Straw constructions for Math Mania*

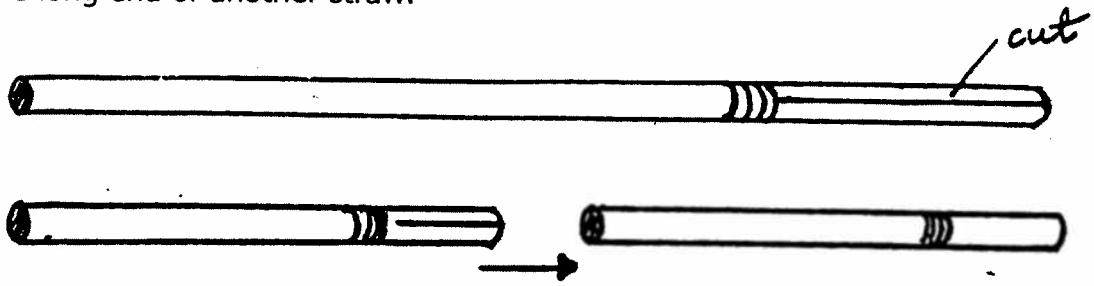
- polygons & polyhedra -

Materials: flexible drinking straws, scissors, masking tape (for three-dimensional shapes)

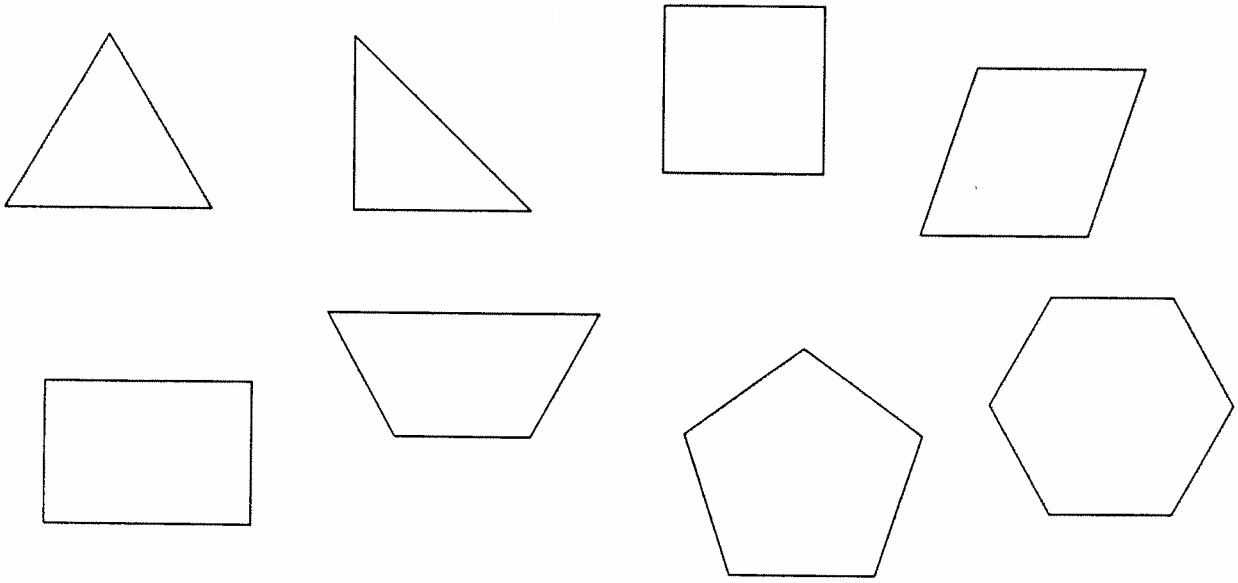
Polygon: Greek for "many knees" or "many angles".

Polyhedron : Greek for "many faces". (The plural is polyhedra.)

1. Cut lengthwise through the short end of a straw. Squeeze the cut end and push it inside the long end of another straw.

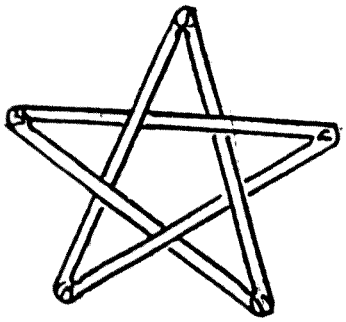


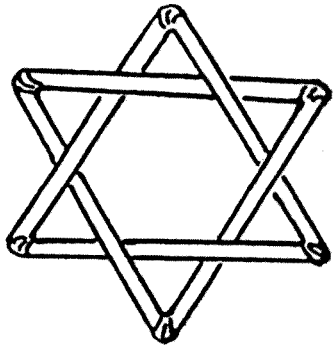
2. Here are some polygons the students can make.
   - Name those shapes!
   - You can discuss the relationships among them (e.g. a square is a rhombus but not all rhombuses are squares)
   - What other polygons can they make? They don't all need to be regular.
   - For some shapes you may need to make one or more of the long ends shorter.



*This activity is based on material from the Pacific Institute for the Mathematical Sciences' outreach program, Math Mania.

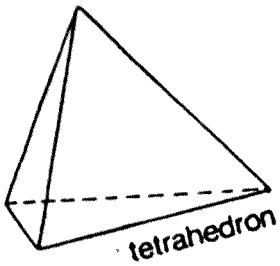
3. Make stars by weaving straws.
   - Ask how many straws are needed before you start. (If a student has difficulty figuring this out, suggest counting the bends.)

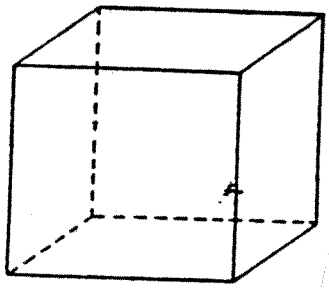


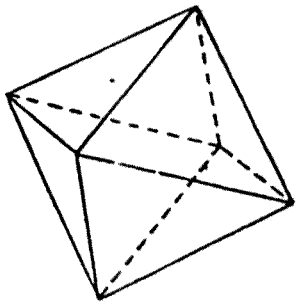


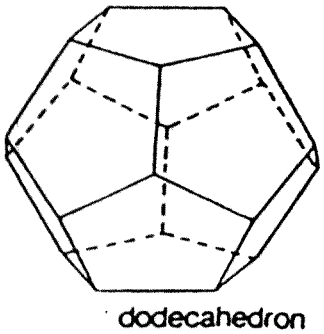
4. Build three-dimensional shapes by joining polygons with masking tape. (Some of these are very ambitious!) To make the construction sturdier, be sure each edge consists of two straws. You can also use triangles to brace the inside of a complicated shape.

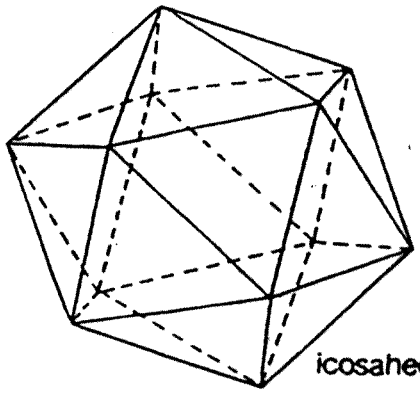
   Here are the five Platonic solids:











What's a Platonic solid? There are only five of them!
- It's made of regular polygons (so the edges are all the same length & the angles are all the same) and the same number of faces meet at each vertex.
- It has to be convex – if you use a straight line to connect any point in the shape to any other point, the line cannot go outside the shape.