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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 2
Lesson
5

Lesson Exemplar for Mathematics Grade 7
Quarter 2: Lesson 5 (Week 5)
SY 2024-2025

Development Team

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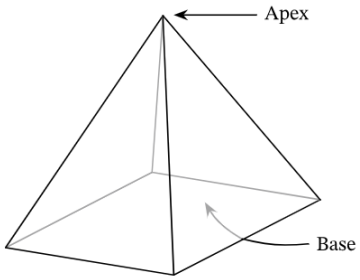
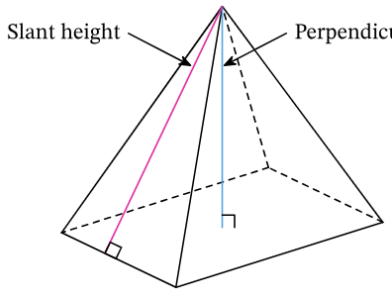
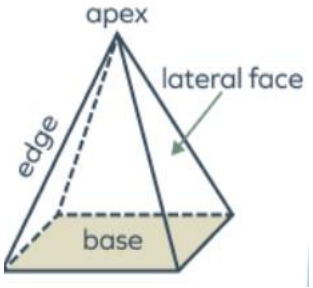
MATHEMATICS / QUARTER 2 / GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners should have knowledge and understanding of volume of square and rectangular pyramids, and cylinders.
B. Performance Standards	By the end of the quarter, the learners are able to find the volume of square and rectangular pyramids, and the volume of cylinders. (MG)
C. Learning Competencies and Objectives	***Learning Competency*** By the end of the lesson, the learners are able to … 1. explain inductively the volume of a square and rectangular pyramid, leading to the identification of the formula. 2. find the volume of a square and rectangular pyramid. 3. solve problems involving the volumes of square and rectangular pyramids. ***Learning Objectives*** At the end of this lesson, the learner should be able to: 1. accurately determine the properties of square and rectangular pyramids; 2. accurately determine the relationship between a cube, rectangular prism and a pyramid; 3. correctly determine the volumes of square and rectangular pyramids; and 4. correctly solve word problems involving the volumes of square and rectangular pyramids.
D. Content	Deriving the Formula of the Volume of the Rectangular Pyramid Estimate Volume of a Rectangular Pyramid Solve Problems involving the Volume of Rectangular Pyramid
E. Integration	Optional

II. LEARNING RESOURCES
Big Ideas Math. (n.d.). Volumes of Pyramids. https://www.bigideasmath.com/protected/content/ipe/grade%207/07/g7_07_03.pdf CueMath. (2023). Square Pyramid. https://www.cuemath.com/geometry/square-pyramid/ Math is Fun. (2017). Pyramids. https://www.mathsisfun.com/geometry/pyramids.html Math Worksheets 4 Kids. (2023). Volume of Rectangular Pyramid. https://www.mathworksheets4kids.com/volume/rectangular-pyramid-all.pdf Nagwa. (2024). Volume of Rectangular Pyramid. https://www.nagwa.com/en/presentations/576124795725/ SplashLearn. (n.d.). Rectangular Prism – Definition, Types, Properties, Examples, FAQs. https://www.splashlearn.com/math-

vocabulary/geometry/rectangular-prism
Testbook. (2023). Rectangular Pyramid: Types, Formula, Properties, and Examples. https://testbook.com/maths/rectangular-pyramid
Third Space Learning. (2023). Square Pyramid. https://thirdspacelearning.com/us/math-resources/topic- guides/geometry/square-pyramid/

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** Let the learners answer the short activity. **2. Feedback (Optional)** To explain the answer to the activity, let the learners give their thoughts on how to solve the volume of the given solid figures. The learner should also explain how the properties of solid figures are useful in determining the dimensions of solid figures for them to apply the formula in solving their volumes. With this, the learner in this stage of the lesson can relate the short activity to the new lesson. **Ask the following essential questions for further discussion:** 1. How many correct answers did you get? 2. What type of figures did you encounter in the activity? 3. How do you differentiate a solid figure from a plane figure? 4. How did you determine the number of faces, edges, and vertices of the different solids? 5. How did you compute the volumes of the different solids? 6. What similarities and differences among rectangular prisms, triangular prisms, and cubes did you identify?	The teacher will unlock the main topic by activating the prior knowledge of learners. This lesson leads them to relate their prior knowledge to learn the new lesson. The teacher may also add more activities when it is necessary. The teacher should give feedback after the learner answers the short activity. Students can do this on a separate worksheet provided. The teacher should provide feedback on every activity.
B. Establishing Lesson Purpose	**1. Lesson Purpose** Did you know that one of the oldest pyramid structures known to man is the “Great Pyramid of Giza?” It was constructed around 2550 BC in Egypt, and they are considered one of the seven wonders of the world.	In this part, the teacher should explain the importance of the lesson to the students. Giving real-world examples is helpful in engaging them to learn the lesson.

