

Unit Plan Grade 6/7 – Measurement- Volume and Capacity–Term 3

Grade 6 OEs and SEs:

OEs:

- estimate, measure, and record quantities, using the metric measurement system;
- determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism.

SEs:

- estimate, measure, and record length, area, mass, capacity, and volume, using the metric measurement system.
- determine, through investigation using a variety of tools and strategies (e.g., decomposing rectangular prisms into triangular prisms; stacking congruent triangular layers of concrete materials to form a triangular prism), the relationship between the height, the area of the base, and the volume of a triangular prism, and generalize to develop the formula (i.e., $\text{Volume} = \text{area of base} \times \text{height}$) (Sample problem: Create triangular prisms by splitting rectangular prisms in half. For each prism, record the area of the base, the height, and the volume on a chart. Identify relationships.)
- solve problems involving the estimation and calculation of the surface area and volume of triangular and rectangular prisms (Sample problem: How many square centimetres of wrapping paper are required to wrap a box that is 10 cm long, 8 cm wide, and 12 cm high?).

Summative Task: EQAO Question: changing m to cm and calculating the volume of a 3D object.

Grade 7 OEs and SEs

OEs:

- determine the relationships among units and measurable attributes, including the area of a trapezoid and the volume of a right prism.

SEs:

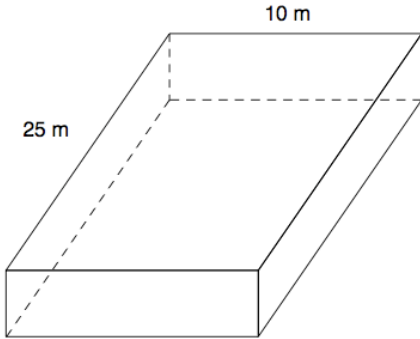
- sketch different polygonal prisms that share the same volume (Sample problem: The Neuman Company is designing a new container for its marbles. The container must have a volume of 200 cm³. Sketch three possible containers, and explain which one you would recommend.);
- determine, through investigation using a variety of tools (e.g., concrete materials, determine, through investigation using a variety of tools and strategies (e.g., decomposing right prisms; stacking congruent layers of concrete materials to form a right prism), the relationship between the height, the area of the base, and the volume of right prisms with simple polygonal bases (e.g., parallelograms, trapezoids), and generalize to develop the formula (i.e., $\text{Volume} = \text{area of base} \times \text{height}$) (Sample problem: Decompose right prisms with simple polygonal bases into triangular prisms and rectangular prisms. For each prism, record the area of the base, the height, and the volume on a chart. Identify relationships.);

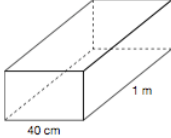
–solve problems that involve the surface area and volume of right prisms and that require conversion between metric measures of capacity and volume (i.e., millilitres and cubic centimetres) (Sample problem: An aquarium has a base in the shape of a trapezoid. The aquarium is 75cm high. The base is 50 cm long at the front, 75 cm long at the back, and 25 cm wide. Find the capacity of the aquarium.).

Summative Task:

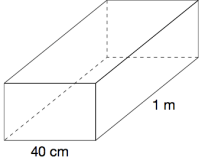
EQAO Question: changing m to cm and calculating the volume of a 3D object.

Day	Problem/Checkpoint	Intent
<p>1</p> <p>WAAAAC</p>	<p>Warm-up: Brainstorm: What is volume? Brainstorm ideas on the SmartBoard. (units we measure it with, cm³, m³, etc., the space something occupies)</p> <p>Activity: Provide students with 60 linking cubes. They are to calculate the volume of a rectangular prism with measurements 5 cm in length, 2 cm in width, and 6 cm in height. (MMS Gr. 6, pg. 225 Connect)</p> <p>Consolidation: It is not always practical to count cm cubes to find the volume of a rectangular prism. We can develop a formula: Show students the formula for volume. $V = l \times w \times h$</p> <p>Homework: Two friends are comparing the sizes of their pets' cages. Melissa has a hamster. Its cage is 58 cm long, 30 cm wide, and 25 cm tall. Nicole has a guinea pig. Its cage is 82 cm long, 59 cm wide, and 92 cm tall. What is the volume of each cage? (MMS Gr. 6 pg. 226#3)</p>	<p>Exploring Volume- developing a formula to calculate volume for a rectangular prism.</p>

