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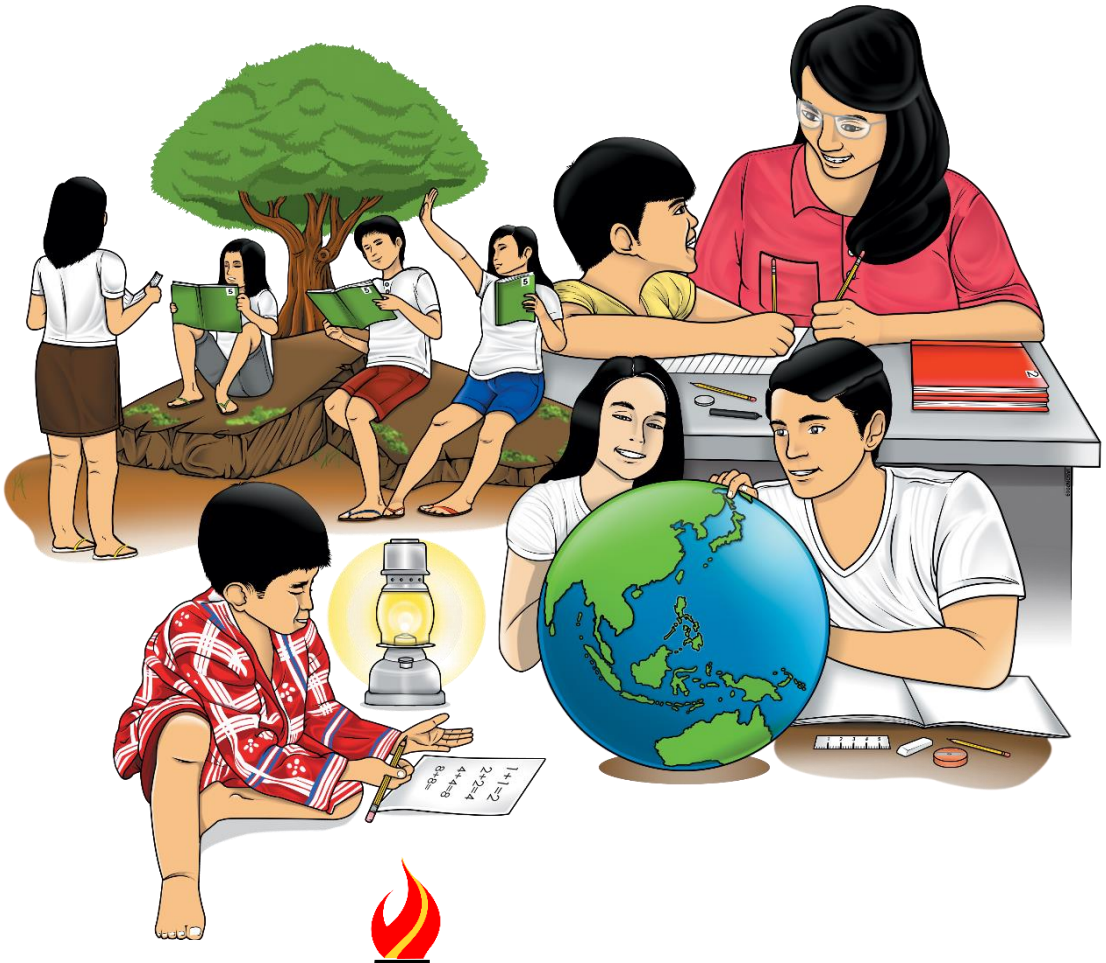
Mathematics

Quarter 4 – Module 6: Finding the Volume of a Given Cube and a Rectangular Prism and Using cm^3 and m^3



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Quarter 4 – Module 6: Finding the Volume of a Given Cube and a Rectangular Prism and Using cm^3 and m^3
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Mathematics

Quarter 4 – Module 6: Finding the Volume of a Given Cube and a Rectangular Prism and Using cm^3 and m^3

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Good day, Mathletes!

This module was designed and written to help you gain an understanding of key concepts involved in finding the volume of a given cube and a rectangular prism and expressing these in cubic centimeters and cubic meters.

