



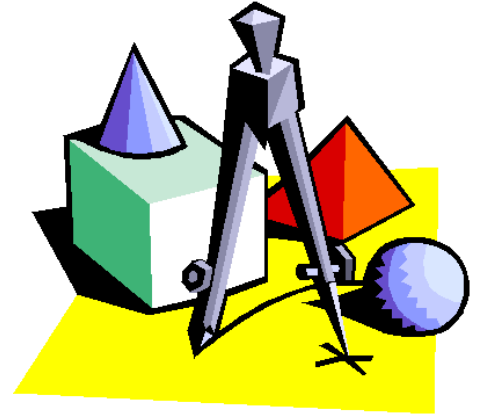
MODULE 5 LESSONS OBJECTIVES

A Concepts of Volume

Lesson 1: Explore volume by building with and counting unit cubes.

Lesson 2: Find the volume of a right rectangular prism by packing with cubic units and counting.

Lesson 3: Compose and decompose right rectangular prisms using layers.



B Volume and the Operations of Multiplication and Addition

Lesson 4: Use multiplication to calculate volume.

Lesson 5: Use multiplication to connect volume as packing with volume as filling.

Lesson 6: Find the total volume of solid figures composed of two non-overlapping rectangular prisms.

Lesson 7: Solve word problems involving the volume of rectangular prisms with whole number edge lengths.

Lessons 8–9: Apply concepts and formulas of volume to design a sculpture using rectangular prisms within given parameters.

C Area of Rectangular Figures with Fractional Side Lengths

Lesson 10: Find the area of rectangles with whole-by-mixed and whole-by-fractional number side lengths by tiling, record by drawing, and relate to fraction multiplication.

Lesson 11: Find the area of rectangles with mixed-by-mixed and fraction by-fraction side lengths by tiling, record by drawing, and relate to fraction multiplication.

Lesson 12: Measure to find the area of rectangles with fractional side lengths.

Lesson 13: Multiply mixed number factors, and relate to the distributive property and the area model.

Lessons 14–15: Solve real world problems involving area of figures with fractional side lengths using visual models and/or equations.



D Drawing, Analysis, and Classification of Two-Dimensional Shapes

Lesson 16: Draw trapezoids to clarify their attributes, and define trapezoids based on those attributes.

Lesson 17: Draw parallelograms to clarify their attributes, and define parallelograms based on those attributes.

Lesson 18: Draw rectangles and rhombuses to clarify their attributes, and define rectangles and rhombuses based on those attributes.

Lesson 19: Draw kites and squares to clarify their attributes, and define kites and squares based on those attributes.

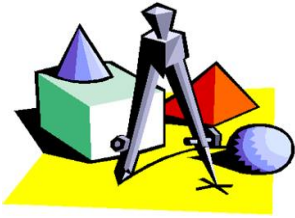
Lesson 20: Classify two-dimensional figures in a hierarchy based on properties.

Lesson 21: Draw and identify varied two-dimensional figures from given attributes.



1. Jackie and Ron both have 12 centimeter cubes. Jackie builds a tower 6 cubes high and 2 cubes wide. Ron builds one 6 cubes long and 2 cubes wide. Jackie says her structure has the greater volume because it is taller. Ron says that the structures have the same volume. Who is correct? Draw a picture to explain how you know. Use grid paper if you wish.

2. Mike uses 12 centimeter cubes to build structures. Use centimeter cubes to build at least 3 different structures with the same volume as Mike's. Record one of your structures on dot paper.



3. An ice cube tray has two rows of 8 cubes in each. How many ice cubes are in a stack of 12 ice cube trays? Draw a picture to explain your reasoning.

4. Draw a $2\text{ cm} \times 2\text{ cm} \times 1\text{ cm}$ rectangular prism on the board, or project an image of one on the board. Karen says that the volume of this prism is 5 cm^3 and that she calculated it by adding the sides together. Give the correct volume of this prism, and explain Karen's error.



5. a. A small fish tank is filled to the top with water. If the tank measures 15 cm by 10 cm by 10 cm, what is the volume of water in the tank? Express your answer in mL.
- b. After a week, water evaporates out of the tank, so the water is 9 cm high. What is the volume of the water in the tank?

