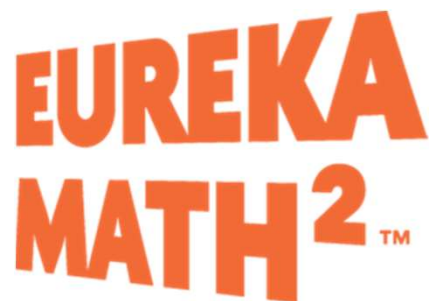




Module 5 - Lesson 19:

Compose and decompose right rectangular prisms to find their volume by using layers.

CCSS Standard – 5.MD.C.3 / 5.MD.C.3.a / 5.MD.C.3.b / 5.MD.C.4

FLUENCY (10-min)**Whiteboard Exchange: Divide Whole Numbers**

Find the quotients and remainder.

Show your method.

$$\begin{array}{r} \text{006.36} \\ 50 \overline{) 31800} \\ \underline{- 300} \downarrow \\ 180 \downarrow \\ \underline{- 150} \downarrow \\ 300 \\ \underline{- 300} \\ 0 \end{array}$$

$$\begin{array}{r} \text{042} \\ 21 \overline{) 882} \\ \underline{- 84} \downarrow \\ 42 \\ \underline{- 42} \\ 0 \end{array}$$



FLUENCY (10-min)

Whiteboard Exchange:
Divide Whole Numbers

Find the quotients and remainder.
Show your method.



$$\begin{array}{r} \text{0 1 3 8.5} \\ 18 \overline{) 2,4930} \\ \underline{- 18} \\ 69 \\ \underline{- 54} \\ 153 \\ \underline{- 144} \\ 90 \\ \underline{- 90} \\ 0 \end{array}$$

FLUENCY (10-min)

Whiteboard Exchange: Write and Evaluate Expressions



Write an expression to represent the statement.

Then solve for the value of the expression.

The difference between 1 half and 1 fourth, multiplied by 3

2 times as much as the sum of 3 tenths and 1 fifth

FLUENCY (10-min)

Whiteboard Exchange: Write and Evaluate Expressions



Write an expression to represent the statement.

Then solve for the value of the expression.

The difference between 2 thirds and 5 ninths, divided by 3

LAUNCH (5-min)

Examine Layers of Figures

Which One Doesn't Belong?

1-minute:

Find a category in which three of the figures belong, but a fourth figure does not.
Be ready to explain your reasoning.

How many cubes are in the base of Figure B? How do you know?

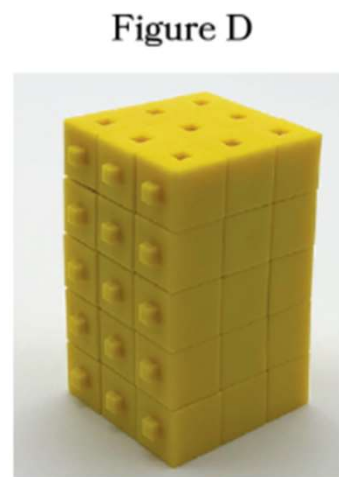
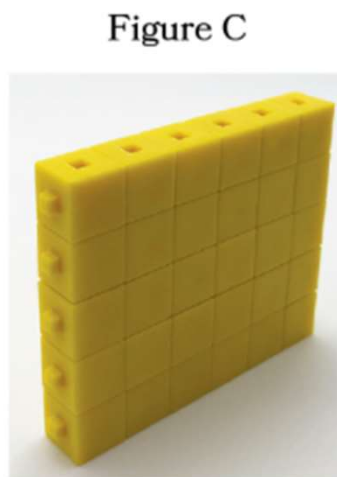
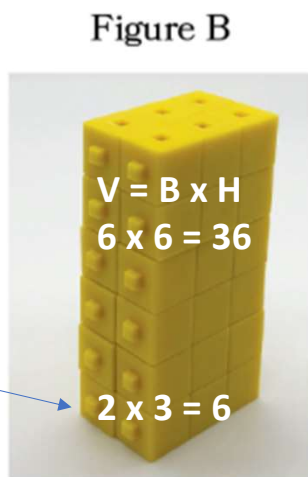
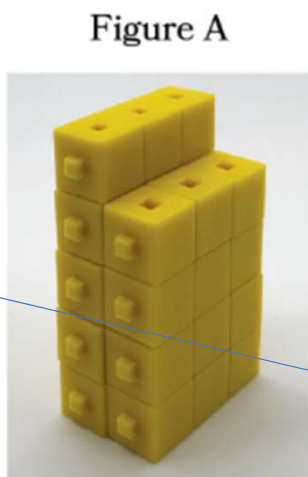


Figure A doesn't belong because it's not a right rectangular prism.