Volume is the amount of space that is enclosed in a 3-dimensional or solid figure. Cubes and rectangular prisms are some examples of solid figures. To get their volumes, you may need to determine first their dimensions: lengths, widths and heights.

So, what are you waiting for? Proceed and stay focused.

At the end of this module, you are expected to be able to:

- find the volume of a given cube and rectangular prism using cubic centimeters and cubic meters; and
- appreciate the value of understanding the concept of and being able to find the volumes of cubes and rectangular prisms.

Before going any further, let us check your understanding about finding the volume of a given cube and a rectangular prism using cubic centimeters and cubic meters.

What I Know

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper.

1. Which of the following could be done to get the volume of a rectangular prism?
   A. Add its length, width and height.
   B. Get the average of its length, width and height.
   C. Find the product of its length, width and height.
   D. Multiply its length and width. Then, add the height to the product.

2. The length, width and height of a rectangular prism are 9 m, 4 m and 3 m, respectively. Which of the following is the volume of the prism?

A.16 m^3 B. 100 m^3 C. 108 m^3 D. 1 080 m^3

3. A rectangular box is filled with 60 cubes. Each cube measures 2 cm on each edge. Which of the following is the volume of the box?

A. 62 cm^3 B. 68 cm^3 C. 120 cm^3 D. 480 cm^3

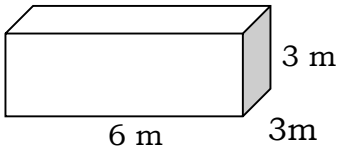
4. If a side of a cube measures 5 cm, which of the following is the amount of space occupied by the cube?

A. 5 cm^3 B. 125 cm^3 C. 225 cm^3 D. 625 cm

5. The length, width and height of a rectangular box are 50 cm, 20 cm and 60 cm, respectively. Which of the following is the volume of the box?

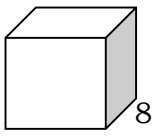
A. 43.33 cm^3 B. 130 cm^3 C. 60 000 cm^3 D. 80 000 cm^3

6. Which of the following is the volume of the figure below?



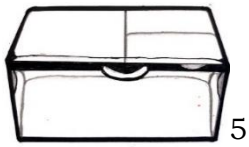
A. 54 m^3 C. 36 m^3
B. 45 m^3 D. 12m^3

7. Which of the following is the volume of the figure below?



A. 8 cm^3
B. 24 cm^3
C. 64 cm^3
D. 512 cm^3

8. Which of the following is the volume of the prism below?

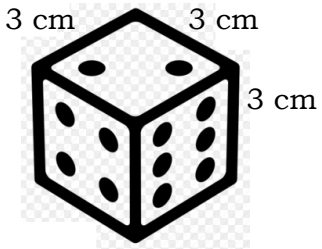


A. 750 cm^3
B. 225 cm^3
C. 200 cm^3
D. 30 cm^3

9. Which of the following is the amount of space occupied by the pool with dimensions: 10 m, 5 m and 3 m?

A. 18 m^3
B. 150 m^3
C. 220 m^3
D. 225 m^3

10. Which of the following is the volume of the figure below?



A. 3 m^3
B. 9 m^3
C. 18 m^3
D. 27 m^3

Compare your answers with the Answer Key at the end of this module. If you got 9 or 10 correct answers, you may skip this module and proceed to the next. Otherwise, go to the next page to gain a better understanding of the concept of the volume of a cube and a rectangular prism and learn how to find it. Let's go!

Lesson 1 Finding the Volume of a given Cube and a Rectangular Prism Using cm^3 and m^3

In order to find the volume of a given cube or a rectangular prism, you may need to master the skills in identifying the edge of the cube and the height, length and width of the rectangular prism. These basic skills may help you easily find the volume of a cube and a rectangular prism using cubic units.

Are you ready? Let's proceed!

What's In

In the previous lesson, you were able to learn how to convert cubic centimeters (cm^3) to cubic meters (m^3) and vice versa. You also converted cubic centimeters (cm^3) to liters (L) and vice versa.

On a separate sheet of paper, copy and complete the following.

