

Capstone: Transformation Art & Geometry Check

Name: _____ Date: _____

LEARNING OBJECTIVE

Students will design an original tessellation or pattern using at least three types of transformations and verify a key measurement using the Pythagorean Theorem.

MATERIALS NEEDED

- graph paper or grid paper
- ruler
- protractor
- tracing paper
- colored pencils or markers
- scissors
- glue stick or tape
- plain paper or poster board

HANDS-ON ACTIVITY

1. On graph paper, design one original polygon shape (at least 4 sides) to be your 'tile.' Trace and cut it out of a spare piece of grid paper.
2. Using your cut-out tile, trace it onto a large plain sheet or poster board, then create a pattern by translating it at least twice, reflecting it at least once, and rotating it at least once, tracing each transformed copy and coloring the repeating pattern to make an art piece.
3. Label at least three of the transformed copies in your pattern with the type of transformation used to create them (translation, reflection, or rotation) and the rule that describes it.
4. Measure two side lengths and any right angle within your tile using your ruler and protractor, then use the Pythagorean Theorem to calculate the length of a diagonal within your tile (if your tile has a right angle) or between two vertices of your design.
5. Write a short caption (3-4 sentences) describing your design, the transformations used, and your Pythagorean calculation.

QUESTIONS

1. List the three types of transformations you used in your design and give the specific rule or description for one of them.
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2. Show your Pythagorean Theorem calculation for the diagonal or distance in your tile design.

3. Why do translations, reflections, and rotations keep your tessellation pieces looking identical in size and shape, while a dilation would not?

4. What was the most challenging part of designing your pattern, and how does this project show a real-world use of geometric transformations?
