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Mobius math answer key 7th grade

Everyday Mathematics for Parents: What You Need to Know to Help Your Child Succeed The University of Chicago School Mathematics Project University of Chicago Press Learn more >> With a login provided by your child's teacher, access resources to help your child with homework or brush up on your math skills. Understanding Everyday Mathematics for Parents Learn more about the EM curriculum and how to assist your child. CCSS Standards Addressing This activity reinforces what students learned in the previous lesson. Students are given two contextual situations and determine if the situation requires surface area or volume to be calculated. Arrange students in groups of 2. Give students 1 minute of quiet work time followed by time to discuss their reasoning with a partner. Follow with a whole-class discussion. For each situation, decide if it requires Noah to calculate surface area or volume. Explain your reasoning. Noah is planning to paint the bird house he built. He is unsure if he has enough paint. Noah is planning to use a box with a trapezoid base to hold modeling clay. He is unsure if the clay will all fit in the box. Select students to share their responses. Ask students to describe why the bird house situation calls for surface area and why the clay context calls for volume. To highlight the differences between the two uses of the box, ask: “What are the differences in how Noah is using the boxes in these situations?” “How can you determine if a situation is asking you to calculate surface area or volume?” The goal is to ensure students understand the differences between situations that require them to calculate surface area and volume. In this activity, students apply what they have learned previously about surface area and volume to different situations (MP4). Students have to consider whether they are finding the surface area or volume before answering each question. In addition, students apply proportional reasoning to find the cost of the vinyl that is needed. This is an opportunity for students to revisit this prior understanding in a geometry context. As students work on the task, monitor for students who are using different methods to decompose or compose the base of the object to calculate the area. Arrange students in groups of 2. Make sure students are familiar with the terms “foam” and “vinyl.” For example, it may help to explain that many binders are made out of cardboard covered with vinyl. In the diagram, all measurements have been rounded to the nearest inch. Give students 3–5 minutes of quiet work time followed by time to share their answers with a partner. Follow with a whole-class discussion. Representation: Internalize Comprehension. Activate or supply background knowledge by reviewing an image or video of a foam play structure. Allow students to use calculators to ensure inclusive participation in the activity. Supports accessibility for: Memory; Conceptual processing At a daycare, Kiran sees children climbing on this foam play structure. Kiran is thinking about building a structure like this for his younger cousins to play on. The entire structure is made out of soft foam so the children don’t hurt themselves. How much foam would Kiran need to build this play structure? The entire structure is covered with vinyl so it is easy to wipe clean. How much vinyl would Kiran need to build this play structure? The foam costs 0.8¢ per in3. Here is a table that lists the costs for different amounts of vinyl. What is the total cost for all the foam and vinyl needed to build this play structure? vinyl (in2) cost ($) 75 0.45 125 0.75 When he examines the play structure more closely, Kiran realizes it is really two separate pieces that are next to each other. How does this affect the amount of foam in the play structure? How does this affect the amount of vinyl covering the play structure? For the first question, students may try to figure out the total mass of foam needed instead of the total volume. Point out that they are not given any information about how much the foam weighs and prompt them to look for a different way of answering the question “how much foam?” Some students might see the 0.8¢ for the unit price and confuse that with $0.80. Remind students of their work with fractional percentages in a previous unit and that 0.8¢ must be less than 1¢. Select previously identified students to share how they calculated the area of the base. Consider asking some of the following questions: “Are there other ways to calculate the area of the base?” “How did you know if you had to calculate surface area or volume for this problem?” “If Kiran buys a big block of foam that is 36 inches wide, 20 inches deep, and 10 inches tall and cuts it into this shape, what shapes would he be cutting off?” (A rectangular prism for the step on the left side and a triangular prism for the slide part on the right.) “How much more would the big block of foam cost than your calculations?” (This method wastes a volume of \(36 \boldcdot 20 \boldcdot 10 - 4,\!960 = 2,\!240\) cubic inches of foam. This would be an extra $17.92 since \(2,\!240 \boldcdot 0.008 = 17.92\).) If Kiran decides not to cover the bottom of the structure with vinyl, how much would he save?” (This reduces the area of vinyl needed by another \(36\boldcdot 20 = 720\) square inches. This would save $4.32 since \(720 \boldcdot 0.006 = 4.32\).) Conversing, Listening: MLR7 Compare and Connect. Use this routine when students share their strategies for calculating the volume of the play structure. Ask students to consider what is the same and what is different about each approach. In