1. 7 000 cm^3 = _____ m^3
2. 25 L = _____ cm^3
3. 15 000 cm^3 = _____ m^3
4. 4 m^3 = _____cm^3
5. 2 cm^3 = _____L

What's New

In this lesson, you are going to deal about finding the volume of a given cube and a rectangular prism using cubic centimeters (cu. cm or cm^3) and cubic meters (cu. m or m^3).

Remember, volume is the amount of space that a solid figure takes up or occupies. Consider the problem below.

Teacher Leny brought to her class a 3 × 3 × 3 Rubik's cube. She told the class to determine the amount of space enclosed in the object. A Rubik's cube is a solid figure which contains ( ) cubic units.

If each is a cubic unit, how many cubic units are there in the figure? How many cubic units are there in one layer? How many layers are there? How many cubic units are there?

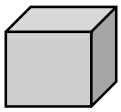
What Is It

You already know that volume is the amount of space that is enclosed in a 3-dimensional or solid figure. Since it is an amount of space, it has to be expressed in cubic units. If the dimensions are in centimeters, the volume would be measured in cubic centimeters or cm^3. If the dimensions are in meters, the volume would be in cubic meters or m^3. Cubes and rectangular prisms are some examples of solid figures.

How can we find the volume of a cube or rectangular prism? In the previous module, you already derived the formula for finding the volume of a given cube and a rectangular prism. The volume is computed by multiplying the length, width and height of the rectangular prism.

The faces of a cube are squares. Its length, width, and height are equal. The sides of the square are called the edges of the cube. The edges are usually symbolized by s.

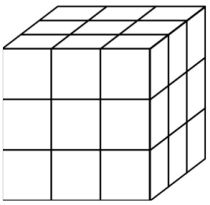
Therefore, the volume of a cube is $s \times s \times s$ or s^3.



s = 4 m

$V = s \times s \times s$
$V = 4\ m \times 4\ m \times m$
$V = 64\ m^3$

Note that 64 m^3 can be read either as 64 cubic meters or 64 meter cubes.
Now, let's answer the problem in What's New.



There are 9 s in each layer. There are 3 layers.

Then, the volume is 3 × 3 × 3 = 27 s.

Hence, there are 27 s in the Rubik's cube.

In a rectangular prism, the base is always a rectangle. The area of the base is the product of its length (l) and width (w). Thus, to get the volume of the prism, we may multiply the area of the base with the height (h).

Volume of a rectangular prism = area of the base × height of the prism

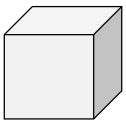
$$V = l \times w \times h$$

Study the rectangular prism below and the computation for its volume on the right.

V = l × w × h
V = 5 cm × 3 cm × 4 cm
V = 60 cm^3

Study the examples below.

Example 1

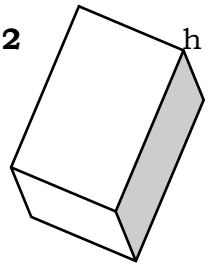


s = 5 cm

Formula: V = s × s × s
Solution: V = 5 cm × 5 cm × 5 cm
Answer: V = 125 cm^3

Note that 125 cm^3 is read either as 125 cubic centimeters or 125 centimeters cube.

Example 2



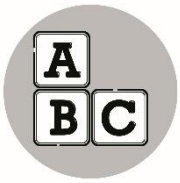
Formula: V = l × w × h
Solution: V = 5 cm × 3 cm × 4 cm
Answer: V = 60 cm^3

Example 3

What is the amount of space that is occupied by a rectangular pool which is 5.5 m in width, 10 m in height and 7 m in depth (height).

Formula: $V = l \times w \times h$
Solution: $V = 5.5\ m \times 10\ m \times 7\ m$
Answer: $V = 385\ m^3$

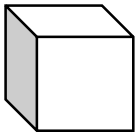
You are now ready to find the volume of a cube and a rectangular prism using cubic centimeters and cubic meters. Keep going!



What's More

Activity 1: Complete Me!

Direction: Find the volume of the cubes and rectangular prisms. On your answer sheet, copy and supply your answers for the following.