Figure B doesn't belong because its height is not 5 units.

Figure C doesn't belong because its length is not 3 units.

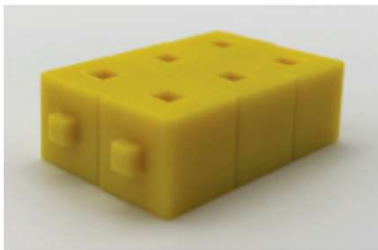
Figure D doesn't belong because its bottom layer, or base, doesn't have 6 cubes.

Today, we will find the volume of right rectangular prisms by using layers.

LEARN (35-min)

Add Layers to Compose Right Rectangular Prisms

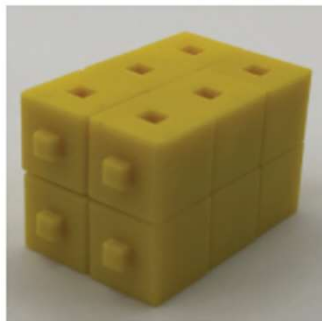
What is the volume of this figure?



1 layer of 6 cubes

$$3 \times 2 \times 1$$

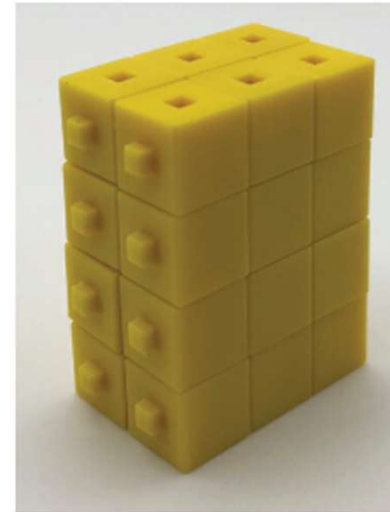
Volume = 6 cubic units



2 layers each having 6 cubes

$$3 \times 2 \times 2$$

Volume = 12 cubic units



4 layers each having 6 cubes

$$3 \times 2 \times 4$$

Volume = 24 cubic units

Volume:

$$L \times W \times H$$

or

$$B \times H$$

$$3 \times 2 \times 4 = 24$$

or

$$6 \times 4 = 24$$

Let's create a **table** describing these prisms:

Number of Layers	Number of Cubes in Each Layer	Volume (cubic centimeters)
1	6	6
2	6	12
4	6	24

Please Notice This



The BASE layer of 6 cubes stays the same.

LEARN (35-min)

Add Layers to Compose Right Rectangular Prisms

LEARN book page 187.

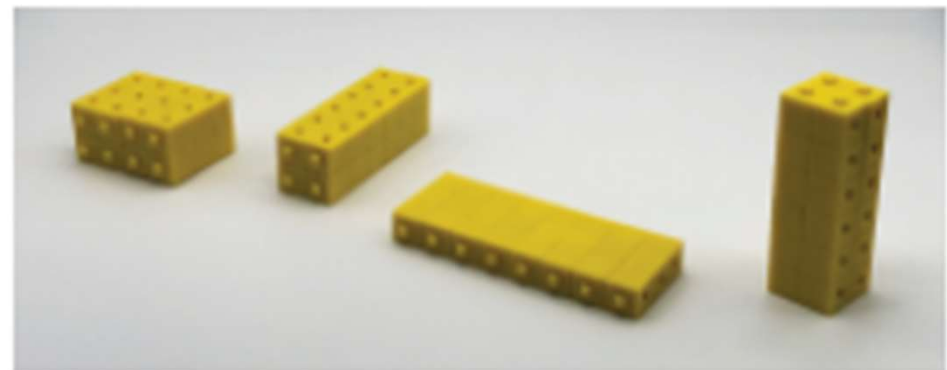
1. Use 24 cubes to create a right rectangular prism. Create a prism that is different from the one created in class.
 - a. Describe the layers in the right rectangular prism you created.
 - b. What is the volume of the prism? How do you know?



