

# Tips for Constructing Paper Models

## General Tips

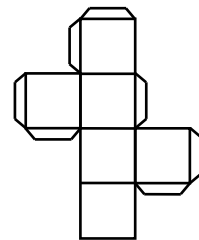
- **Equipment you will need:** Ruler, compass, pencil, scissors, glue, toothpick, pin, colored pencils.
- Constructing these models out of paper is a real exercise in accuracy and careful work. Careless work results in a form that can't come together properly.
- It is important to use good paper<sup>1</sup>. If the paper is too thin, then it won't hold its form; if it's too thick, then it won't fold nicely. Use the paper sparingly.
- It is best to do any artwork on the paper after it has been cut out, and after the folds have been made, but before it has been glued together.

## Making the Polygon Form(s)

- Each *polyhedron* paper model has faces with specific polygonal shapes. Your polyhedron may have different faces. You will need to make a nearly perfect *form* of each of these polygonal faces.
- **If you do have a photocopy of the form...** The polygon form on photocopied paper is not stiff enough to use for tracing, so you should first make a duplicate of it on thick construction paper. To do this, put the photocopy of the form on top of the sheet of construction paper. Then, using a pin, push through all the vertices of the photocopied form thereby making tiny holes on the construction paper underneath. With a ruler carefully draw the polygon form on the construction paper by connecting the holes that were just made. Carefully cut out this polygon.
- **If you don't have a photocopy of the form...** For example, your form may be an equilateral triangle. You will then need to *very* carefully construct the equilateral triangle on construction paper, then carefully cut it out.

## Drawing the Net

- **Planning.** Think about how the net can be laid out so that it can be cut out and folded up into the desired polyhedron. For example, in order to make a cube, the square form will have to be traced six times in order to create the full net.
- **Tracing.** Using the polygon form that has just been cut out, create the net by tracing adjacent polygons on the sheet of construction paper. If you have a large piece of construction paper, plan it so that the net is toward the edge of the paper, so you don't waste much paper. Use a very sharp pencil when drawing the net. For best results, leave a pencil's width (0.2mm) of space along the edge between adjacent polygons, in order to account for the fold that will occur along this edge.
- **Placing the Tabs.** Once the net has been made, placement of the tabs needs to be determined. The tabs don't need to be drawn or cut out very neatly, since they won't be seen, but they need to run the length of the whole edge. It is important that no edges are left without a tab, and that no edge has two tabs joining it. Considering all of this, draw all the tabs in the proper places. One possible net (with tabs) for constructing a cube is shown at the right. Can you see how this pattern will fold together, and how all the tabs will connect?



A Cube Net with tabs

## Putting it together

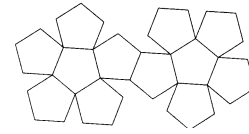
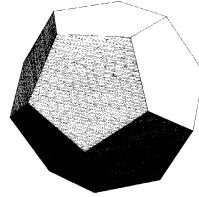
- **Folding.** After the net is cut out, folds need to be made along certain edges by placing a ruler along the edge, folding the paper up, and then going over the fold a couple of times with your finger nail.
- **Gluing.** The last part of the construction is gluing it together. This is a slow process, since after gluing a few tabs, it must be allowed to dry somewhat before gluing more tabs. It is best if the tabs are strategically placed in the net in such a way that the last face that gets glued has no tabs on it (this is the bottom square in the above drawing). This allows the last face to be gently pressed into place onto tabs (with glue on them) that are connected to other faces.

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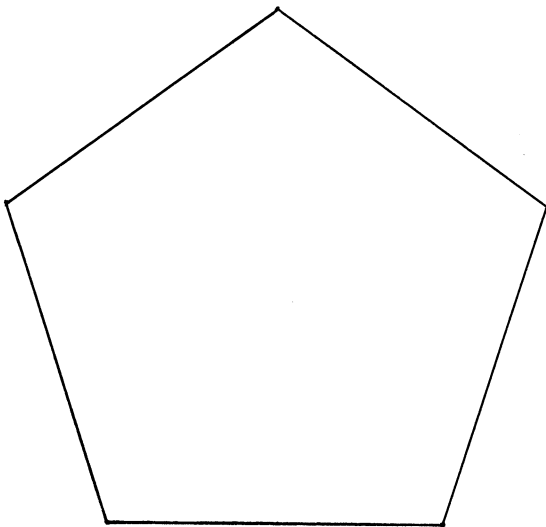
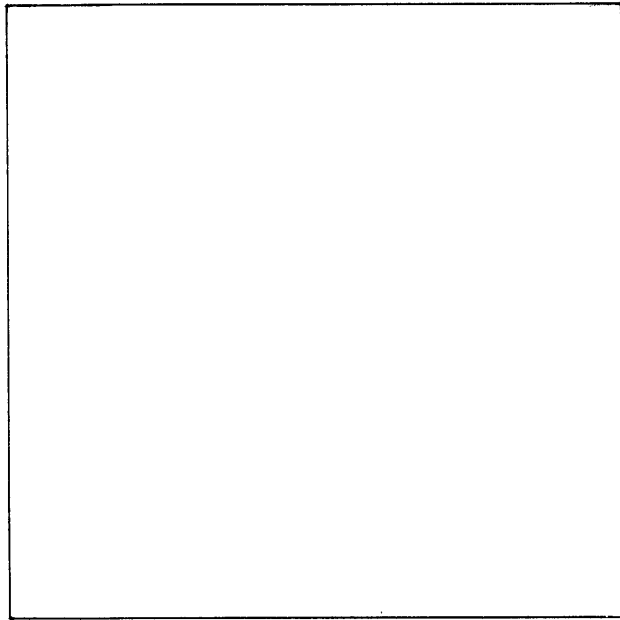
<sup>1</sup> An 80-pound Bristol paper works quite well, although may be expensive. "Via" 80-pound cover paper (made by International Paper) is cheaper and works just as well. You can order it through a paper supply store in 23" by 35" sheets at a cost of about 65¢ per sheet. Alternatively, I find that standard file folders work fairly well.

# Notes for making a Dodecahedron Paper Model

Here's a drawing of a dodecahedron and one possible net.



Here's the size of the form that you'll need to cut out for a cube and a dodecahedron.



So now just follow the "tips" on the backside...