	2. Unlocking Content Area Vocabulary *Pyramids* are three-dimensional geometric shapes where the base is a polygon, and all other sides are triangles that meet at the apex or vertex (See Figure 1).  Figure 1  Figure 2  Figure 3 The *height of the pyramid* is the *perpendicular height,* which is the distance from the apex or vertex to the base of the pyramid. (See Figure 2.) The *slant height* is the distance measured along a *lateral face* from the apex to the *base edge*. It is the height of the triangle, which is the lateral face of the pyramid. (See Figures 2 and 3.)	The teacher should deliver this lesson for two weeks.
C. Developing and Deepening Understanding	**DAY 2** **SUB-TOPIC: VOLUME OF RECTANGULAR PYRAMID** **1. Explicitation** A *Rectangular Pyramid* is a three-dimensional geometric shape that has a rectangular base and four triangular faces (lateral faces) that are joined at the top by a vertex or apex. Figures 1, 2, and 3 above are examples of rectangular pyramids. The bottom rectangles are called the base of the pyramid. Imagine that we can fill a rectangular pyramid fully with water. If we pour this water into a rectangular prism of the same base and height as the rectangular pyramid, we would observe that the level of water is exactly one-third of the height of the rectangular prism. This is always the case for any pyramid.	Make sure that students already learned volumes of cubes and rectangular prisms (Area of base times height or $V = A_{base} \times h$). Note that by "pyramid", we only consider a *right* rectangular pyramid.

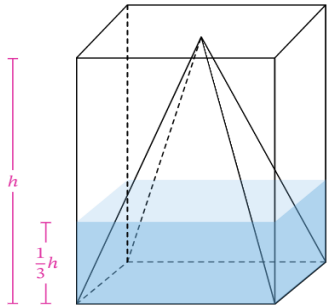


Figure 4

That is, the *volume of a pyramid* is one-third of the volume of a prism of the same base and perpendicular height. Particularly, the volume of a *rectangular pyramid* is one-third of the volume of a *rectangular prism* of the same base and perpendicular height. Recall,

$$V_{prism} = A_{base}\ x\ height \quad and \quad A_{rectangle} = l\ x\ w.$$

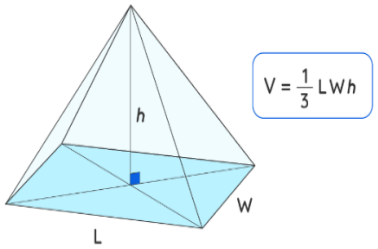
$$V_{pyramid} = \frac{1}{3}\ (V_{prism})$$

$$V_{pyramid} = \frac{1}{3}(A_{base}\ x\ h)$$

$$V_{pyramid} = \frac{1}{3}(l\ x\ w\ x\ h)$$

2. Worked Example

Example 1. Find the volume of a rectangular pyramid whose base is 6 x 7 inches and a height of 10 inches.



Solution:

- What is asked in the problem?
  The volume of a rectangular pyramid.
- What is the unit used in the problem?
  The unit used is inches.
- What is the volume of the pyramid?
  The volume of the rectangular pyramid is **140** in^3**.**

The teacher asks the questions. Students supply the answers.

In this part, the teacher will employ interactive discussion.

