

**Mathematics****Topic Name: Topic 7 Solve Area, Surface Area, and Volume Problems****Resource: enVision Math 2.0, Pearson, 2016****Duration: March/April 5 Weeks****Enduring Understandings:****Student must understand:**

- The formula for the area of a parallelogram,  $A = bh$ , can be derived from the formula for the area of a rectangle.
- The formula for the area of a triangle,  $A = \frac{1}{2}bh$ , can be derived from the formula of the area of a parallelogram.
- The areas of trapezoids and kites can be found by decomposing the trapezoid and kite into shapes which the area formulas are known.
- The areas of polygons, including polygons on the coordinate plane, can be found by composing and decomposing the polygons into shapes for which the area formulas are known.
- A solid figure can be classified based on the number of bases, the shape of the base(s), and the shape of the other faces.
- A net can be used to represent a polyhedron.
- Many real-world problems can be represented with a mathematical model, but that model may not represent a real-world situation exactly.
- The surface area of a prism is the sum of the areas of its faces.
- The surface area of a pyramid is the sum of the areas of its faces.
- Unit cubes or formulas can be used to find the volume of rectangular prisms and cubes.

**Essential Questions:**

- How can you use the area formula of a rectangle to find the area formula of a parallelogram?
- How can you find the area of a triangle?
- How can you find the area of a trapezoid and kite?
- How can you find the areas of polygons?
- How can you classify and represent solid figures?
- How can you find the surface area of a prism?



- How can you find the surface area of a pyramid?
- How can you find the volume of a rectangular prism with fractional edge lengths?

Focus of Standards:

Student Outcomes:	Skills	Assessments	Resources
<ul style="list-style-type: none"> <li>• I can use a formula to find the areas of parallelograms and rhombuses.</li> <li>• I can find the base or height of a parallelogram or rhombus when the area and the height or base are known.</li> <li>• I can find the areas of triangles, including right triangles.</li> <li>• I can find the corresponding base or height of a triangle.</li> <li>• I can find the areas of trapezoids.</li> <li>• I can find the areas of kites.</li> <li>• I can find the areas of polygons by composing and decomposing shapes, including polygons on the coordinate plane.</li> <li>• I can classify solid figures.</li> <li>• I can identify solid figures from nets.</li> <li>• I can draw nets of solid figures.</li> <li>• I can use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• I can test and verify the appropriateness of math models.</li> <li>• I can explain why the results from mathematical models may not align exactly to</li> </ul>	<ul style="list-style-type: none"> <li>• Find areas of parallelograms and rhombuses</li> <li>• Solve triangle area problems</li> <li>• Find areas of trapezoids, kites, and polygons</li> <li>• Represent solid figures using nets</li> <li>• Find surface areas of prisms and pyramids</li> <li>• Find volume with fractional edge lengths</li> </ul>	<p><b>Assessments:</b></p> <p><b>Formative</b></p> <ul style="list-style-type: none"> <li>• Diagnostic assessment</li> <li>• Study Island</li> <li>• Kahoot!</li> <li>• Exit tickets</li> <li>• Round Robin group work               <ul style="list-style-type: none"> <li>○ Open ended questions</li> <li>○ May/may not be game activity</li> </ul> </li> <li>• Analysis of student homework</li> <li>• Class polls               <ul style="list-style-type: none"> <li>○ Show of hands: 1 finger ok, 2 fingers need help, 3 fingers lost</li> </ul> </li> <li>• One thing I learned/One thing I need work on</li> </ul> <p><b>Summative</b></p>	<p><b>Texts:</b></p> <p><i>enVision 2.0 Common Core</i></p> <p><b>Digital:</b></p> <ul style="list-style-type: none"> <li>• Student/Teacher eText</li> <li>• Videos</li> <li>• MathXL</li> <li>• IXL</li> <li>• 3-Act Mathematical Modeling</li> <li>• Virtual Nerd App</li> <li>• BouncePages App</li> <li>• Math Tools</li> <li>• Reflex Math</li> </ul> <p><b>Classroom Math Materials</b></p> <ul style="list-style-type: none"> <li>• Student text</li> <li>• Online text</li> </ul>