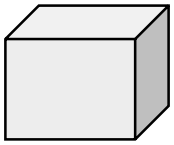
1. 

s = 2 m

$V = s \times s \times s$

$= 2\ m \times 2\ m \times 2\ m$

$=$ _____

2. 

s = 3 cm

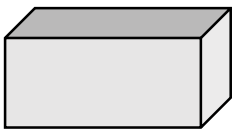
s = 3 cm

s =3 cm

$V = s \times s \times s$

$= 3\ cm \times$____ $\times$ ____

$= 27\ cm^3$

4. 

h= 5 cm

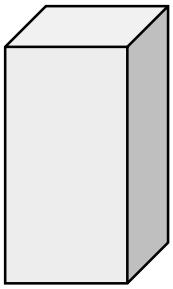
w = 6 cm

l = 10 cm

$V = l \times w \times h$

$= 10\ cm \times$ ____ $\times 5\ cm$

$=$ _____

5. 

h = 10 m

w = 5 m

l = 8 m

$V = l \times w \times h$

$= 8\ m \times 5\ m \times$ _____

$=$ _____

3. s = 4 cm

V = s × s × s

= ___ ×____ × 4 cm

= _____

Activity 2: True or False!

Directions: Read the statement below. On your answer sheet, write T if the sentence is correct and F, if it is incorrect.

_____1. The volume of a cube with 9-m side is 27 cu. m.

_____2. The volume of a cube can be found by multiplying the length of its edge by 3..

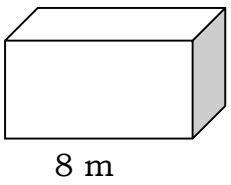
_____3. The volume of rectangular solid with dimensions 3 m × 4 m × 7 m is 84 cu. m.

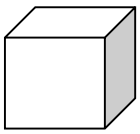
_____4. A prism, with dimensions 15 cm × 8 cm ×10 cm, has a volume of 400 cu. cm.

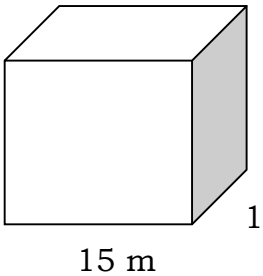
_____5. Volume is the number of cubic units needed to fill a shape.

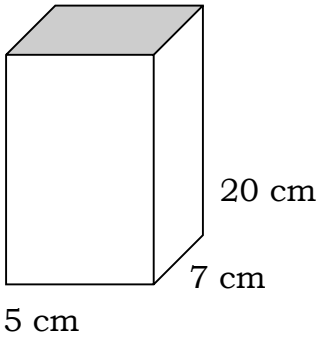
Activity 3: Find Me!

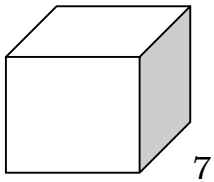
Directions: Find the volume of the solid figures below. Write your answers in your Math Activity notebook. You may use a calculator.

1. 

2. 

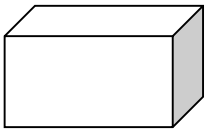
3. 

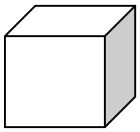
4. 

5. 

What I Have Learned

In your own words, explain how to find the volume of a cube and a rectangular prism. You may use the figure below in your explanation.

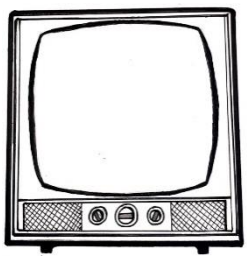
1. 

2. 

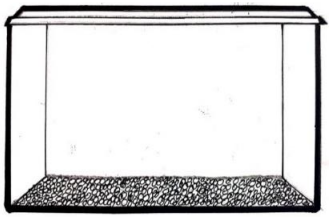
You have reached this far. You are doing fine. Keep going!

What I Can Do

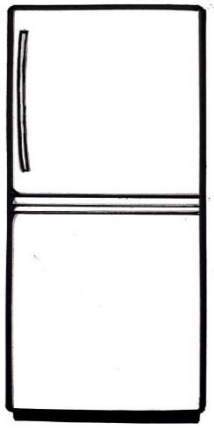
Directions: Find the volume of the following objects using the appropriate formula. Write your answers and solutions on a separate sheet of paper. You may use a calculator.

1. 