The number of cubes in each layer is not the same. If you know the number of cubes in each layer, you simply can multiply the base layer by the height (the number of layers).

Prisms with the same volume can look very different.

Number of Layers	Number of Cubes in Each Layer	Volume (cubic centimeters)
4	6	24
6	4	24
2	12	24
3	8	24
1	24	24



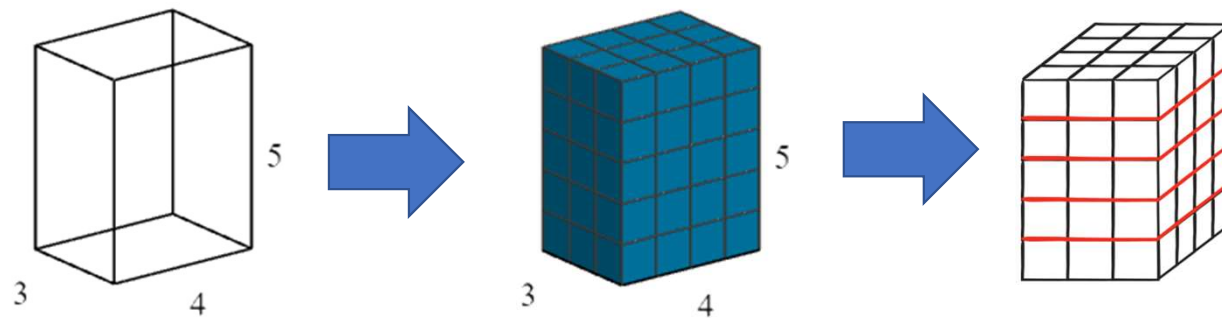
LEARN (35-min)

Decompose Right Rectangular Prisms into Layers

Use interactive prisms in
Digital Great Minds.



We can also find the volume of a right rectangular prism by decomposing it into layers and finding the volume of each layer.



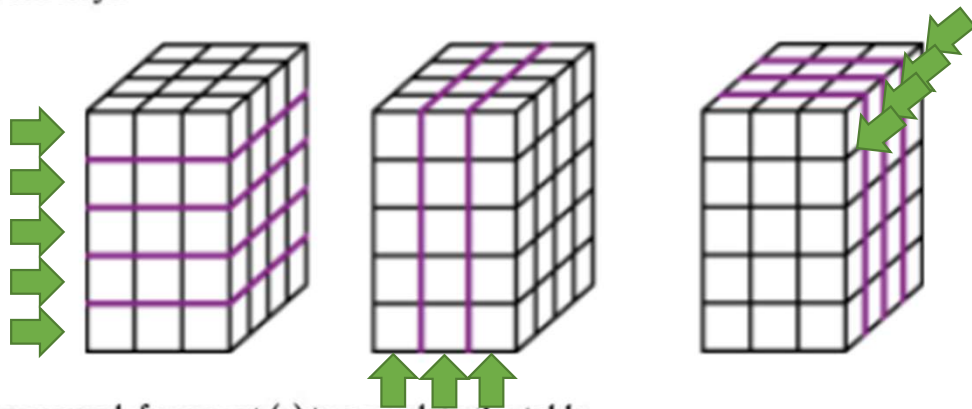
This prism has 12 cubes in each layer. The base dimensions are 3 units by 4 units = 12 units.
The red lines decompose the figure into 5 layers.
So, there are 5 base layers or $12 \times 5 = 60$ units.
The volume of this prism is 60 cubic units.

Notice the red lines decompose this prism horizontally. Can we decompose the prism any other way?

Decompose Right Rectangular Prisms into Layers

LEARN book page 187.

2. The right rectangular prism shown is composed of centimeter cubes.
- a. Draw lines on the prisms to show how to decompose the prism into layers in three different ways.



- b. Use your work from part (a) to complete the table.

Number of Layers	Number of Cubes in Each Layer	Volume (cubic centimeters)
5	12	60
3	20	60
4	15	60

The same prism was decomposed here three different ways!
Horizontally and two different types of vertical layers.