6. A storage company advertises three different choices for all your storage needs: "The Cube," a true cube with a volume of 64 m^3 ; "The Double" (double the volume of the cube); and "The Half" (half the volume of the cube). What could be the dimensions of the three storage units? How might they be oriented to cover the most floor space? The most height?



7. Geoffrey wants to grow some tomatoes in four large planters. He wants each planter to have a volume of 320 cubic feet, but he wants them all to be different. Show four different ways Geoffrey can make these planters, and draw diagrams with the planters' measurements on them.

8. Sketch a rectangular prism that has a volume of 36 cubic cm. Label the dimensions of each side on the prism. Fill in the blanks that follow.

Height: _____ cm

Length: _____ cm

Width: _____ cm

Volume: _____ cubic cm



9. The chart below shows the dimensions of various rectangular packing boxes. If possible, answer the following without calculating the volume. a. Which box will provide the greatest volume? b. Which box has a volume that is equal to the volume of the book box? How do you know? c. Which box is $\frac{1}{3}$ the volume of the lamp box? Box Type Dimensions (l \times w \times h) Book Box 12 in \times 12 in \times 12 in

Picture Box 36 in \times 12 in \times 36 in

Lamp Box 12 in \times 9 in \times 48 in

The Flat 12 in \times 6 in \times 24 in

10. Heidi and Andrew designed two raised flowerbeds for their garden. Heidi's flowerbed was 5 feet long by 3 feet wide, and Andrew's flowerbed was the same length but twice as wide. Calculate how many cubic feet of soil they need to buy to have soil to a depth of 2 feet in both flowerbeds.



11. Mrs. Golden wants to cover her 6.5 foot by 4 foot bulletin board with silver paper that comes in 1-foot squares. How many squares does Mrs. Golden need to cover her bulletin board? Will there be any fractional pieces of silver paper left over? Explain why or why not. Draw a sketch to show your thinking.

12. Margo is designing a label. The dimensions of the label are 31 2 inches by 11 4 inches. What is the area of the label? Use the RDW process.



13. The Colliers want to put new flooring in a 61 2 foot by 71 3 foot bathroom. The tiles they want come in 12-inch squares. What is the area of the bathroom floor? If the tiles cost \$3.25 per square foot, how much will they spend on the flooring?

14. Jennifer's class decides to make a quilt. Each of the 24 students will make a quilt square that is 8 inches on each side. When they sew the quilt together, every edge of each quilt square will lose $\frac{3}{4}$ of an inch.

a. Draw one way the squares could be arranged to make a rectangular quilt. Then, find the perimeter of your arrangement.

b. Find the area of the quilt.



15. Janet bought 5 yards of fabric $21\frac{1}{4}$ feet wide to make curtains. She used $\frac{1}{3}$ of the fabric to make a long set of curtains and the rest to make 4 short sets.

a. Find the area of the fabric she used for the long set of curtains.

b. Find the area of the fabric she used for each of the short sets.

16. Kathy spent $\frac{3}{5}$ of her money on a necklace and $\frac{2}{3}$ of the remainder on a bracelet. If the bracelet cost \$17, how much money did she have at first?



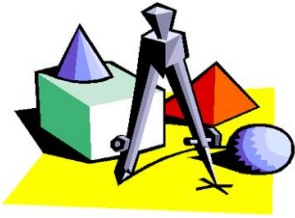
17. Ava drew the quadrilateral to the right and called it a trapezoid. Adam said Ava is wrong. Explain to your partner how a set square can be used to determine who is correct. Support your answer using the properties of trapezoids.

18. How many 2-inch cubes are needed to build a rectangular prism that measures 10 inches by 6 inches by 14 inches?



19. The teacher asked her class to draw parallelograms that are rectangles. Kylie drew Figure 1, and Zach drew Figure 2. Zach agrees that Kylie has drawn a parallelogram but says that it's not a rectangle. Is he correct? Use properties to justify your answer.

20. Nita buys a rug that is $10 \frac{3}{4}$ feet \times $12 \frac{1}{2}$ feet. What is the area of the rug? Show your thinking with an area model and a multiplication sentence.



21. Use what you know about quadrilaterals to answer each question below.

a. Explain when a trapezoid is not a parallelogram. Sketch an example.

b. Explain when a kite is not a parallelogram. Sketch an example.