Using the formula for the volume of a rectangular pyramid, we have

$$V_{pyramid} = \frac{1}{3}(l\ x\ w\ x\ h)$$
$$V_{pyramid} = \frac{1}{3}(6\ in\ x\ 7\ in\ x\ 10\ in)$$
$$V_{pyramid} = 140\ in^3$$

Therefore, the volume of the rectangular pyramid is $140\ in^3$**.**

Example 2. Find the volume of a rectangular pyramid if its base length is 10 meters, its base width is 6 meters, and its height is 14 meters.
Solution:

- What is being asked in the problem?
  The volume of a rectangular pyramid is asked.
- What is the unit used in the problem?
  The unit used in the problem is meters (m).
- What is the volume of the rectangular pyramid?
  The volume of the rectangular pyramid is $280\ m^3$.

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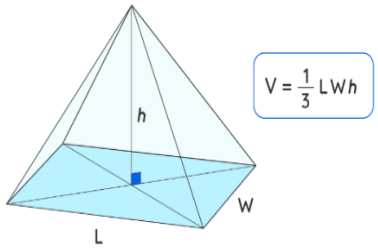
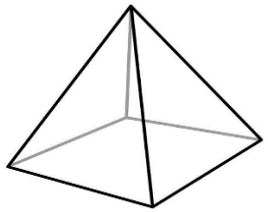
Using the formula for the volume of a rectangular pyramid, we have

$$V_{pyramid} = \frac{1}{3}(l\ x\ w\ x\ h)$$
$$V_{pyramid} = \frac{1}{3}(10\ m\ \ x\ \ 6\ m\ \ \ x\ 14\ m)$$
$$V_{pyramid} = 280\ m^3$$



Therefore, the volume of the rectangular pyramid is $280\ m^3$.

Example 3. Suppose that the government of the City of Manila is planning to build a pyramidal water reservoir. The base area of the reservoir has to be 12,545 square feet (ft^2). Given that its height is 51 feet (ft), find the volume of the reservoir.

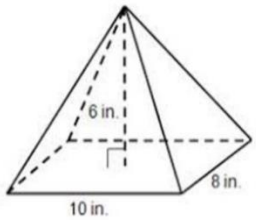
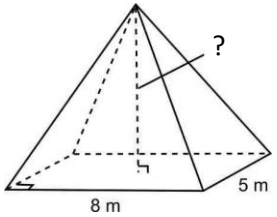


Solution:

- What is being asked in the problem?
  The volume of the pyramidal water reservoir is asked.

	• What is the unit used in the problem? The unit used in the problem is feet (ft). • What is the volume of the reservoir? The volume of the reservoir is **213,265** *cubic feet* (ft^3). Using the formula of the volume of a rectangular pyramid, we have $V_{pyramid} = \frac{1}{3}(A_{base}\ x\ h)$**,** where the area of base is 12,545 square feet. Then, $V_{pyramid} = \frac{1}{3}(12{,}545\ ft^2\ x\ 51\ ft)$ $V_{pyramid} = 213{,}265\ cu.ft$ Therefore, the volume of the pyramidal water reservoir is **213,265** ft^3. **DAY 3** **3. Lesson Activity** **Exercise No. 1** Find the volume of the solid figures described by doing the following steps. • Draw the solid figure with measurements. • Answer the guide questions in complete sentences. • Show solutions in the space provided. 1. A rectangular pyramid with a length of 9 inches, width of 7 inches, and height of 5 inches. Find the volume of the pyramid. • What is asked in the problem? • What is the unit used in the problem? • What is the volume of the rectangular pyramid? 2. A rectangular pyramid with a width of 1 ft, length of 5 ft, and height of 20 ft. Find the volume of the pyramid. • What is asked in the problem? • What is the unit used in the problem? • What is the volume of the rectangular pyramid? 3. A rectangular pyramid whose base area is 120 ft^2 and height of 9 ft. Find the volume of the pyramid. • What is asked in the problem? • What is the unit used in the problem? • What is the volume of the rectangular pyramid?	The teacher may use Think, Pair, Share (TPS) and other strategies to engage learners in deepening the lesson. The teacher should use collaborative and individual implementation of the activity to assess and evaluate the learning of students in two aspects of learning styles. Students can do this on a separate worksheet provided. To further the discussion, the teacher may add more learning activities.