<p>the problem situation.</p> <ul style="list-style-type: none"> <li>• I can find the surface area of rectangular prisms, including cubes.</li> <li>• I can find the surface area of triangular prisms.</li> <li>• I can find the surface areas of square and triangular pyramids.</li> <li>• I can use cubes and a formulas to find the volume of a rectangular prism or a cube with fractional edge lengths.</li> </ul>		<ul style="list-style-type: none"> <li>• End topic tests</li> <li>• Group topic assessment</li> <li>• EOY test</li> <li>•</li> </ul> <p><b>Benchmark</b></p> <ul style="list-style-type: none"> <li>• Diagnostic assessment</li> <li>• Pearson benchmark tests</li> <li>• EOY test</li> </ul> <p><b>Alternative</b></p> <ul style="list-style-type: none"> <li>• Work paper from tests will also be graded for additional points if reasoning is clear and correct, even if answer is wrong</li> <li>• One on one conferencing</li> <li>• Oral questioning</li> </ul>	<ul style="list-style-type: none"> <li>• Bounceapp</li> <li>• Digital toolkit</li> <li>• Math Practices and Problem Solving Handbook</li> </ul>
---	--	---	---

**VOCABULARY**

**Tier 2**  
Kite, base, edge, face, net

**Tier 3**  
Polyhedron, vertex



NJSL Math Standards	NJSL Math Practices
<p><b>Relevant Standards:</b></p> <p><b>6.NS.C.6c</b> Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p> <p><b>6.NS.C.8*</b> Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p> <p><b>6.EE.A.2a</b> Write, read, and evaluate expressions in which letters stand for numbers. Write expressions that record operations with numbers and with letters standing for numbers.</p> <p><b>6.EE.A.2c</b> 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.</p> <p><b>6.EE.B.6</b> Use variables to represent numbers and write expression when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.</p> <p><b>6. G.A.1</b> Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other</p>	<p><b>MP.1</b> Make sense of problems and persevere in solving them</p> <p><b>MP.2</b> Reason abstractly and quantitatively.</p> <p><b>MP.3</b> Construct viable arguments and critique the reasoning of others.</p> <p><b>MP.4</b> Model with mathematics.</p> <p><b>MP.5</b> Use appropriate tools strategically.</p> <p><b>MP.6</b> Attend to precision.</p> <p><b>MP.7</b> Look for and make use of structure.</p> <p><b>MP.8</b> Look for and express regularity in repeated reasoning.</p>



shapes; apply these techniques in the context of solving real-world and mathematical problems.

**6. G.A.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 formula  $V = l w h$  and  $V = b h$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

**6. G.A.3** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

**6.G.A.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.

**Interdisciplinary Connections**

NJSLS for ELA and Science are introduced, developed, and practiced in the context of learning math content and engaging in mathematical practices.

**ELA**

**ELA-Literacy.RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks

**ELA-Literacy.RST.6-8.4.**Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

**ELA-Literacy.RST.6-8.3** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).



**ELA-Literacy.SL.6.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

## Science

**MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

**MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

**MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

**MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

## NJSLS: 21st Century Life and Careers

**Key Subjects and 21st Century:** Themes Mastery of key subjects and 21st century themes is essential to student success. Key subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics. In addition, schools must promote an understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into key subjects:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy

**9.1.8.E.8** Compare the value of goods and services from different sellers when purchasing large quantities and small quantities.

**9.2.8.B.5** Analyze labor market trends using state and federal labor market information and other resources available online.

**9.1.8.B.7** Construct a budget to save for long-term, short-term, and charitable goals

**9.1.8.C.2** Compare and contrast credit cards and debit cards and the advantages and disadvantages of using each.

**9.1.8.C.5** Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, and mortgages) and compare the interest rates associated with each.

