Bridging for Math Strength Resources
[Standards of Learning Curriculum Framework](#)

Standard of Learning (SOL) 8.6b Describe how changing one measured attribute of a rectangular prism affects the volume and surface area.

Student Strengths	Bridging Concepts	Standard of Learning
Students can describe and determine the surface area and volume of a rectangular prism.	Students can make connections between the scale factor of the lengths of similar prisms and the corresponding scale factor of the volumes of these similar figures.	Students can describe how changing one measured attribute of a rectangular prism affects the volume and surface area.

Understanding the Learning Trajectory

Big Ideas:
- Volume of a rectangular prism is affected when one dimension is changed through multiplication.
- The surface area of a rectangular prism is affected when one dimension is multiplied by a factor.

Formative Assessment:
- VDOE Just in time Quick Check [SOL 8.6b](#) (Word) / [PDF](#) / [Desmos](#)

Important Assessment Look Fors:

- When one attribute of a rectangular prism is changed by a specific scale factor, students can determine the effect of the change on the prism's volume with respect to that scale factor.
- Students can determine a missing attribute by applying the concept of volume and scale factor to a given practical problem.
- Students can determine the difference between the effect a change in one attribute has on the volume of the prism versus the effect on the surface area of that prism.

Purposeful Questions:

- Are the volumes the same or different when the only dimension changed is the length, width, or height? Why or why not?
- How can drawing a picture of the two prisms help in solving for the missing dimension?
- What strategy did you use to solve for the missing attribute?

Bridging Activity to Support Standard	Instructional Tips
Routine **12.1: Three Prisms**	Students will have time to explore how changes in dimensions can result in the same or different volumes.
Rich Tasks **Good Questions for Math Teachers page 256**	Page 256: "A packaging factory wants you to build a box that will hold twice as many cubes as the box pictured here: (Box is 3 units, by 2 units, by 5 units) What could the dimensions of the new box be? How do you know? Draw your new box to scale using graph paper." With this task, students are asked to double the volume. This task allows students to make a distinction between doubling all dimensions versus one dimension and which method doubles the volume.
Games/Tech **Desmos: Rectangular Prism Volume** **Similar Shapes**	Students will explore the effect of changing dimension on the volume of a rectangular prism This practice game has different levels and includes different shapes beyond the rectangular prism. Level 3 asks students to practice determining the volume of a similar shape by making connections between the scale factor of similar attributes.

Other Resources:
- VDOE Mathematics Instructional Plans (MIPS)
  - o 8.6b - Changing Attributes (Word) / PDF Version
- VDOE Word Wall Cards: Grade 8 (Word) | (PDF)
  - o Volume – Changing One Attribute
  - o Surface Area – Changing One Attribute
- VDOE Instructional Videos for Teachers
  - o Volume and Surface Area (grades 6-8)
  - o Units of Measure (grades 4-8)
- Other VDOE Resources
  - o Area, Volume, and Surface Area: Find the Volume of Rectangles inside Rectangles [eMediaVA]

Learning Trajectory Resources:

Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership*, *7*(3), NCSM.

Clements, D. H., & Sarama, J. (2019). Learning and teaching with learning trajectories [LT]2. Marsico Institute, Morgridge College of Education, University of Denver. https://www.learningtrajectories.org/

Common Core Standards Writing Team. (2019). Progressions for the Common Core State Standards for Mathematics. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Richardson, K. (2012). How Children Learn Number Concepts: A Guide to Critical Learning Phases. Bellingham: Math Perspectives Teacher Development Center.

Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally.* (10th edition) New York: Pearson (2019:9780134802084)

VDOE Curriculum Framework for All Grades - Standard of Learning Curriculum Framework (SOL)