	4. The width and length of the base of a rectangular pyramid are 12 feet and 15 feet, respectively. If its height is 9 feet, what is its volume? ● What is asked in the problem? ● What is the unit used in the problem? ● What is the volume of the rectangular pyramid?	
D. Making Generalizations	**1. Learners' Takeaways** **A. Generalization Questions** • How do you determine the volume of a rectangular pyramid? • How are the volumes of a rectangular prism and a pyramid related? • Why do you think pyramid shapes are usually used for roofs of most houses instead of a simple slope or single slant? • Why do you think the known structures in Egypt were built in pyramid shape?	The teacher may ask questions that lead to abstractions of the lesson.
	B. Generalization Activities Julio is constructing a container in the shape of a rectangular pyramid for a project to be presented in class. His teacher also said that every pyramid should represent a real-life example to make the project meaningful. He wants the base of the pyramid to measure 5 inches by 8 inches and the height of the pyramid to be 12 inches. How many cubic inches could the pyramid hold? What steps should Julio use to determine the volume of the constructed rectangular pyramid?	Teacher may give activities to emphasize generalization of the lesson. Recall the lesson activity for them to answer the problem based on their capacity.
	C. General Statements A ***Rectangular Pyramid*** is a three-dimensional geometric shape that has a rectangular base and four triangular faces (lateral faces) that are joined at the top by a vertex or apex. The bottom rectangles are called the base of the pyramid. The volume of rectangular pyramid is $V_{pyramid} = \frac{1}{3}(l \times w \times h) = \frac{1}{3}lwh$ A rectangular pyramid is a three-dimensional figure that has triangles as surfaces and a rectangle as its base. Three rectangular pyramids fill one rectangular prism with the same base and height.	The teacher may ask students to give a generalization statement.
	2. Reflection on Learning Let students share their reflections.	In this part, students may write a reflection about the importance of the lesson in real-life representation.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS
A. Evaluating Learning	**DAY 4** **1. Formative Assessment** **A. Multiple Choice** Directions: Read each problem carefully. Encircle the letter of the correct answer. 1. Find the volume of a pyramid with a base area of 24 square centimeters and a height of 12 centimeters. a. 96 cm^3 b. 36 cm^3 c. 288 cm^3 d. 56 cm^3 2. Given the figure below, solve for the volume.  a. 480 in^3 b. 160 in^3 c. 80 in^3 d. 48 cm^3 3. Find the volume of a rectangular pyramid that has a side length of 3 cm, a width of 2 cm, and a height of 5 cm. a. 30 cm^3 b. 25 cm^3 c. 1.5 cm^3 d. 10 cm^3 4. Given the pyramid with a volume of 120 cubic meters below, what is its height?  a. 3 m b. 40 m^2 c. 9 m d. 40 m	The teacher should assess learners collaboratively and individually on the last three days of this lessons. Students can do this in the separate worksheet provided. **Answer Key:** 1. 96 cm^3 2. 160 in^3 3. 10 cm^3 4. 9 m 5. 210 dm^3

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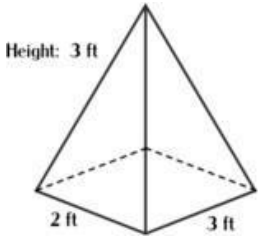
5. A pyramid has a rectangular base. The length of the base is 9 dm and its width is 5 dm. If the height of the pyramid is 140 cm, what is its volume?
a. 2,100 dm^3 b. 210 dm^3 c. 244 dm^3 d. 323 dm^3

B. Problem-solving.
Solve the following problems completely.
• Draw the solid figure with measurements.
• Show solutions in the space provided.
• Write the final answers in sentence form.



1. Ren constructed a model of a rectangular pyramid. The dimensions of the model are shown in the diagram. What is the volume of Ren's model in cubic feet?
2. A paperweight made of glass is sold as a souvenir at a tourist center. The height of the pyramid paperweight is 4 inches, and its base area is 9 square inches. How much glass, in cubic inches, is needed to manufacture 200 paperweights?

2. Homework (Optional)
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<td>The teacher may give homework to students who still have difficulty understanding the lesson and for mastery.</td>
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<td rowspan="5">B. Teacher's Remarks</td>
<td>Note observations on any of the following areas:</td>
<td>Effective Practices</td>
<td>Problems Encountered</td>
<td rowspan="5">The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.

Teachers may also suggest ways to improve the different activities explored/lesson exemplar.</td>
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C. Teacher's Reflection	*Reflection guide or prompt can be on:* • *principles behind the teaching* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* • *students* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* • *ways forward* *What could I have done differently?* *What can I explore in the next lesson?*	Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions