

Grade Six Chapters 11 – Surface Area and Volume

Overview & Support

Standards:

Solve real-world and mathematical problems involving area, surface area, and volume.

- 6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
- 6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find the volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems
- 6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Apply and extend previous understandings of arithmetic to algebraic expressions.

- 6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.
- Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are
 - no parentheses to specify a particular order (Order of Operations).

Suggested Routines:

- use volume cubes
- connect to area

Suggested Resources:

- Which One Doesn't Belong?
<https://wodb.ca/>
- Illustrative Mathematics for **POSSIBLE** routines and activities
<https://tasks.illustrativemathematics.org/content-standards/6>
- Graham Fletcher - 3 Act Tasks: Got Cubes?
<https://gfletchy.com/got-cubes/>
- Go Math: Personal Math Trainer (PMT)
- Go Math: Math on the Spot

Manipulatives:

Volume cubes

Net manipulative printouts (optional)

Vocabulary:

base

polygon

cube

polyhedron

lateral face

prism

pyramid
net
volume

vertex
solid figure

edge
surface area

Strategies for Chapter:

- use volume cubes to demonstrate
- tables to organize surface area work

Color Coding:

Green (G) - The lesson accurately reflects the Framework standard(s).

Yellow (Y) - This lesson includes notes to refer to while planning the lesson.

Red (R) - This lesson does not accurately reflect the Framework standard(s). Skip the lesson.

Essential Question:

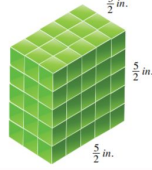
How can you use measurements to describe three-dimensional figures?

Lesson-by-Lesson Overview:

Lesson #, Standard	Title	Materials	Vocab	Notes
Show What You Know				
11.1 Y 6.G.4	Three-Dimensional Figures and Nets	nets https://taks.illustrativemathematics.org/content-standards/6/G/A/4/tasks/1985	Solid figure, net	Option: Combine 11.1 and 11.2 However, if students need more experiences with finding the net of a 3 dimensional shape and then finding its surface area, it is suggested to do each lesson separately, instead of combining. See Blackline Masters on Think Central for nets to copy for students to cut out.
11.2 G 6.G.4	Explore Surface Area Using Nets	nets	Surface area	Make a table of each lateral surface, (its multiplier,) its formula, and its area. Then add all areas to find surface area. Using linking cubes can also help students to understand surface area and build conceptual understanding.
11.3 G	Surface Area of Prisms	net		Students will begin using and interpreting the formula for the surface area of a

6.G.4 6.EE.2c				prism. Memorization of the formula is not necessary. (6.EE.2c)
11.4 Y 6.G.4 6.EE.2c	Surface Area of Pyramids	net	Lateral area	Clarify the different base shapes for triangular pyramid and square pyramid. Students will begin using and interpreting the formula for the surface area of a pyramid. Memorization of the formula is not necessary. (6.EE.2c) See the Framework for clarification on deriving formulas.

Mid-Chapter Checkpoint

11.5 G 6.G.2	Fractions and Volume	Volume cubes		<p>See Framework (Example for 6.G.2.)</p> <div data-bbox="938 661 1528 877" data-label="Complex-Block"> <p>Example: Counting Fractional Cubic Units 6.G.2</p> <p>The model at right shows a rectangular prism with dimensions $\frac{3}{2}$ inches, $\frac{5}{2}$ inches, and $\frac{5}{2}$ inches. Each of the cubic units shown in the model has a volume of $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$ cubic inches. Students should reason why each of these units has this volume (i.e., by discovering that 8 of them fit in a $1 \times 1 \times 1$ cube). Furthermore, students explain why the volume of the rectangular prism is given by $\frac{3}{2} \times \frac{5}{2} \times \frac{5}{2}$ cubic inches and why the volume can also be determined by finding $(3 \times 5 \times 5) \times (\frac{1}{8}$ cubic inch).</p> <p><small>Adapted from ADE 2010.</small></p>  </div> <p>Students will need a strong foundation of multiplying fractions.</p> <p>This lesson covers the conceptual understanding of the formula.</p> <p>Graham Fletcher - 3 Act Tasks: Got Cubes? https://gfletchy.com/got-cubes/</p>
11.6 G 6.G.2 6.EE.2c	Volume of Rectangular Prisms	Volume cubes		<p>Students will need a strong foundation of multiplying fractions.</p> <p>Students will begin using and interpreting the formula for the volume of a rectangular prisms. Memorization of the formula is not necessary. (6.EE.2c)</p>
11.7 Y 6.G.1, 6.G.2 6.G.4	Problem Solving: Geometric Measurements			Lesson has a variety of performance task type of word problems. These problems cover both surface area and volume.

Chapter 11 Test

Reteach Options	Reteach standards from this unit to help meet students' need. Some ideas for reteach activities are listed below:
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| | <ul style="list-style-type: none">● Math centers or math games focused on unit standards● Small group instruction focused on a single standard● Whole group instruction focused on a single standard● My Favorite No – Rewrite student work with an error and work as a class to identify positives in the work and areas that need to be revised● Select 1 – 3 problems to resolve in their groups and discuss whole class. We want new learning to occur on this day that helps students over misconceptions.● Complete the “Performance Task” from Go Math! In the Assessment Book in small groups. Share strategies and discuss whole class.● Use the Reteach activities based on standards that need intervention. |
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