North Middlesex Regional Schools
Bridges Summer Academy

Geodesic Dome
Measuring the apothem

Massachusetts Standards:

10.G.10 demonstrate the ability to visualize solid objects and recognize their projections and cross sections.

Focus Question:
How can we translate geometric concepts into actual objects?

Culminating Assessment:
After building the geodesic dome, students will need to measure the apothem. The apothem will serve as the basic unit of measurement for pacing out distances on the Cartesian plane.

Strategies:
Opening Assignments: 1) Using toothpicks and gumdrops, students will construction some basic geometric shapes such as triangles or cubes. Examples are given below.
2) The class will then build a geodesic dome using the same materials.

Procedures: When the students have finished building the toothpick domes, the instructor can initiate a discussion of where students have seen geodesic domes before. The Epcot Center at Disney is a common answer and easy for children to visualize. Students will then be provided the parts of a larger goodie. Each section of pipe is five feet long. The five base triangles are connected with nuts and bolts.

The triangles are then paired with neighboring triangles using twist-e-tyes. A “roof” made up of five spokes is then placed onto the top of the geodome in order to hold the structure together. Photos are available below:
**Student Activities:**
Each of the five sides is made up of equal lengths of PVC pipe. Using the Polygon Interior Angles Theorem, students will calculate the measure of each interior angle (108 degrees). Students will then adjust the base of the dome to correspond with these calculations. The class will then measure the apothem. This unit measurement will then supply the distance unit that students pace out coordinates on the Cartesian plane.

**Assessments:**
Students will need to calculate the apothem correctly in order to pace out coordinates in the Greek scroll task.

**Resources Materials:**
- **Gumdrops or marshmallows**
- Toothpicks
- PVC pipes
- Supplies for creating goodie (teacher’s responsibility)
- Nuts & bolts
- Twist-e-tyes
- Measuring tape
- Street chalk
- Compass