Lesson Plan

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Origametry! – Exploring Geometry through Origami

By: Amanda Martin
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Math
Grades 9–12

Introduction

Origametry? Yes, the art of origami involves several geometric components! In this lesson, students will create a decahedron through a paper folding activity and determine how geometric concepts, such as parallel lines, perpendicular lines, and bisecting lines, connect to the ancient art form.

Learning Objectives

Common Core State Standards: MATH.CONTENT.HSG.CO.D.12

- Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
- Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Materials Needed

- Origami paper (5 sheets per student)
- Notebooks/journals/notebook paper

Procedure

1. Ask students to review and discuss the following terms with a partner: parallel, perpendicular, and bisecting lines.
2. As a class, discuss the meanings of parallel, perpendicular, and bisect in relation to angles and shapes.
3. Inform students that in today's lesson they will learn how to create a decahedron (solid figure with 10 sides) through origami. Discuss with the class the art of origami (additional information about the origins of origami can be found here).
4. Each student will fold 5 identical shapes. Students will need 5 sheets of origami paper each. Here is a video link that walks students through the steps of paper folding to create a decahedron. After the first shape is assembled, pause (or replay) the video to allow students time to make the remaining 4 shapes. When students have completed all 5 shapes, play the remaining portion of the video that shows students how to piece their shapes together to form the decahedron.

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5. Students will work with a partner (or small group if necessary) to formulate answers to the following questions:
   - How are parallel lines and perpendicular lines used in origami?
   - Does origami involve the use of bisecting lines? If so, how?
   - Are there other ways that geometry and origami are connected?

Students should gather as much information as possible for each question and provide response in written form on a shared piece of paper.

Evaluation

Students will work with a partner (or small group) to gather responses for the following questions. Use the following checklist to evaluate student work for completeness and accuracy.

Origametry! Checklist	Complete?
How are parallel lines and perpendicular lines used in origami?	
Does origami involve the use of bisecting lines? If so, how?	
Are there other ways that geometry and origami are connected?	