

Teacher: Mr. Tom Robertson

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Lesson Plan

Title: Dilations of 2 and 3 dimensional figures and their affect on area, surface area, and volume.

Introduction: Students will create a story board and use the Alice programming language to illustrate what they have learned about dilations of two and three dimensional figures.

Learning Outcomes: Students will be able to solve problems involving the dilation of two and three dimensional figures. Students will develop general rules. Students should be able to explain why their results make sense.

Ex: If a 2ft by 5ft rectangle is doubled in size, how many times larger is the area of the new rectangle?

Ex: If a triangle with base 4 cm and height 7 cm is dilated by a scale factor of 3, how many times larger is the area of the new triangle.

Ex: If a circle with a diameter of 2.5 m is dilated by a scale factor of $\frac{1}{5}$, how times smaller is the area of the new circle.

Ex: If a rectangular prism 3 cm X 4 cm X 5 cm is dilated by a factor of 2, how many times larger is the surface area of the new prism? How many times larger is the volume of the new prism?

Ex: If a triangular prism with base 1.2 m, height 2.5 m, and length 3.2 is dilated by a factor of .5, how many times smaller is the surface area of the new prism? How many times smaller is the volume of the new prism?

Ex: If a cylinder with radius $2\frac{1}{2}$ cm and length $6\frac{2}{3}$ cm is dilated by a scale factor of $\frac{1}{3}$, how many times smaller is the surface area of the new cylinder?
How many times smaller is the volume of the new cylinder?

Curriculum Alignment:

7th Grade Mathematics

2.02 Solve problems involving volume and surface area of cylinders, prisms, and composite shapes.

3.03 Use scaling and proportional reasoning to solve problems related to similar and congruent polygons.

Prior Knowledge: Students will need to have experience using story board templates and building Alice worlds: creating methods and adding objects. Students will also need to be familiar with **scale factor**, **surface area** and **volume**.

Resources and Materials:

Story board template
Computers
Alice
Data Projector (optional for presentation)

Instructional Activities:

- Whole group: review of surface area and volume of prisms and cylinders.
- Individual: create story boards for presenting what students have learned about dilations of two and three dimensional figures
- Pairs or Small Group: students share their story boards
- Check Point: teacher reviews story boards for completeness
- Individual: students use their story boards to create their Alice worlds
- Whole group: students present their Alice worlds

Assessment:

- teacher observation
- grading rubric