

Shape Skeletons

Creating Polyhedral Shapes with Straws

Topics

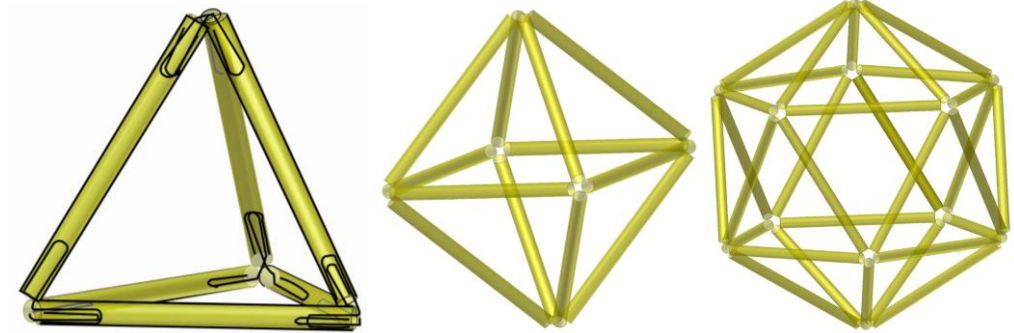
3-Dimensional Shapes,
 Regular Solids,
 Geometry

Materials

- ✓ Drinking straws
- ✓ Paperclips, medium or jumbo
- ✓ Scissors
- ✓ Optional: Pipe cleaners

Learning Standards

CCSS Math: Geometry,
 2D & 3D Shapes;
 Measurement & Data,
 Angles, Volume

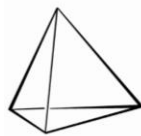


Use simple materials to investigate regular or advanced 3D shapes. Fun to create, these shapes make wonderful showpieces and learning tools!

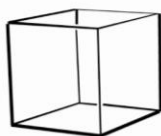
To Do and Notice

1. Cut the straws in half. Choose which shape to construct from the images and table below. **Note:** The 4-sided tetrahedron, 8-sided octahedron, and 20-sided icosahedron have triangular faces and usually form sturdier skeletal shapes. The 6-sided cube with square faces and the 12-sided dodecahedron with pentagonal faces tend to be less sturdy.

Platonic Solids



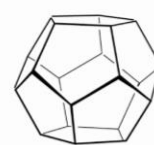
Tetrahedron



Cube



Octahedron



Dodecahedron



Icosahedron

Polyhedron	Faces	Shape of Face	Edges	Vertices
Tetrahedron	4	Triangles	6	4
Cube	6	Squares	12	8
Octahedron	8	Triangles	12	6
Dodecahedron	12	Pentagons	30	20
Icosahedron	20	Triangles	30	12

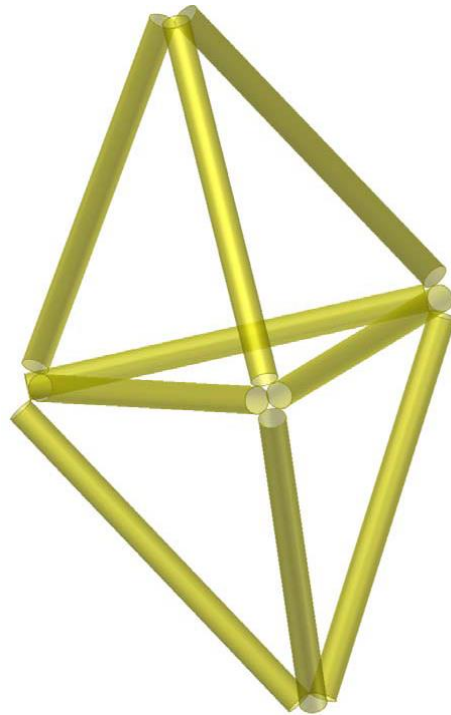
2. Start creating the chosen shape by forming one or more face shapes and then adding straws or join shapes at each of the vertices.
3. Bend the paperclips so that the 2 loops form a “V” or “L”. Widen the narrower loop and insert one loop into the end of one half straw and the other loop into another half straw.
4. Optional: In place of paper clips, run pipe cleaners through the straws to join them and form shapes. Create nested shapes (i.e. shapes within other shapes), or extended shapes (see next page).



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 are the **Platonic** and **Archimedean** solids. The five Platonic solids have faces of regular polygons, of equal size and shape, and they have identical vertices. Archimedean solids are composed of two or more regular polygons.

Visit <https://raft.net> for more resources!



Triangular Dipyramid