

**Winslow Township School District**  
**Mathematics Curriculum – Geometry**  
**Unit 4**

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<p><a href="#">Unit 4</a></p> <p><b>Geometric Modeling</b></p>	<ul style="list-style-type: none"> <li>● G.MG.A.1</li> <li>● G.GMD.A.3</li> <li>● G.GMD.B.4</li> <li>● G.MG.A.2</li> <li>● G.MG.A.3</li> <li>● G.GMD.A.1</li> </ul>	<ul style="list-style-type: none"> <li>● Explain volume formulas and use them to solve problems.</li> <li>● Visualize relationships between two dimensional and three-dimensional objects</li> <li>● Apply geometric concepts in modeling situations</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p>
<p><i>Unit 4:</i></p> <p><i>Suggested Open Educational Resources</i></p>	<p><a href="#">G.MG.A.1 Toilet Roll</a></p> <p><a href="#">G.GMD.A.3 The Great Egyptian Pyramids</a></p> <p><a href="#">G.GMD.B.4 Tennis Balls in a Can</a></p> <p><a href="#">G.MG.A.2 How many cells are in the human body?</a></p> <p><a href="#">G.MG.A.3 Ice Cream Cone</a></p> <p><a href="#">G.GMD.A.1 Area of a circle</a></p>		<p>MP.3 Construct viable arguments &amp; critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>

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Curriculum Unit 4	Standards		Pacing	
			Days	Unit Days
<b>Unit 4</b> <b>Geometric Modeling</b>	<ul style="list-style-type: none"> <li>● G.MG.A.1</li> <li>● G.GMD.A.3</li> <li>● G.GMD.B.4</li> <li>● G.MG.A.3</li> <li>● G.GMD.A.1</li> </ul>	<p>Model real-world objects with geometric shapes based upon their measures and properties, and solve problems using volume formulas for cylinders, pyramids, cones, and spheres. Identify cross-sections, three-dimensional figures, and identify three-dimensional objects created by the rotation of two-dimensional objects.</p> <p>Solve design problems using geometric methods</p> <p>Using dissection arguments, Cavalieri’s principle, and informal limit arguments, develop informal arguments for formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.</p>	22	45
	<ul style="list-style-type: none"> <li>● G.MG.A.1</li> <li>● G.GMD.A.3</li> <li>● G.GMD.B.4</li> <li>● G.MG.A.2</li> </ul>	<p>Model real-world objects with geometric shapes based upon their measures and properties, and solve problems using volume formulas for cylinders, pyramids, cones, and spheres. Identify cross-sections, three-dimensional figures, and identify three-dimensional objects created by the rotation of two-dimensional objects.</p> <p>Apply concepts of density based on area and volume in modeling situations</p>	13	
	Assessment, Re-teach and Extension		10	

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<b>Unit 4 Geometry</b>		
<b>Content Standards</b>	<b>Suggested Standards for Mathematical Practice</b>	<b>Critical Knowledge &amp; Skills</b>
<ul style="list-style-type: none"> <li>● <b>G.MG.A.1.</b> Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).</li> <li>● <b>G.GMD.A.3.</b> Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</li> <li>● <b>G.GMD.B.4.</b> Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>● Real-world objects can be described, approximately, using geometric shapes, their measures, and their properties.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>● identify cross-sections of three dimensional objects.</li> <li>● identify three-dimensional objects generated by rotation of two-dimensional objects.</li> <li>● solve problems using volume formulas for cylinders, pyramids, cones, and spheres.</li> <li>● model real-world objects with geometric shapes.</li> <li>● describe the measures and properties of geometric shapes that best represent a real-world object.</li> </ul> <p>Learning Goal 1: Model real-world objects with geometric shapes based upon their measures and properties, and solve problems using volume formulas for cylinders, pyramids, cones, and spheres. Identify cross-sections, three-dimensional figures, and identify three-dimensional objects created by the rotation of two-dimensional objects.</p>
<ul style="list-style-type: none"> <li>● <b>G.MG.A.2.</b> Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>● model real-world situations, applying density concepts based on area.</li> <li>● model real-world situations, applying density concepts based on volume.</li> </ul> <p>Learning Goal 2: Apply concepts of density based on area and volume in modeling situations.</p>
<ul style="list-style-type: none"> <li>● <b>G.MG.A.3.</b> Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>● design objects or structures satisfying physical constraints</li> <li>● design objects or structures to minimize cost.</li> <li>● solve design problems.</li> </ul> <p>Learning Goal 3: Solve design problems using geometric methods</p>