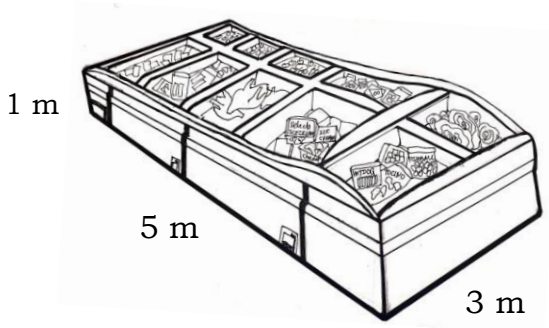
old television

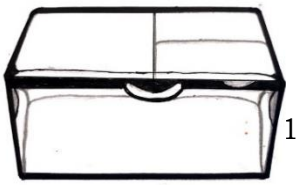
2. 

rectangular aquarium

3 

Refrigerator

4. 

5. 

lunch box

Assessment

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write the chosen letter on a separate sheet of paper.

1. What is the volume of a rectangular wooden–box whose length, width and height are 50 cm, 20 cm and 60 cm, respectively?

   A. 60 cm^3 B. 130 cm^3 C. 60 000 cm^3 D. 120 000 cm^3

2. What is the amount of space enclosed in a rectangular box with dimensions 10 cm, 8 cm and 5 cm?

   A. 400 cm^3 B. 400 m^3 C. 500 cm^3 D. 500 m^3

3. If a rectangular box measures 8 cm, 5 cm and 3 cm, what is the volume of the box?

   A. 200 cm^3 B. 120 m^3 C. 120 cm^3 D. 100 m^3

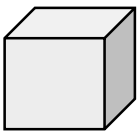
4. A rectangular can of meatloaf measures 12 cm by 5 cm by 7 cm. What is the amount of space that is occupied by the can?

   A. 520 m^3 B. 420 m^3 C. 420 cm^3 D. 400 cm^3

5. If a sandbox measures 10 m × 8 m × 0.5 m, what is the amount of space enclosed in the sandbox?

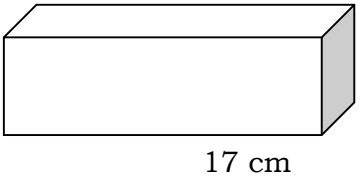
   A. 18.5 m^3 B. 40 m^3 C. 48 m^3 D. 480 m^3

6. Which of the following is the volume of the cube shown below?



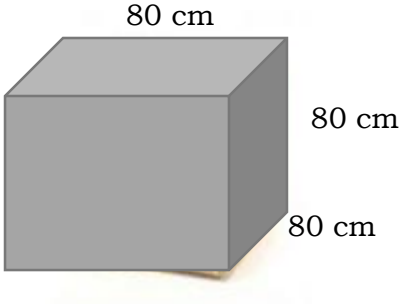
   A. 27 cm^3 C. 709 cm^3
   B. 81 cm^3 D. 729 cm^3

7. Which of the following is the volume of the prism shown below?



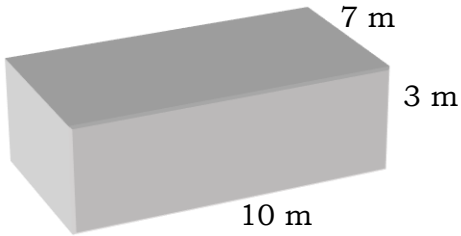
   A. 50 cm^3 C. 2 400 m^3
   B. 2 040 cm^3 D. 2 4000cm^3

8. Which of the following is the volume of the object shown below?



A. 512 000 cm^3
B. 504 000 cm^3
C. 64 000 cm^3
D. 240 cm^3

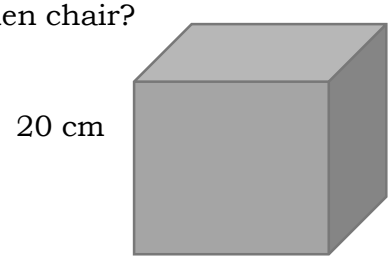
9. Which of the following is the volume of the object shown below?