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<p>2</p> <p>WAAAAC</p>	<p>Warm up: How many different rectangular prisms can you make with volume 24 cm^3? Sketch each prism you find. Label each sketch with the dimensions. (MMS Gr. 6 pg. 227 #6)</p> <p>Activity: A rectangular prism has volume 186 cm^3. It is 1.3 cm high. What is the area of its base? How do you know? (MMS Gr. 6 pg. 227 #5)</p> <p>Homework: A rectangular prism has volume 90 cm^3. The area of its base is 45 cm^2. What is its height? How do you know?</p>	<p>Calculating the volume of a triangular prism.</p>
<p>3 Check Point</p>	<p>A pool in the shape of a rectangular prism is shown below.</p>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Hint : $1 \text{ m}^3 = 1000 \text{ L}$</p> </div> <p>How many litres of water are needed to completely fill the swimming pool?</p>	

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4	<p>10 Jude's fish tank, shown below, holds 100 000 cm³ of water when full. Jude decides to pour in water to a height of 5 cm below the top of the tank.</p>  <p>How much water, in cm³, will Jude need to pour into the tank so that the water is 5 cm below the top?</p> <p>Show your work.</p>	<p><i>Learn how to order different fractional parts.</i></p>
5	<p>Warm Up: Mention to the students that length and width are the same as saying base and height.</p> <p>Activity: Using what you know about the formula for calculating the volume of a rectangular prism, how would you calculate the volume of a triangular prism? Sketch an example and show all dimensions to support your thinking.</p> <p>Consolidation: Solidify the formula for the volume for a triangular prism.</p> <p>Homework: How is the volume of a triangular prism related to the volume of a rectangular prism? Sketch an example to support your thinking.</p>	<p><i>Determine what the formula is to calculate the volume of a triangular prism.</i></p>

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6	<p>Warm Up: Brainstorm Capacity (how much something will hold, mL, L)</p> <p>Activity: A rectangular prism has the dimensions 2m length, 55cm width and 70cm height. What is the capacity of the container in mL? Sketch an example and show all dimensions to support your thinking. (Answer is 770,000cm³ volume, which = 770,000mL capacity) 1cm³ = 1mL <i>*Possible extension: What is the capacity of the container in litres?</i></p> <p>Consolidation: Volume and capacity are interchangeable. We can calculate the capacity using volume with the conversion of 1cm³ = 1mL and 1m³ = 1L</p> <p>Homework: Julie has a swimming pool with a volume of 450m³. It is 600cm high. What is the base area of the swimming pool? What is the capacity of the pool in L? Sketch an example and show all dimensions to support your thinking. (Answer is base area = 75m². Capacity = 450,000L)</p> <p>Activity: A rectangular prism has the dimensions 24cm length, 8cm width and 6cm height. What is the capacity of the container in mL? Sketch an example and show all dimensions to support your thinking. (Answer is 1152cm³ volume, which = 1152mL capacity)</p>	<p>- demonstrate an understanding of capacity and its relationship to volume</p>

Day	Problem/Checkpoint	Intent
7 Summative Assessment	<p data-bbox="540 275 711 302">From EQAO.</p> <p data-bbox="540 327 1109 363">Jude's fish tank, shown below, holds $100\,000\text{ cm}^3$ of water when full. Jude decides to pour in water to a height of 5 cm below the top of the tank.</p>  <p data-bbox="540 558 1109 577">How much water, in cm^3, will Jude need to pour into the tank so that the water is 5 cm below the top?</p> <div data-bbox="552 630 1102 934" style="border: 1px solid black; padding: 5px;"><p data-bbox="565 642 659 657">Show your work.</p></div>	<p data-bbox="1141 279 1385 422"><i>show their understanding of volume and capacity.</i></p>