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| **Course: Geometry**<br>**Unit 6 - Three-Dimensional Models** | **Year of Implementation:** 2021-2022 |
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## Stage One - Desired Results

**Link(s) to New Jersey Student Learning Standards for this course:**
https://www.state.nj.us/education/cccs/2020/

**Unit Standards:**
*G-GMD.B.4, G-GMD.A.1-3, G-MG.A.1*

*9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas*
*9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities*

**Transfer Goal:** Students will be able to independently use their learning to apply their understanding of two dimensional and three dimensional space to create models that most efficiently utilize resources.

| *Enduring Understandings*<br>Students will understand that. . . | *Essential Questions* |
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| *EU 1*<br>three-dimensional figures may have the same volumes but different surface areas. | *EU 1,2*<br>● How can you determine the surface area and volume of three-dimensional figures? |
| *EU 2*<br>good decision making requires logical reasoning based on known facts. | *EU 2*<br>● How can you find and compare the areas and volumes of similar solids? |
| *EU 3* | *EU 2,3,4*<br>● Describe real world objects in geometric terms. |

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| you can analyze a three dimensional figure by using the relationships among its vertices, edges, and faces.<br><br>*EU 4*<br>there are different ways to measure different dimensional figures | ● How can using geometry enhance design of real life structures?<br>● How does what we measure influence how we measure? |
| *<u>Knowledge</u>*<br>*Students will know . . .*<br><br>*EU 1*<br>● formulas for surface area and volume of various shapes. (G-GMD.A.3)<br><br>*EU 2,4*<br>● units of measure differ when calculating linear measure, area, and volume. (G-GMD.A.1)<br><br>*EU 3*<br>● surface area formulas are based upon the shape's components. (G-GMD.A) | *<u>Skills</u>*<br>Students will be able to. . .<br><br>*EU 1*<br>● compare and calculate the areas and volumes of similar solids. (G-GMD.A.3)<br>● apply concepts of density based on area and volume in modeling situations. (G-GMD.B.4)<br><br>*EU 2*<br>● solve problems using volume formulas for cylinders, pyramids, cones, and spheres. (G-GMD.A.3)<br><br>*EU 3*<br>● identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. (G-GMD.A.4) |
| **Stage Two - Assessment** | |
| *<u>Other Evidence:</u>* | |

- Assessed elements from the Performance Task
- Other teacher–graded evaluations
- Warm-Ups/Exit Tickets
- Desmos: Volume or Surface Area?
  https://teacher.desmos.com/activitybuilder/custom/588942a0ba3d1ee10662d349

## Stage Three - Instruction

*Learning Plan:* **Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.**

For example:

- 3 Act Task: How long to fill the air mattress? (M, T, EU 2)
  https://whenmathhappens.com/2015/01/28/air-mattress/
- 3 Act Task: Girl Scout Cookies (M, T, EU 1, 2)
  https://www.101qs.com/3675
- 3 Act Task: Water Tank - octagonal prism (M, T, EU 2, 3, 4)
  https://mrmeyer.com/threeacts/watertank/
- 3 Act Task: Box 'Em Up (M, T, EU )
  https://www.savvasrealize.com/community/program/3162d61e-4b73-3fad-87e7-0a9e0f539531/43/tier/b77e5053-d74e-3554-9b75-f0ef65282d6b/45/lesson/468a840c-b91a-34de-ac45-7f8269971551/40
- Desmos: Volume of a Cylinder (M, T, EU 4)
  https://teacher.desmos.com/activitybuilder/custom/5e6931dfc628310c3b172700

- Cheetos: Which is cheesier? (M, T, EU 2, 3, 4)
  https://www.mathalicious.com/lessons/the-cheese-that-goes-crunch

**Approximate Timeline: 10 days**

- Area of regular polygons
- Three-dimensional figures and cross sections
- Lateral Area, Surface Area & Volume of prisms
- Lateral Area, Surface Area and Volume of pyramids
- Lateral Area, Surface Area and Volume of cylinders
- Lateral Area, Surface Area and Volume of cones
- Lateral Area, Surface Area and Volume of spheres