A. 320 m^3
B. 255 m^3
C. 210 m^3
D. 20 m^3

10. A wooden cube chair has an edge measuring 20 centimeters. Which of the folowing is the volume of the wooden chair?

A. 60 cm^3
B. 120 000 cm^3
C. 8 000 cm^3
D. 200 000 cm^3



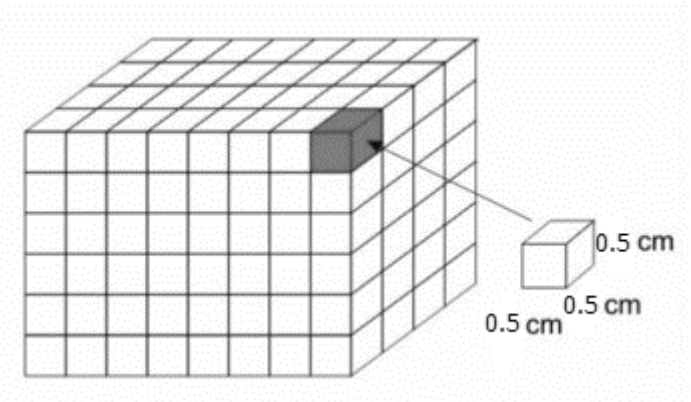
You're almost done. Do the last activity.

Additional Activities

A. On a separate sheet of paper, draw figures that may represent cubes or rectangular prisms with the following measures.
Find their volumes.

1. l = 4 m
   w = 1 m
   h = 3 m
2. s = 14 cm
3. s = 20 cm
4. l = 8 cm
   w = 3 cm
   h = 10 cm
5. s = 12 m

B. As shown below, the edge length of each cube that the prism is made up of is 0.5 cm. What is the volume of the prism? Write your solution and your answer on a separate sheet of paper.



C. Collect at least 5 objects that can represent cubes or rectangular prisms. Measure the length, width and height in meters and centimeters of each object. Copy and complete the table below on a separate sheet of paper. You may use a calculator.

Object	Length	Width	Height	Volume
1.				
2.				
3.				
4.				
5.				

Hurray! You did it! You need to take a break!

Answer Key

What I Know

1. C	6. A
2. C	7. D
3. D	8. A
4. B	9. B
5. C	10. D

What's In

1 0.007 m^3
2 25 000 cm^3
3 0.015 m^3
4 4 000 000 cm^3
5. 0.002 L

What I Have Learned

Explanations vary.
1. 40 cm^3
2. 1 000 m^3

What I Can DO

1. 3 511.808 cm^3
2. 9 375 cm^3
3. 0.5625 m^3
4. 15 m^3
5. 1 800 cm^3

What's More

Activity 1: Complete Me!

1. $V = s \times s \times s$
   $= 2\text{ m} \times 2\text{ m} \times 2\text{ m}$
   $= 8\ m^3$

2. $V = s \times s \times s$
   $= 3\text{ cm} \times 3\text{ cm} \times 3\text{ cm}$
   $= 27\ cm^3$

3. $V = s \times s \times s$
   $= 4\text{ cm} \times 4\text{ cm} \times 4\text{ cm}$
   $= 64\ cm^3$

4. $V = l \times w \times h$
   $= 5\text{ cm} \times 6\text{ cm} \times 10\text{ cm}$
   $= 300\ cm^3$

5. $V = l \times w \times h$
   $= 8\text{ m} \times 5\text{ m} \times 10\text{ m}$
   $= 400\ m^3$

Assessment

1. C	6. D
2. A	7. B
3. C	8. A
4. C	9. C
5. B	10. C

What's More

Activity 2: True or False!

1. F
2. F
3. T
4. F
5. T

Activity 3: Find Me!

1. 128 m^3
2. 1 000 cm^3
3. 2 250 m^3
4. 2 100 cm^3
5. 421.875 m^3

Additional Activities

A.

1. 12 m^3
2. 2 744 cm^3
3. 8 000 cm^3
4. 240 cm^3
5. 1 728 m^3

(Note: Figures may vary.

B. 24 cm^3

C. Answers vary.

References

Ursua, Alvin C. and Angeline P. Lumbre. 21st Century Mathletes Textbook. Quezon City: Vibal Group Inc., 2016.

Coronel, Carmelita C. and Bamba, Nelia D. Mathematics for a Better Life Textbook. Quezon City: SD Publications, Inc., 2010

Grade 5 Teacher's Guide

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