

**Lesson Title:** Dilating a Cartoon Character**Project Objective**

Students will dilate a cartoon character using a scale factor. After they have completed the lesson, students will have: (1) demonstrated that two similar figures are related by a scale factor; (2) discovered that the sides, perimeters, areas and volumes of similar figures are related by the scale factor ; (3) used technology and other resources to create and present their dilation.

**Project Essential Question**

What are the relationships that exist between similar figures using the scale factor, length ratios, perimeter ratios, area ratios, and volume ratios?

**The Standards for Mathematical Practice Addressed**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

**Common Core Standards for Mathematics Addressed**

**Cluster: 8.G.** Understand congruence and similarity using physical models, transparencies, or geometry software.

**Standards:**

- **8.G.3** Describe the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- **8.G.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

**Arts**

Mural artists use similarity to help them create their larger artwork. Muralists begin creating a mural by drawing a small picture with a grid of squares drawn over it. They then divide the surface on which the mural will be painted into a similar but larger grid of squares. Proceeding square by square, they draw the lines and shapes of the original drawing into the corresponding positions of the mural surface's larger squares. Finally, they paint in the regions to complete the mural.

**Technology, Resources, and Suggested Materials**

- 8.5 x 11 image of an approved cartoon character
- Microsoft Word
- Yard Stick
- Masking Tape
- Scissors
- large bulletin board paper
- tempera paint, water colors and brushes
- iPad application Chatterpix

**Key Vocabulary**

**Transformation** - A transformation changes a figure into another figure.

**Image** - The new figure formed by a transformation.

**Similar Figures** - Figures that have the same shape but not necessarily the same size; Two figures are similar when corresponding side lengths are proportional and corresponding angles are congruent.

**Dilation** - A transformation in which a figure is made larger or smaller.

**Scale Factor** - The ratio of the side lengths of the image of a dilation to the corresponding side lengths of the original figure.

**Project Procedures**

**Launch:** Begin the lesson by asking students about their previous experiences enlarging and/or reducing images. Review rubric and instructions worksheet with students.

[https://docs.google.com/document/d/1u8232tBQ7HrS0nVjCl3driFB5kC\\_RIsLqWuEatwLuC0/edit?usp=sharing](https://docs.google.com/document/d/1u8232tBQ7HrS0nVjCl3driFB5kC_RIsLqWuEatwLuC0/edit?usp=sharing)

Share past finished projects with students.

<https://drive.google.com/folderview?id=0BwckSzAG2Z-SVU54RVhXY2ppT28&usp=sharing>

**Student Summative Assessment**

Students will complete the task questions in part 8 to demonstrate the knowledge of the relationship between a figure and its dilation relative to linear dimensions, area and volume.

**Differentiation / Accommodations**

This lesson includes several differentiation possibilities for students of varying ability levels and interests. For instance, detail of the character chosen and/or the scale factor. Possibly provide a character with the centimeter grid and eliminate this step for students, if necessary.

**References****Rubric and Student Instructions Worksheet:**

[https://docs.google.com/document/d/1u8232tBQ7HrS0nVjCl3driFB5kC\\_RIsLqWuEatwLuC0/edit?usp=sharing](https://docs.google.com/document/d/1u8232tBQ7HrS0nVjCl3driFB5kC_RIsLqWuEatwLuC0/edit?usp=sharing)

**Sample Finished Project Videos:**

<https://drive.google.com/folderview?id=0BwckSzAG2Z-SVU54RVhXY2ppT28&usp=sharing>