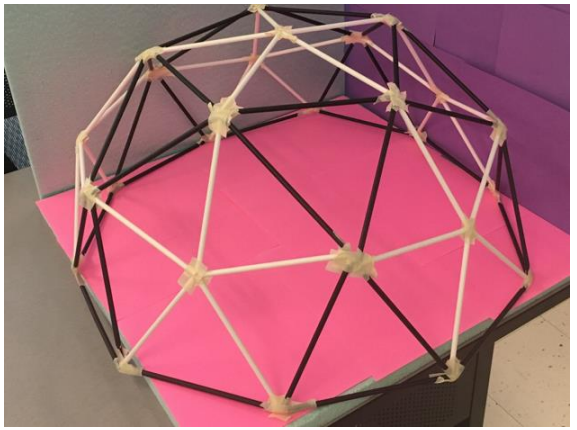
Geodesic Dome (2V)



1. **Gather** 65 "struts."
2. **Cut** 30 struts to $\frac{8}{9}$ of their original length. These are the **short struts**; the remaining 35 struts are the **long struts**.
3. **Arrange** 5 short struts so that they share one endpoint ("node") and secure with tape; the angles between adjacent short struts should be the same. This is the "star."

4. **Create** border around the "star" using 5 long struts and secure with tape. Your resulting pentagon will not lie flat.

5. **Make** 5 more pentagons following Steps 3 and 4.
6. **Join** 5 pentagons together using a long strut between adjacent pentagons along the bottom. Secure with tape.

7. Assemble the 5 pentagons into a circle. Tape the touching joint between adjacent pentagons.
8. Tape the 6th pentagon at the peak.

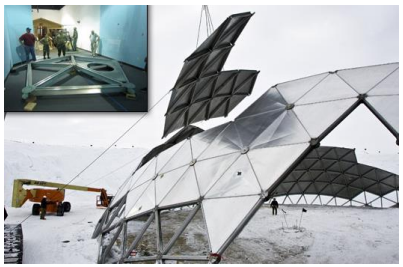
Domes

"Geo' refers to the earth, especially its spherical shape. 'Desic' has to do with measurement. A literal meaning of 'geodesic' is 'to measure the earth'. Geodesic domes come in a variety of forms, and are classified by the number of different-sized struts in its design. A one-frequency dome has struts that are equilateral; this type of geodesic dome is an icosahedron, a 20-sided polyhedron whose faces are equilateral triangles. An icosahedron is one of the five Platonic solids. Higher-frequency geodesic domes can be made into larger structures. Geodesic domes are resilient against stresses from all directions, including accumulating snow and strong winds.

Triangles and Spheres

Geometrically, **triangles** are a very strong polygons because they have fixed sides and angles; therefore when a force is applied to a vertex, it does not distort easily. Similarly, **spheres** are the strongest 3D shape because applied stresses are equally distributed across the surface. In a dome, or hemisphere, when compression is applied to the top, the base is in tension. The **geodesic dome** uses triangular faces arranged in a nearly spherical shape. Because this structure is self-supporting, internal supports are not necessary and the entire interior is usable space.

NAVY NOTES



The Naval Civil Engineering Laboratory and the Naval Facilities Engineering Command selected a geodesic dome to house the U.S. South Pole Station. The domed encloses a base of residential and industrial buildings until it was dismantled and replaced in 2010. A part of this dome now resides in the SeaBees Museum in Port Hueneme, CA.