

Geometric Properties of American Indian Designs

by Glenn Blake, Polly Dupuis, and Sue Moore

Grade level 9 - 10

Time required

Six 50 minute class periods

Materials/Technology

Attached templates

Tracing paper

Ruler

Protractor

Geometry Software Utility

Mirror

Summary

In this unit, students will learn how to recognize and construct various geometric transformations. They will also apply the concepts to identify the geometric properties of traditional American Indian designs.

Objectives

The student will:

- 1) use paper folding to examine perpendicular distance and properties of reflectional geometry.
- 2) identify and construct reflections, rotations, dilations and translations.
- 3) recognize similarity.

Montana Math standards addressed

- 1) Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.
- 2) Students use algebraic concepts, processes and language to model and solve a variety of real-world and mathematical problems.

Assessment

Evaluate student learning using the attached assessment exercise in which students apply the concepts of transformational geometry to traditional American Indian designs.

Extensions

- 1) Have students work with a tribal artisan on a beadwork project.
- 2) Have students research their family coat of arms and identify transformational geometry in it.

Further information

For further information about these lessons, contact Polly Dupuis via electronic mail at polly@compuplus.net.

References

Fife, T. & Merrifield, A. (1997). Traditional design. In Integrated Mathematics: Simon and Schuster.

Serra, M. (1993). Discovering geometry: Key Curriculum Press.