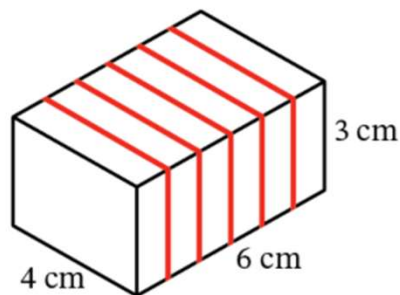
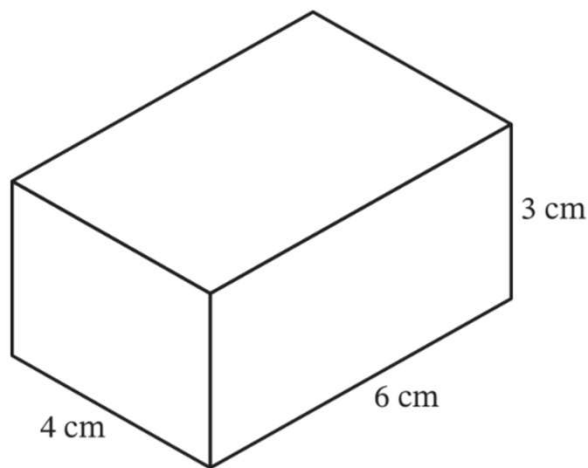
Property:
All right rectangular prisms can be decomposed into layers in three different ways.

It does not matter how you slice a right rectangular prism to find its volume.

LEARN (35-min)

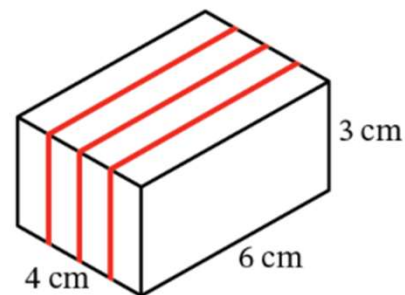
Decompose Right Rectangular Prisms into Layers

LEARN book page 188.



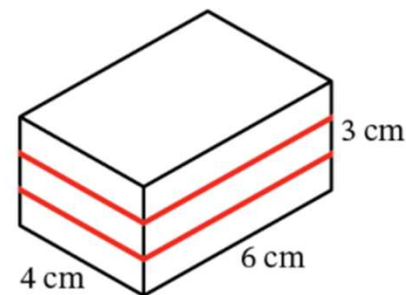
6 layers

The volume of each layer is 12 cubic centimeters.



4 layers

The volume of each layer is 18 cubic centimeters.



3 layers

The volume of each layer is 24 cubic centimeters.

- Draw lines to show how to decompose the prism into layers.
- Use the layers you created in part (a) to complete the following sentences.

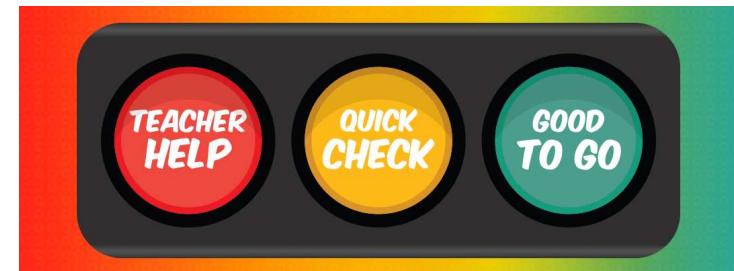
The prism has _____ layers.

Each layer has _____ cubic centimeters.

The volume of this prism is _____ cubic centimeters.

LAND (10-min)

Exit Ticket



Exit Ticket – PAGE 193

Small Group Time:

Problem Set Pages 189 - 192

Homework:

Page 121 APPLY BOOK

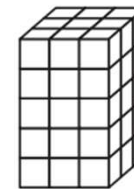
Name _____

Date _____



19

The right rectangular prism shown is composed of centimeter cubes.



- Draw lines to decompose the prism into layers.
- Use the layers you created in part (a) to complete the following sentences.

The prism has _____ layers.

There are _____ centimeter cubes in each layer.

The volume of the prism is _____ cubic centimeters.

- How does decomposing a prism into layers help you find the volume?