Name a slice parallel to its base and find its area. Use pi.

ANSWER _____

3 An 8 cm by 6 cm by 2 cm prism is cut parallel to its 8 cm by 2 cm side. Find the area of each new face and their combined area.

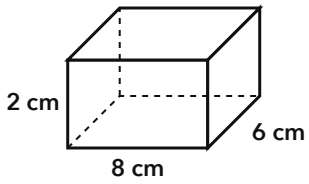
ANSWER _____

4 A cylinder with radius 6 cm is cut parallel to its base. Name the two new faces and find their combined area. Use pi.

ANSWER _____

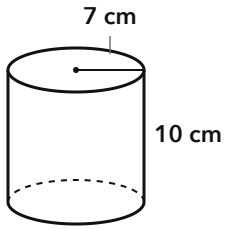
APPLY IT Show your work

1 A maker cuts the foam block shown halfway between its top and bottom, parallel to its base. What shape are the new faces? Find their combined area.



ANSWER _____

2 A baker cuts the cake shown halfway up its height, parallel to its base. Find the area of one cut face and the volume of one piece. Use pi.



ANSWER _____

CHALLENGE One step up

A 12 cm by 8 cm by 6 cm block is cut halfway across its 8 cm width, parallel to a 12 cm by 6 cm side. Name each cut face. Find the combined surface area of both pieces, and explain the increase.

WORK SPACE AND ANSWER

ANSWER KEY

Slice and Size

GRADE 7 · 7.GR.A.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A 6 cm by 2 cm by 7 cm prism is sliced parallel to its 6 cm by 2 cm base. Name the slice and find its area.	**Rectangle; 12 cm^2**
2	A cylinder has radius 2 cm and height 9 cm. Name a slice parallel to its base and find its area. Use pi.	**Circle; 4pi cm^2**
3	An 8 cm by 6 cm by 2 cm prism is cut parallel to its 8 cm by 2 cm side. Find the area of each new face and their combined area.	**16 cm^2 each; 32 cm^2 combined**
4	A cylinder with radius 6 cm is cut parallel to its base. Name the two new faces and find their combined area. Use pi.	**Two circles; 72pi cm^2 combined**

PART 2 · APPLY IT

1. **Two rectangles; 96 cm^2 combined** Each new face matches the 8 cm by 6 cm base. Their combined area is 2 × 8 × 6 = 96 cm^2.
2. **49pi cm^2; 245pi cm^3** The circular cut face has area pi × 7 × 7 = 49pi cm^2. Each piece is 5 cm high, so its volume is 49pi × 5 = 245pi cm^3.

CHALLENGE

Each cut face is a 12 cm by 6 cm rectangle. The original surface area is 2(12 × 8 + 12 × 6 + 8 × 6) = 432 cm^2. The cut adds two 72 cm^2 faces, so the combined surface area is 576 cm^2, an increase of 144 cm^2.

Accept pi notation or an equivalent expression using π. For the challenge, accept any clear explanation that the cut creates two additional 12 cm by 6 cm faces.