Polyhedral Models

Poster Board and Rubber Band Constructions of Regular and Semi-Regular Polyhedra

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Instructions for Poster Board Constructions

1. Tracing the templates onto poster board: Begin tracing at a corner of the poster board, and trace subsequent polygons as close as possible to each other to maximize how many shapes can fit onto each sheet of poster board. A looped piece of masking tape can be used to secure the template from moving while tracing.

2. Cutting out the shapes: Cut shapes into single pieces before trimming the sides and cutting the details of the notches; that is, first cut each tracing out into its own “chunk” to facilitate precise cutting of the shape.

Use large scissors to trim the “chunks” into the desired polygon (hexagon, pentagon, square, or triangle), and for the time being ignore the notches and cut straight through to the vertices.

Then, using small scissors cut out the notches with 4 inward cuts. Do not attempt to cut “out” of a corner. First, snip the two parallel “outside” cuts; then snip the two crisscross “inside” cuts.

3. Scoring the shapes for folding the tabs: Score each edge of each polygon from bottom-of-notch to bottom-of-notch, on what will become the inside of your polyhedron. Carefully bend each tab away from the scoring, so that the scratch mark opens up as you bend along the line that was scored.

Position the polygon so that the non-dominant hand holds the ruler on top of the polygon with only the tab sticking out on the side of the dominant hand, which will hold the stylus and score the poster board. Scoring should begin on the far end, and then continue by dragging the stylus toward oneself and tilted toward oneself. The position is correct when the ruler is pointing directly toward the person doing the scoring. Scoring should be done on a clipboard or on a piece of scrap poster board to protect the desk from the stylus.

4. Attaching the polygons with rubber bands: Use one rubber band to attach two edges together, remembering that the tabs will be on the outside when the polyhedron is completed, like an inside-out seam on a garment.

5. Doing surgery on faulty tabs: The notches need to be deep enough so that rubber bands do not slip out. The distance from notch-to-notch must be the same for the two tabs being attached. If one tab is longer than the other, then the shorter tab will slip out. Repair that situation by cutting a new notch on the longer tab, so that its length from notch to notch matches the shorter tab.

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1. Cut out the large pentagon.
2. At each vertex cut two 3/8 inch incisions: A to B and C to D.
3. The area between the cuts needs to be removed. Cut from A to D and from C to B, forming a notch to hold the rubber band.
4. When all five vertices are prepared, the edges may be folded, by first scoring along the fold line on the side that will become the inside of the polyhedron. Bend the tab away from the scoring.
Tetrahedron \( \{3, 3\} \)

Cube \( \{4, 3\} \)

Octahedron \( \{3, 4\} \)

Dodecahedron \( \{5, 3\} \)

Icosahedron \( \{3, 5\} \)
Dodecahedron 5, 3

Cuboctahedron 3-4-3-4

Small Rhombicuboctahedron

8 triangles
18 squares

8 triangles
6 squares

12 pentagons
20 hexagons

Truncated Icosahedron
Score and bend.
Staple tabs together.