**Career Ready Practices:** Today's students need to develop thinking skills, content knowledge, and social and emotional competencies to



navigate complex life and work environments.

**CRP2.** Apply appropriate academic and technical skills.

**CRP4.** Communicate clearly and effectively and with reason.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity

### **NJSLS Technology Standards**

**8.1.8.A.4** Graph and calculate data within a spreadsheet and present a summary of the results

**8.1.8.C.1** Collaborate to develop and publish work that provides perspectives in a global problem for discussions with learners from other countries

**8.1.8.F.1** Explore a local issue, by using digital tools to collect and analyze data to identify and make an informed decision.



<b>Integrated Differentiation/Accommodations/Modifications</b> <i>(Alternate Modes of Instruction and Support)</i>		
<b>Modifications to Support Gifted and Talented Students</b>	<b>Modifications to Support English Language Learners</b>	<b>Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)</b>
<p>Provide appropriate challenge for wide ranging skills and development areas.</p> <p>Participate in inquiry and project-based learning units of study</p> <p>Assigning roles within partnerships</p> <p>Differentiated supports: content, process, product, environment</p> <p>Assign enVision 2.0 Enrichment EnVision Math Tools and Games</p> <p>Have students discuss and share methods and processes of solving mathematical problems</p>	<p>Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)</p> <p>Provide students with visual models and hands-on materials.</p> <p>Front load and immerse students in literacy and language experiences related to content.</p> <p>Provide students with visual models, sentence stems, concrete objects, and hands-on materials.</p> <p>Model procedures for better understanding of skills.</p> <p>Collaboration between ELL and general education teacher to maximize learning.</p> <p>Use appropriate student level of enVision 2.0 practice problems and intervention.</p> <p>Using game like activities online, in order to engage ELL learners and aid in developing problem-solving skills and persistence</p>	<p>Review student individual educational plan and/or 504 plan.</p> <p>Establish procedures for accommodations and modifications for assessments as per IEP/504.</p> <p>Modify classroom environment to support academic and physical needs of the students as per IEP/504.</p> <p>Provide appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team.</p> <p>Provide Title I services to students not meeting academic standards in Math.</p> <p>Differentiation through content, process, product, environment.</p> <p>Introduce topics using multiple representations</p> <p>Provide instructional adaptations and interventions in the general education classroom.</p> <ul style="list-style-type: none"> <li>● Differentiated Intervention (enVision 2.0)               <ul style="list-style-type: none"> <li>○ Reteach</li> <li>○ Additional Vocabulary Support</li> <li>○ Build Mathematical Literacy</li> <li>○ Math tools and Games</li> </ul> </li> <li>● MATHXL</li> <li>● IXL</li> </ul>





	Linguistically modify assessments	<p>Have students communicate their reasoning, orally or on paper.</p> <p>Modify classroom environment to support student needs.</p> <p>If necessary, provide:</p> <ul style="list-style-type: none"> <li>● graph paper to organize math work</li> <li>● multiplication table</li> <li>● individual reference sheets</li> </ul> <p>Give extended time for tests</p> <p>Intensive individual intervention:</p> <ul style="list-style-type: none"> <li>● Rtl in enVision 2.0</li> </ul>
--	-----------------------------------	--

**Sources**  
 New Jersey Student Learning Standards (2016) <http://www.state.nj.us/education/cccs/2016/math/standards.pdf>  
 New Jersey Student Learning Standards: Technology (2014) - <http://www.state.nj.us/education/cccs/2014/tech/8.pdf>  
 New Jersey Student Learning Standards: ELA (2014) - <https://www.state.nj.us/education/cccs/2016/ela/g03.pdf>  
 New Jersey Science and Engineering Practices - <https://www.state.nj.us/education/cccs/2016/science/>  
 NJ Career Ready Practices (2014) - <https://www.state.nj.us/education/cccs/2014/career/CareerReadyPractices.pdf>  
 Pearson enVision 2.0 (2016) <https://www.pearsonrealize.com/index.html#/>