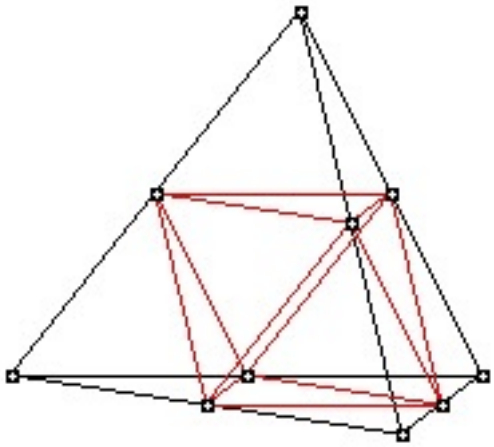
Regular Polyhedra with Doweling Rods

The Big Tetrahedron

You will need 36 rods and 22 connectors. The teams that built four tetrahedra and one octahedron come together. Put the octahedron with one of its faces on the ground. Put three tetrahedra around the octahedron, sharing faces. Put the fourth tetrahedron on top of the octahedron. The four tetrahedra with the octahedron in the middle form a new tetrahedron. The length of the edges of this tetrahedron is twice as big as the edges of the original tetrahedra.



- Compare the area of the base of the big tetrahedron to the area of the base of one of the original tetrahedra. You will see that the base of the big tetrahedron is formed by four triangles. The area of the base of the big tetrahedron is therefore twice as big as the area of the base of the original tetrahedron.
- Compare the height of the big tetrahedron with the height of the original tetrahedron. The height is twice as big.
- Compare the volume of the big tetrahedron with the volume of the original tetrahedron. The volume of a tetrahedron can be computed by using the formula $v = \frac{B \times h}{3}$.

  Because the base of the tetrahedron is four times bigger, and the height is two times bigger, the volume will be 8 times bigger, $\frac{4B \times 2h}{3} = 8\frac{B \times h}{3}$.
- With this information we can figure out what is the volume of the octahedron in the middle. The volume of this octahedron will be the difference of the volume of the big tetrahedron and four times the volume of the original tetrahedron. Therefore the volume of the octahedron is four times the volume of the tetrahedron with the same edge length.