

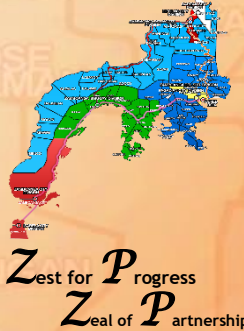
JANUARY	<i>Makugihon</i>
FEBRUARY	<i>Mahigugmaon</i>
MARCH	<i>Matinabangon</i>
APRIL	<i>Matinahuron</i>
MAY	<i>Mahapsay og Malimpyo</i>
JUNE	<i>Maabtik og Masunod sa Dhaklong Oras</i>
JULY	<i>Maantigo og Maabilidad</i>
AUGUST	<i>Maginhuhunoon para sa Uban</i>
SEPTEMBER	<i>Madaginton</i>
OCTOBER	<i>Matinud-anon</i>
NOVEMBER	<i>Masaligan</i>
DECEMBER	<i>Maalampon</i>



Republic of the Philippines
Department of Education
 Regional Office IX, Zamboanga Peninsula



6



MATHEMATICS

4th QUARTER – Module 1: RELATIONSHIP OF THE VOLUME BETWEEN SOLID FIGURES



Name of Learner: _____

Grade & Section: _____

Name of School: _____

Mathematics – Grade 6
Alternative Delivery Mode
Quarter 4 - Module 1: Relationship of the Volume between Solid Figures
First Edition, 2020

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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 of lessons in each SLM. This will tell you if you can proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for a 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 with 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. Read the instructions carefully before performing each task.

If you have any questions 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

After successfully doing this module's activities, you are expected to determine the relationship of the volume between a rectangular prism and a pyramid, a cylinder, a cone, and a cylinder and sphere. **(M6ME-IVa-95)**

The activities provided in this module will help you master your skills in calculating volumes of given solid figures. It will further help you understand better the importance of determining the relationships between each solid figure.

So, it is essential to pay full attention to this module and exert the best effort to comply with every task.

Believe that learning can continue amidst the health crisis. Good luck, stay safe, and God bless.



What I Know

Directions: Choose the letter that corresponds to your answer. Write your answer on a separate sheet.

1. If a prism volume is 30m^3 , what is the volume of a pyramid with the same base and height?
A. 10m^3 B. 15m^3 C. 20m^3 D. 60m^3
2. The volume of a cylinder is 99cm^3 ; what is a cone's volume with the same radius and height?
A. 53cm^3 B. 43cm^3 C. 33cm^3 D. 23cm^3
3. If the volume of a sphere is 40cm^3 , find a cylinder's volume with the same radius.
A. 60cm^3 B. 20cm^3 C. 12cm^3 D. 2cm^3
4. What is the volume of a prism if the volume of a pyramid is 15m^3 ?
A. 54m^3 B. 45m^3 C. 35m^3 D. 34m^3
5. If the volume of a cone is 100cm^3 , what is a cylinder's volume with the same radius and height?
A. 300cm^3 B. 50cm^3 C. 25cm^3 D. 10cm^3

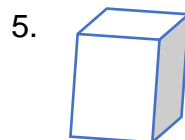
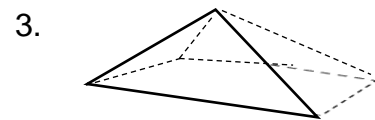
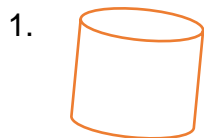
LESSON

Relationship of Volume of Solid Figures



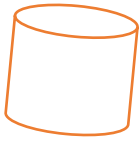
What's In

Directions: Name the given solid figures.

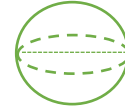




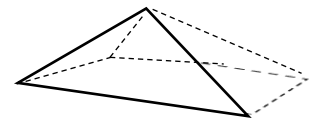
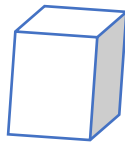
What's New



Solid Figures Author Unknown



Solid figures are fat, not flat.
 A cone is like a party hat.
 A sphere is like a bouncy ball.
 A prism is like a tall building.
 A cylinder is like a can; you pop.
 A cube is like a dice you drop.
 Solid figures are here and there.
 Solid figures are everywhere.



What is It

VOLUME

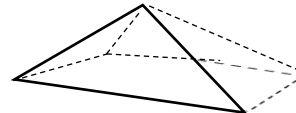
Volume is the amount of space enclosed by a solid. It must always be expressed in cubic units.

