

MATH

AS ART-TRANSFORMATIONS

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Art is around us in everything just as math is. Students are surrounded by art whether through their games they play, classes they take, or through their everyday activities. There is a large amount of math involved in art, but the workings of art can often be described using math.

How can you use math to create art just as artists do?

MIDDLE SCHOOL EIGHTH GRADE

TIMEFRAME TWO CLASS PERIODS (90 - 120 MIN.)

STANDARD BENCHMARKS AND VALUES

CCSS.MATH.8.G.A.2 - Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

CCSS.MATH.8.G.A.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.

CCSS.MATH.PRACTICE.MP4 - Model with mathematics.

CCSS.MATH.PRACTICE.MP5 - Use appropriate tools strategically.

CCSS.MATH.PRACTICE.MP7 - Look for and make use of structure.

ENDURING UNDERSTANDINGS

- Transformations: looking at the artistic rendering of pieces through math.
- Art can be mathematical in nature which makes it unique.

CRITICAL SKILLS AND CONCEPTS:

- Recognize that images of a figure when translated, reflected, and rotated create a congruent figure.
- Recognize that images of a figure when dilated create a similar figure.
- Understand that artists use transformations to create their work.
- Use a geoboard to create dilations of a figure.
- Work cooperatively to create dilations.
- Create a work of art using one or more transformations of one or more figures.
- Critique the work of others by examining peers works of art.

AUTHENTIC PERFORMANCE TASK:

Produce a work of art using one or more transformations.

AUTHENTIC AUDIENCE:

School community including other students, teachers and administration.

OTHER EVIDENCE:

Dilations created on geoboard.

Discussions of art with students as they view the PowerPoint.

LEARNING PLAN

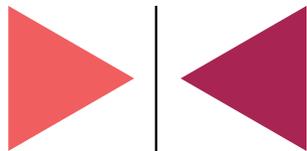
1. Present PowerPoint slide show of art with transformations to students.

- Pose to students as they watch the slides – What do you notice about all of the works we are viewing/ have viewed?

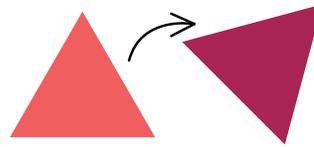
2. Review the four types of transformations (translation, reflection, rotation, and dilation). Have students recall what they are; how they move a figure.

- Pose to students – What did you notice about the figures from the art that we viewed earlier? (answers to obtain – the figures were the same/similar)
- Review or introduce the idea that translations, reflections, and rotations create congruent figures and dilations produce similar figures.

FOUR TYPES OF TRANSFORMATIONS



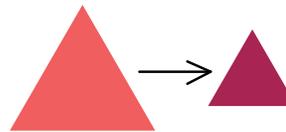
REFLECTION



ROTATION



TRANSLATION



DILATION

3. Students will work in pairs with a geoboard creating a series of dilations.

- Have students create a figure on a geoboard using four or less pegs. This will be their original figure.
- Have students dilate the figure. Pose the questions– What is the scale factor of dilation?; Are the figures congruent or similar? Explain.
- Have students continue to dilate figure additional times to create as many as they can.

4. Students share their dilation work with the class.

- Pose question – What do you notice about all students dilations? (all figures are similar)

5. Students will create own work of art using transformations.

- Give each student cardstock to draw their original figure. Have students cut out the figure. Using this figure and a larger paper and any art supplies, have students create a piece of art by translating, reflecting and/or rotating their original to form multiple images.

6. Once students have completed artwork, present all the work in a gallery walk.

- Pose question – What do you think of the art?; How were transformations used in the art?; Which piece did you like the most and why?