RAFT IDEAS

Topics: 3-Dimensional Shapes, Regular Solids, Geometry

Materials List

- ✓ Straws or other hollow, stiff sticks
- ✓ Chenille stems or thin stir straws, cut to 7 cm – 15 cm (3”-6”) lengths

This activity can be used to teach:
Common Core Math Standards:

- Shapes & Attributes (Grades 2-8, Geometry)
- Angles (Grade 4, Measurement and Data, 5-7)
- Volume (Grade 5, Measurement and Data, 3-5)
- Geometric Measurement and Dimension (High School, Geometry)
- Geometric construction & modeling (High School, Geometric modeling, 1)
- Problem Solving and Reasoning (Math Practices Grades 2-12)

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Stick Polyhedra

Making Some Platonic Solid Skeletons



Investigate regular 3-dimensional shapes with simple materials. Fun to build and wonderful show-pieces for the classroom.

Assembly

1. Choose which shape to construct: 4-sided tetrahedron, 8-sided octahedron, or 20-sided icosahedron. (Note: the 2 other platonic solids, the cube and dodecahedron, do not contain the triangle faces that make the shapes structurally sound using this construction method. Unless additional supports are added, shapes containing only triangle faces should be chosen.)
2. Using the table below and images as a guide, construct the shape by inserting chenille stems into each straw opening at the vertices. Add extra lengths of chenille stem, if required, to further secure connections.

Polyhedron	Triangles	Faces	Edges	Vertices
Tetrahedron	**4**	**4**	**6**	**4**
Octahedron	**8**	**8**	**12**	**6**
Icosahedron	**20**	**20**	**30**	**12**

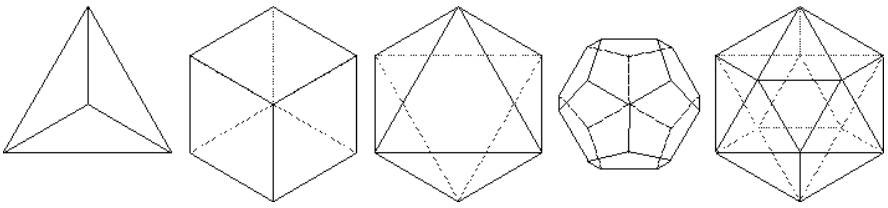

Image from Sacred Geometry

The Math Behind the Activity

Geometry has ancient roots. The Egyptians excelled at both 2-dimensional and 3-dimensional geometry; and the Greeks connected the solid shapes to both the natural and spiritual worlds. The most basic solid shapes to this day are termed the “Platonic and Archimedean Solids”, with Platonic solids containing uniform faces.

Measurement and Geometry is one of the main strands in the California Math Standards. Students learn a bit more about shapes each year of school, starting with describing the faces of solid shapes, then adding measurement of edges, angles, volumes, and surface areas. This activity can be useful at many levels, depending on the needs and abilities of the students.

Web Resources (Visit www.raft.net/raft-idea?isid=415 for more resources!)
Detailed descriptions of 3-dimensional shapes (including formulas), along with links to paper model plans, can be found at “Sacred Geometry”
http://www.geometrycode.com/sg/polyhedra.shtml