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	<p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p>	
<ul style="list-style-type: none"> <li>● <b>G.GMD.A.1.</b> Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri’s principle, and informal limit arguments.</li> </ul>	<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>● construct viable dissection arguments and informal limit arguments.</li> <li>● apply Cavalieri’s principle.</li> <li>● construct an informal argument for the formula for the circumference of a circle.</li> <li>● construct an informal argument for the formula for the area of a circle.</li> <li>● construct an informal argument for the formula for the volume of a cylinder, pyramid, and cone.</li> </ul> <p>Learning Goal 4: Using dissection arguments, Cavalieri’s principle, and informal limit arguments, develop informal arguments for formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.</p>

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Unit 4 Geometry	
District/School Formative Assessment Plan	District/School Summative Assessment Plan
Pre-Assessment, Quizzes Exit Tickets Daily Monitoring Linkit!	Unit Benchmark Linkit! PARCC Diagnostic
Focus Mathematical Concepts	
<p><b>Common Misconceptions:</b></p> <ul style="list-style-type: none"> <li>● <b>G.MG.A.1</b> When students ask to see “useful” mathematics, what they often mean is, “Show me how to use this mathematical concept or skill to solve the homework problems.” Mathematical modeling, on the other hand, involves solving problems in which the path to the solution is not obvious. Geometry may be one of several tools that can be used.</li> <li>● <b>G.GMD.A.3</b> An informal survey of students from elementary school through college showed the number <math>\pi</math> to be the mathematical idea about which more students were curious than any other. There are at least three facets to this curiosity: the symbol <math>\pi</math> itself, the number 3.14159..., and the formula for the area of a circle. All of these facets can be addressed here, at least briefly. Many students want to think of infinity as a number. Avoid this by talking about a quantity that becomes larger and larger with no upper bound. The inclusion of the coefficient <math>1/3</math> in the formulas for the volume of a pyramid or cone and <math>4/3</math> in the formula for the volume of a sphere remains a mystery for many students. In high school, students should attain a conceptual understanding of where these coefficients come from. Concrete demonstrations, such as pouring water from one shape into another should be followed by more formal reasoning.</li> <li>● <b>G.GMD.B.4</b> Some cross sections are more difficult to visualize than others. For example, it is often easier to visualize a rectangular cross section of a cube than a hexagonal cross section. Generating solids of revolution involves motion and is difficult to visualize by merely looking at drawings.</li> <li>● <b>G.MG.A.2, G.MG.A.3</b> When students ask to see “useful” mathematics, what they often mean is, “Show me how to use this mathematical concept or skill to solve the homework problems.” Mathematical modeling, on the other hand, involves solving problems in which the path to the solution is not obvious. Geometry may be one of several tools that can be used.</li> <li>● <b>G.GMD.A.1</b> An informal survey of students from elementary school through college showed the number <math>\pi</math> to be the mathematical idea about which more students were curious than any other. There are at least three facets to this curiosity: the symbol <math>\pi</math> itself, the number 3.14159..., and the formula for the area of a circle. All of these facets can be addressed here, at least briefly. Many students want to think of infinity as a number. Avoid this by talking about a quantity that becomes larger and larger with no upper bound. The inclusion of the coefficient <math>1/3</math> in the formulas for the volume of a pyramid or cone and <math>4/3</math> in the formula for the volume of a sphere remains a mystery for many students. In high school, students should attain a conceptual understanding of where these coefficients come from. Concrete demonstrations, such as pouring water from one shape into another should be followed by more formal reasoning.</li> </ul>	