this discussion, listen for and amplify comments that refer to the way the figure was decomposed. Draw students’ attention to the various ways area and perimeter of the base were found and how these were represented in each strategy. These exchanges can strengthen students’ mathematical language use and reasoning based on volume and surface area. Design Principle(s): Maximize meta-awareness This activity provides another opportunity for students to apply what they have previously learned about surface area and volume to different situations. Students will practice using proportions as they apply to volumes of prisms in a real-world application. As students work on the task, monitor for students who use different strategies to answer the questions. Arrange students in groups of 2. If desired, have students close their books or devices and display this regular hexagon with the dimensions of the sandbox in the problem for all to see. Ask students to calculate the base area of the sandbox. Give students 2–3 minutes of quiet work time followed by time to discuss their work with a partner. Follow with a whole-class discussion. Action and Expression: Internalize Executive Functions. Chunk this task into more manageable parts to support students who benefit from support with organizational skills in problem solving. For example, present one question at a time. Supports accessibility for: Organization; Attention The daycare has two sandboxes that are both prisms with regular hexagons as their bases. The smaller sandbox has a base area of 1,146 in2 and is filled 10 inches deep with sand. It took 14 bags of sand to fill the small sandbox to this depth. What volume of sand comes in one bag? (Round to the nearest whole cubic inch.) The daycare manager wants to add 3 more inches to the depth of the sand in the small sandbox. How many bags of sand will they need to buy? The daycare manager also wants to add 3 more inches to the depth of the sand in the large sandbox. The base of the large sandbox is a scaled copy of the base of the small sandbox, with a scale factor of 1.5. How many bags of sand will they need to buy for the large sandbox? A lawn and garden store is selling 6 bags of sand for $19.50. How much will they spend to buy all the new sand for both sandboxes? Students may think that Andre’s father needs to purchase 15 bags of sand, because they rounded their answers to 5 and 10 for the individual sandboxes and then added \(5 + 10 = 15\). Point out to students that he could pour some of the sand from the same bag into both sandboxes. Select previously identified students to share their methods of solving the problem. Consider asking the following questions: “Are there any other ways to solve this problem?” “Did you use any answers from one question (or multiple questions) to help you answer another question? If so, why?” “Did you use volume or surface area to help you answer any questions?” (yes, volume) “How did you calculate how much the daycare would spend on sand?” Writing: MLR3 Clarify, Critique, Correct. Present an incorrect statement that reflects a possible misunderstanding from the class for the number of bags Andre’s dad needs to purchase. For example, an incorrect statement is: “Andre’s dad needs to buy 15 sandbags because the small sandbox needs 5 bags and the larger sandbox needs 10 bags.” Prompt students to critique the solution (e.g., ask students, “Is this answer reasonable? Why or why not?”), and then write feedback to the author that identifies how to improve the solution and expand on his/her work. Listen for students who tie their feedback directly to the problem context (e.g., asking, “Why can’t one bag be used for both sandboxes?” or “How much sand will be left over?”) and use the language of volume, surface area, and perimeter. This will help students evaluate, and improve on, the written mathematical arguments of others and highlight the importance of context when solving problems. Design Principle(s): Maximize meta-awareness “How do we use volume and surface area to solve more complex real-world problems?” (You may need to calculate volume or surface area to answer a bigger question like how much it would cost to build a toy.) “What other skills did you have to use to solve the problems in this lesson?” (ratios and proportional relationships) Explain to students that many times in real-world problems calculating the volume or surface area is just a small piece of what is needed to be done. There are many other skills involved in solving more complex problems. CCSS Standards Addressing Suppose we wanted to make a concrete bench like the one shown in this picture. If we know that the finished bench has a volume of 10 ft3 and a surface area of 44 ft2 we can use this information to solve problems about the bench. For example, How much does the bench weigh? How long does it take to wipe the whole bench clean? How much will the materials cost to build the bench and to paint it? To figure out how much the bench weighs, we can use its volume, 10 ft3. Concrete weighs about 150 pounds per cubic foot, so this bench weighs about 1,500 pounds, because \(10 \boldcdot 150 = 1,\!500\). To figure out how long it takes to wipe the bench clean, we can use its surface area, 44 ft2. If it takes a person about 2 seconds per square foot to wipe a surface clean, then it would take about 88 seconds to clean this bench, because \(44 \boldcdot 2 = 88\). It may take a little less than 88 seconds, since the surfaces where the bench is touching the ground do not need to be wiped. Would you use the volume or the surface area of the bench to calculate the cost of the concrete needed to build this bench? And for the cost of the paint?