UNDERSTANDING VOLUME OF PRISM AND PYRAMID

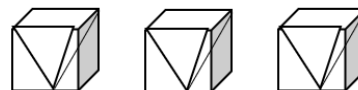
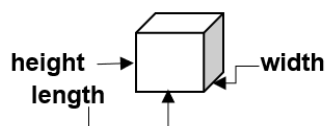
RECTANGULAR PRISM



RECTANGULAR PYRAMID



A **prism** has two bases, while a **pyramid** has only one base. It's pretty obvious that having the same base and height, a pyramid will have less volume than a prism. How much less?



When they have the same measurements of bases and height, it needs three times the pyramid's content to fill the space inside the prism. Therefore, the pyramid's volume is one third the volume of a prism with the same height and base area.

$$V_{prism} = B \times h \text{ or } V = l \times w \times h$$

$$V_{pyramid} = \frac{1}{3} B \times h$$

EXAMPLE 1:

A rectangular prism has a base length of 4 cm, a base width of 3 cm, and a height of 5 cm. Compare the volume of this prism to a pyramid with the same measurements.

SOLUTION: $V(\text{prism}) = l \times w \times h$
 $V = 4\text{cm} \times 3\text{cm} \times 5\text{cm}$
 $V = 12\text{cm}^2 \times 5\text{cm}$
 $V = 60\text{cm}^3$

$$V(\text{pyramid}) = \frac{1}{3} \times B \times h$$

$$B = 4\text{cm} \times 3\text{cm} = 12\text{cm}^2$$

$$h = 5\text{cm}$$

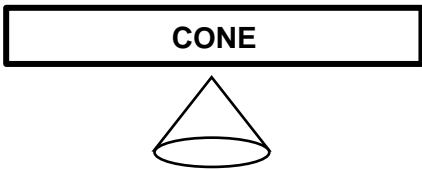
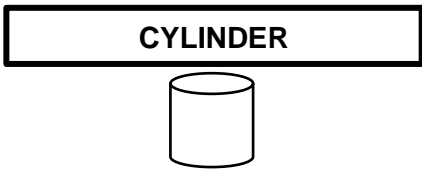
$$V = \frac{1}{3} \times 12\text{cm}^2 \times 5\text{cm}$$

$$V = \frac{1}{3} \times 60\text{cm}^3 = \mathbf{20\text{cm}^3}$$

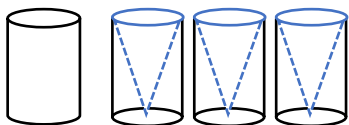
ANSWER:

The volume of a pyramid 20cm^3 is one third the volume of a prism, 60cm^3 .

UNDERSTANDING VOLUME OF CYLINDER AND CONE



Just like prisms and pyramids, the volume of a cone is only $\frac{1}{3}$ of the volume of a cylinder with the same dimensions. It takes 3 cones to fill a pyramid.



Formula: $V_{cylinder} = \pi r^2 h$ $V_{cone} = \frac{1}{3} \pi r^2 h$

EXAMPLE 2:

A metal cone with a radius of 7 meters and a height of 4 meters is used to fill a cylindrical glass of the same dimensions with oil. How many of the cone's capacity will fill the cylinder full?

SOLUTION: $V(\text{cylinder}) = \pi r^2 h$

$$V = (3.14) (7\text{m})^2 (4\text{m})$$

$$V = (3.14) (49\text{m}^2) (4\text{m})$$

$$V = (3.14) (196\text{m}^3)$$

$$V = \mathbf{615.44 \text{ cm}^3}$$

$$V(\text{cone}) = \frac{1}{3} \pi r^2 h$$

$$V = \frac{1}{3} \times 3.14 \times 7\text{m}^2 \times 4\text{m}$$

$$V = \frac{1}{3} \times 3.14 \times 49\text{m}^2 \times 4\text{m}$$

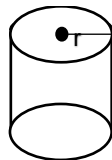
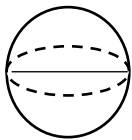
$$V = \frac{1}{3} \times 615.44 \text{ m}^3$$

$$V = \mathbf{205.14 \text{ m}^3}$$

$$V = \mathbf{615.44 \text{ cm}^3 \div 205.14 \text{ m}^3}$$

ANSWER: 3 times

Understanding Volume of Cylinder and Sphere



Formula: $V_{\text{sphere}} = \frac{4}{3} \pi r^3$ $V_{\text{cylinder}} = \pi r^2 h$

A cylinder will fit exactly around the sphere if they have the same radius. In that case, the height of the cylinder is the diameter of the sphere, and the volume of the sphere will be $\frac{2}{3}$ of the cylinder's volume.

EXAMPLE 3:

A globe and a cylindrical shaped jar, each have a radius of 15cm. Compare their volume if the jar fits exactly around the globe.