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District/School Tasks	District/School Primary and Supplementary Resources and Technology Integration
<p><b>PARCC Released Items</b>  <a href="http://www.parcc-assessment.org/released-items">http://www.parcc-assessment.org/released-items</a></p> <p><b>NJDOE Digital Item Library</b>  <a href="https://nj.digitalitemlibrary.com/home">https://nj.digitalitemlibrary.com/home</a></p> <p><b>NJSLA Mathematics Evidence Statements</b>  <a href="https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAIWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491">https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAIWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491</a></p> <p><b>LinkIt! Form A, B, &amp; C</b></p>	<p><b>Textbook</b></p> <p><b>IXL</b>  <a href="https://www.ixl.com/">https://www.ixl.com/</a></p> <p><b>Khan Academy</b>  <a href="https://www.khanacademy.org/">https://www.khanacademy.org/</a></p> <p><b>HS Flip Book:</b>  <a href="http://community.ksde.org/Default.aspx?tabid=5646">http://community.ksde.org/Default.aspx?tabid=5646</a></p> <p><b>North Carolina Wikispaces</b>  <a href="http://maccss.ncdpi.wikispaces.net/">http://maccss.ncdpi.wikispaces.net/</a></p> <p><b>PARCC Educational Resources</b>  <a href="http://www.parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents">http://www.parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents</a></p> <p><b>Diversity, Equity &amp; Inclusion Educational Resources</b>  <a href="https://www.nj.gov/education/standards/dei/">https://www.nj.gov/education/standards/dei/</a></p>
Instructional Best Practices and Exemplars	
<ol style="list-style-type: none"> <li>1. Identifying similarities and differences</li> <li>2. Summarizing and note taking</li> <li>3. Reinforcing effort and providing recognition</li> <li>4. Homework and practice</li> <li>5. Nonlinguistic representations</li> </ol>	<ol style="list-style-type: none"> <li>6. Cooperative learning</li> <li>7. Setting objectives and providing feedback</li> <li>8. Generating and testing hypotheses</li> <li>9. Cues, questions, and advance organizers</li> <li>10. Manage response rate</li> </ol>

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Vocabulary			
Area Area of a circle Cavalieri’s principle Circumference of a circle Cones	Cross-sections Cylinders Dissection Geometric shapes Measures	Physical constraints Properties Pyramids Prisms Spheres	Structures Surface Area Three dimensional objects Volume

**9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills**

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.: Additional opportunities to address 9.1, 9.2 & 9.4:

**Philadelphia Mint**

<https://www.usmint.gov/learn/kids/resources/educational-standards>

**Different ways to teach Financial Literacy.**

<https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/>

**Suggested Modifications for Special Education/504**

Students with special needs: The students’ needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignments. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

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| <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide the opportunity to re-take tests</li> <li><input type="checkbox"/> Modify activities/assignments/projects/assessments</li> <li><input type="checkbox"/> Breakdown activities/assignments/projects/assessments into manageable units</li> <li><input type="checkbox"/> Additional time to complete activities/assignments/projects/assessments</li> <li><input type="checkbox"/> Provide an option for alternative activities/assignments/projects/assessments</li> <li><input type="checkbox"/> Modify Content</li> <li><input type="checkbox"/> Modify Amount</li> <li><input type="checkbox"/> Small Group Intervention/Remediation</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Individual Intervention/Remediation</li> <li><input type="checkbox"/> Additional Support Materials</li> <li><input type="checkbox"/> Guided Notes</li> <li><input type="checkbox"/> Graphic Organizers</li> <li><input type="checkbox"/> Adjust Pacing of Content</li> <li><input type="checkbox"/> Increase one on one time</li> <li><input type="checkbox"/> Peer Support</li> <li><input type="checkbox"/> Other Modifications for Special Education:</li> </ul> |
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**Suggested Modifications for At-Risk Students**

