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# Geometric Himmeli Sculpture

A fun way to explore geometric mathematical solids with a beautiful, sculptural byproduct!

## art + math

In this lesson, traditional Swedish ornaments serve as an educational bridge to learning about platonic solids and more complicated geometric shapes. The term platonic solid may sound intimidating, but really it's one of the simplest categories of 3-D geometric shapes. What makes a platonic solid so special is that all faces of the shape are identical. Consider the die used in games; no matter how many numbered sides a die has, each side must be exactly the same size in order to roll fairly. Only a mere five distinct shapes fall into this category: the tetrahedron, cube, octahedron, dodecahedron and the icosahedron.

The process and mechanics of these geometric forms come to life in traditional Swedish ornaments, called himmeli. Himmeli roughly translates to "sky" or "heaven". These elaborate geometric designs are traditionally woven using reeds or straws held together with a center string. These delicate sculptural ornaments were often given as gifts and used to decorate and brighten living spaces.

As we know, students absorb information in a variety of ways. This project encourages students to engage through a range of styles, both logical/mathematical, as well as visual/spatial. They begin by drawing and measuring a shape out on graph paper. Shapes are then physically constructed as three dimensional objects using thin soft wire threaded through a hollow Artstraw.

# **GRADES 5-12**

Note: Instructions and materials are based upon a class size of 24 students. Adjust as needed.



# Materials (required)

Bienfang Gridded Paper, 8 x 8 grid, 8 1/2" x 11", 50 sheets (10613-1105); share one pad across class

Aleene's Quick Dry Tacky Glue, 4oz (23884-1104); share one bottle among four students

Artstraws, White, Pkg of 1,800 (60903-1004); share one box across class

Blickrylic Student Acrylic Paints, Metallic Brass, 16 oz (00711-9076); share one across class

Blickrylic Student Acrylic Paints, Metallic Copper, 16 oz (00711-9516); share one across class

Blickrylic Student Acrylic Paints, Metallic Silver, 16 oz (00711-9326); share one across class

Blickrylic Student Acrylic Paints, Metallic Soft Gold, 16 oz (00711-9086); share one across class

Blick Natural Copper Wire, 24 Gauge, 100 ft Coil (33415-1024); share four coils across class

**Optional Materials** 

Twisteez, Box of 50 (33407-1050)

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Go to www.DickBlick.com/lesson-plans/geometric-himmeli-sculpture to access a product bundle for your convenience.

#### Preparation

1. Show and discuss solid geometric shapes, identify 2-D shapes within a 3-D object. For example, a cube is made of 6 squares.

#### Process

- 1. Choose a base 2-D geometric shape that can be built into a platonic solid. Platonic solids are special because each face of the shape is a regular polygon, repeated to create a solid 3-D form.
- 2. Draw the base shape on graph paper, marking where two lines meet at an angle, or the vertices.
- 3. Have students count the number of lines in their shape to determine the number of straws needed to construct their sculpture.
- 4. Use Blickrylic to paint Artstraws. These craft straws are made from paper, and coating them in a layer of acrylic paint not only brightens them up, but also helps to strengthen them.
- 5. Cut straws to desired length. About 5" or 6" is a good working size.
- 6. Use thin wire, measuring about three feet, to thread the straws together. This will take a good amount of problem solving. Encourage students to work slowly and take notes using their original sketch.
- While each shape will require a slightly different approach, in general it's best to begin with the base shape and build from there. Additional pieces of wire may be needed as the piece grows.



#### Options

- Have older students work in groups, creating larger and even more complicated polyhedrons.

 Substitute Twisteez soft-coated wire for copper wire when working with younger students.

 Team up with a math teacher! There are many congruent activities that could be done relating to geometry.

### National Core Arts Standards - Visual Arts

#### Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work. Anchor Standard 2: Organize and develop artistic ideas and work.

## Responding

Anchor Standard 8: Perceive and analyze artistic work.

#### **Connecting**

**Anchor Standard 10:** Synthesize and relate knowledge and personal experiences to make art.

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*Step 1:* Using gridded paper, draw a 2-D geometric shape and its corresponding 3-D shape.



Step 2: Paint Artstraws desired colors.



*Step 3:* Use wire to thread straws together, creating a basic geometric shape.

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