SOLUTION: $V(\text{sphere}) = \frac{4}{3} \pi r^3$

$$V = \frac{4}{3} \times 3.14 \times (15\text{cm})^3$$

$$V = \frac{4}{3} \times 10,597.50$$

$$V = \mathbf{14\ 130 \text{ cm}^3}$$

$$V(\text{cylinder}) = \pi r^2 h$$

$$V = 3.14 \times 15\text{cm}^2 \times 30\text{cm}$$

$$V = 3.14 \times 6,750 \text{ cm}^3$$

$$V = \mathbf{21\ 195 \text{ cm}^3}$$

$$\frac{2}{3} \times 21\,195 = 14\,130$$

ANSWER: The volume of the globe is $\frac{2}{3}$ of the volume of the cylindrical jar.



What's More

Directions: Using the relationships of the volume between a rectangular prism and a pyramid; a cylinder and a cone; and a cylinder and sphere, find the volume of the solid figures below. Write your answer on a separate sheet.

1. If the volume of a prism is 45 cm^3 , the volume of a pyramid is _____.
2. If the volume of a cylinder is 57 cm^3 , the volume of a cone is _____.
3. If the volume of a sphere is 30 cm^3 , the volume of a cylinder is _____.
4. If the volume of a pyramid is 15 cm^3 , the volume of a prism is _____.
5. If the volume of a cone is 200 cm^3 , the volume of a cylinder is _____.



What I Have Learned

Directions: Fill in the blank with the correct answer. Write your answer on a separate sheet.

1. The volume of the pyramid is _____ to the volume of the prism with the same height and base.
2. The volume of the prism is _____ to the volume of the pyramid with the same height and base.
3. The volume of a cone is _____ the volume of a cylinder with the same radius and height.
4. The volume of a sphere that will fit exactly in a cylinder is _____ that of the volume of the sphere with the same radius.



What I Can Do

Directions: Read and answer the following problem. Write your answer on a separate sheet.

1. A rectangular prism has a base length of 8 cm, a base width of 6 cm, and a height of 10 cm. Compare the volume of this prism to a pyramid with the same measurements.
2. A metal cone with a radius of 3 meters and a height of 5 meters is used to fill a cylindrical glass of the same dimensions with oil. How many of the cone's capacity will fill the cylinder full?
3. A globe and a cylindrical shaped jar have a radius of 30cm each. Compare their volume if the jar fits exactly around the globe.

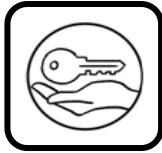


Assessment

Directions: Read each item carefully. Choose the letter of the correct answer. Write your answer on a separate sheet.

1. If the volume of a prism is 9m^3 , what is the volume of a pyramid with the same base and height?
A. 3m^3 B. 9m^3 C. 18m^3 D. 27m^3
2. The volume of a cylinder is 117cm^3 . What is the volume of a cone with the same diameter and height as that of the cylinder?
A. 39cm^3 B. 49cm^3 C. 59cm^3 D. 79cm^3
3. If the volume of a sphere is 180cm^3 , find the volume of a cylinder with the same radius.
A. 420cm^3 B. 320cm^3 C. 220cm^3 D. 120cm^3
4. What is the volume of a prism if the volume of a pyramid is 25m^3 ?
A. 75m^3 B. 85m^3 C. 95m^3 D. 105m^3
5. If the volume of a cone is 50cm^3 , what is the volume of a cylinder with the same radius and height?
A. 150cm^3 B. 250cm^3 C. 350cm^3 D. 450cm^3

6. What is the volume of a pyramid that has the same base and height if a prism has a volume of 45 m^3 ?
- A. 15 m^3 B. 25 m^3 C. 35 m^3 D. 45 m^3
7. A pyramid has a volume of 360 cm^3 . What is the volume of a prism with the same base and height as the pyramid?
- A. $1\,000 \text{ cm}^3$ B. $1\,080 \text{ cm}^3$ C. $1\,800 \text{ cm}^3$ D. $2\,800 \text{ cm}^3$
8. The volume of a cylinder is 48 m^3 ; what is the volume of a cone with the same radius and height?
- A. 16 m^3 B. 14 m^3 C. 13 m^3 D. 11 m^3
9. If a sphere has a volume of 90 cm^3 , find the volume of a cylinder that will fit exactly around the sphere.
- A. 60 cm^3 B. 50 cm^3 C. 40 cm^3 D. 30 cm^3
10. A cylinder has a volume of 30 cm^3 ; what is the volume of a cone with the radius as the cylinder?
- A. 10 cm^3 B. 14 cm^3 C. 19 cm^3 D. 22 cm^3



Answer Key

What I Know:
 1. Cylinder
 2. Sphere
 3. Cone
 4. Rectangular Prism
 5. Rectangular Pyramid

What's In:
 1. 11m^3
 2. 8m^3
 3. 540cm^3
 4. 30cm^3
 5. 30cm^3

What's More:
 1. 15cm^3
 2. 19cm^3
 3. 20cm^3
 4. 45cm^3
 5. 600cm^3

What I Can Do:
 1. The volume of a pyramid 160 cm^3 is one third the volume of a prism, 480 cm^3 .
 2. $141\text{ cm}^3 \div 47\text{ cm}^3 = 3$
 3. $2/3 \times 169\ 560 = 113\ 040$
 The volume of the globe is $\frac{3}{2}$ the volume of the cylindrical jar.