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

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| <input type="checkbox"/> Provide the opportunity to re-take tests<br><input type="checkbox"/> Increase one on one time<br><input type="checkbox"/> Oral prompts can be given<br><input type="checkbox"/> Using visual demonstrations, illustrations, and models<br><input type="checkbox"/> Give directions/instructions verbally and in simple written format<br><input type="checkbox"/> Peer Support<br><input type="checkbox"/> Modify activities/assignments/projects/assessments<br><input type="checkbox"/> Additional time to complete activities/assignments/projects/assessments<br><input type="checkbox"/> Provide an option for alternative activities/assignments/projects/assessments | <input type="checkbox"/> Modify Content<br><input type="checkbox"/> Modify Amount<br><input type="checkbox"/> Adjust Pacing of Content<br><input type="checkbox"/> Small Group Intervention/Remediation<br><input type="checkbox"/> Individual Intervention/Remediation<br><input type="checkbox"/> Additional Support Materials<br><input type="checkbox"/> Guided Notes<br><input type="checkbox"/> Graphic Organizers<br><input type="checkbox"/> Other Modifications for Students At-Risk: |
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**Suggested for English Language Learners**

All WIDA Can Do Descriptors can be found at this link:

<https://wida.wisc.edu/teach/can-do/descriptors>

- Grades 9-12 WIDA Can Do Descriptors:
- Listening  Speaking
  - Reading  Writing
  - Oral Language

Students will be provided with accommodations and modifications that may include:

- Relate to and identify commonalities in mathematics studies in student’s home country
- Assist with organization
- Use of computer
- Emphasize/highlight key concepts
- Teacher Modeling
- Peer Modeling
- Label Classroom Materials - Word Walls

**Suggested Modifications for Gifted Students**

Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.

- Raise levels of intellectual demands
- Require higher order thinking, communication, and leadership skills
- Differentiate content, process, or product according to student’s readiness, interests, and/or learning styles
- Provide higher level texts
- Expand use of open-ended, abstract questions
- Critical and creative thinking activities that provide an emphasis on research and in-depth study
- Enrichment Activities/Project-Based Learning/ Independent Study

Additional Strategies may be located at the links:

- ❖ [Gifted Programming Standards](#)
- ❖ [Webb’s Depth of Knowledge Levels and/or Revised Bloom’s Taxonomy](#)
- ❖ [REVISED Bloom’s Taxonomy Action Verbs](#)



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Suggested Activities	
<input type="checkbox"/> Do Now/Warm-Up <input type="checkbox"/> Whole Group <input type="checkbox"/> Small Groups <input type="checkbox"/> Guided Practice <input type="checkbox"/> Independent Practice	<input type="checkbox"/> Centers <input type="checkbox"/> Intervention/Remediation <input type="checkbox"/> Projects <input type="checkbox"/> Academic Games <input type="checkbox"/> Other Suggested Activities:
Interdisciplinary Connections	
<p><b>Big Ideas Real-Life STEM Videos and Performance Tasks</b></p> <p><b>Interdisciplinary Connections: ELA</b></p> <p><b>NJSLSA.R1.</b> Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p><b>NJSLSA.W2.</b> Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content</p> <p><b>NJSLSA.L1.</b> Demonstrate command of the conventions of standard English grammar and usage when writing or speaking</p> <p><b>SL.9-10.4:</b> Present information, findings and supporting evidence clearly, concisely and logically. The content, organization, development and style are appropriate to task, purpose and audience.</p> <p><b>NJSLSA.L6:</b> Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.</p>	
Integration of Computer Science and Design Thinking NJSLS 8	
<p>8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.</p> <p>8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.</p> <p>8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.</p> <p>8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.</p> <p>8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.</p> <p>8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.</p> <p>8.2.12.ETW.2: Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment. • 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution.</p>	