

A&S 153
#2 Space Clusters

Now we will consider clusters of regular polygons that fit together around a common corner, but with a total angle of less than 360 degrees. Let's call these *space clusters*. For example, the cluster of three squares is $(4, 4, 4)$, and makes a total angle of only 270 degrees. Of course, this cluster can be extended so that the same cluster appears at each corner, eventually closing up to make a cube. Just as in the planar case that we looked at earlier, some space clusters cannot extend to create a polyhedron.

1. The space cluster $(4, 4, 4)$ consists of only one type of polygon (as opposed to, say, $(3, 4, 3, 4)$ which consists of more than one type of polygon). List all space clusters that consist of only one type of polygon. How do you know that you have them all? Determine which of these appear to extend to enclose a polyhedron, and identify these polyhedra by name.
2. Using the textbooks as resources, make a list of all space clusters that consist of more than one type of polygon that can be extended to enclose a polyhedron, and identify these polyhedra by name.