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

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Pinterest.ph

I AM A FILIPINO

by Carlos P. Romulo

I am a Filipino – inheritor of a glorious past, hostage to the uncertain future. As such, I must prove equal to a two-fold task – the task of meeting my responsibility to the past, and the task of performing my obligation to the future.

I am sprung from a hardy race – child many generations removed of ancient Malayan pioneers. Across the centuries, the memory comes rushing back to me: of brown-skinned men putting out to sea in ships that were as frail as their hearts were stout. Over the sea I see them come, borne upon the billowing wave and the whistling wind, carried upon the mighty swell of hope – hope in the free abundance of the new land that was to be their home and their children's forever.

This is the land they sought and found. Every inch of shore that their eyes first set upon, every hill and mountain that beckoned to them with a green and purple invitation, every mile of rolling plain that their view encompassed, every river and lake that promised a plentiful living and the fruitfulness of commerce, is a hollowed spot to me.

By the strength of their hearts and hands, by every right of law, human and divine, this land and all the appurtenances thereof – the black and fertile soil, the seas and lakes and rivers teeming with fish, the forests with their inexhaustible wealth in wild and timber, the mountains with their bowels swollen with minerals – the whole of this rich and happy land has been for centuries without number, the land of my fathers. This land I received in trust from them, and in trust will pass it to my children, and so on until the world is no more.

I am a Filipino. In my blood runs the immortal seed of heroes – seed that flowered down the centuries in deeds of courage and defiance. In my veins yet pulses the same hot blood that sent Lapulapu to battle against the alien foe, that drove Diego Silang and Dagohoy into rebellion against the foreign oppressor.

That seed is immortal. It is the self-same seed that flowered in the heart of Jose Rizal that morning in Bagumbayan when a volley of shots put an end to all that was mortal of him and made his spirit deathless forever; the same that flowered in the hearts of Bonifacio in Balintawak, of Gregorio del Pilar at Tirad Pass, of Antonio Luna at Calumpit, that bloomed in flowers of frustration in the sad heart of Emilio Aguinaldo at Palanan, and yet burst forth royally again in the proud heart of Manuel L. Quezon when he stood at last on the threshold of ancient Malacanang Palace, in the symbolic act of possession and racial vindication. The seed I bear within me is an immortal seed.

It is the mark of my manhood, the symbol of my dignity as a human being. Like the seeds that were once buried in the tomb of Tutankhamen many thousands of years ago, it shall grow and flower and bear fruit again. It is the insigne of my race, and my generation is but a stage in the unending search of my people for freedom and happiness.

I am a Filipino, child of the marriage of the East and the West. The East, with its languor and mysticism, its passivity and endurance, was my mother, and my sire was the West that came thundering across the seas with the Cross and Sword and the Machine. I am of the East, an eager participant in its struggles for liberation from the imperialist yoke. But I know also that the East must awake from its centuried sleep, shake off the lethargy that has bound its limbs, and start moving where destiny awaits.

For I, too, am of the West, and the vigorous peoples of the West have destroyed forever the peace and quiet that once were ours. I can no longer live, a being apart from those whose world now trembles to the roar of bomb and cannon shot. For no man and no nation is an island, but a part of the main, and there is no longer any East and West – only individuals and nations making those momentous choices that are the hinges upon which history revolves. At the vanguard of progress in this part of the world I stand – a forlorn figure in the eyes of some, but not one defeated and lost. For through the thick, interlacing branches of habit and custom above me I have seen the light of the sun, and I know that it is good. I have seen the light of justice and equality and freedom, my heart has been lifted by the vision of democracy, and I shall not rest until my land and my people shall have been blessed by these, beyond the power of any man or nation to subvert or destroy.

I am a Filipino, and this is my inheritance. What pledge shall I give that I may prove worthy of my inheritance? I shall give the pledge that has come ringing down the corridors of the centuries, and it shall be compounded of the joyous cries of my Malayan forebears when first they saw the contours of this land loom before their eyes, of the battle cries that have resounded in every field of combat from Mactan to Tirad Pass, of the voices of my people when they sing:

“I am a Filipino born to freedom, and I shall not rest until freedom shall have been added unto my inheritance—for myself and my children and my children's children—forever.”