

Algebra/Geometry Institute Summer 2006

Polyhedra

Faculty Name: Leigh Ann Melton

School: Grenada Middle School

Grenada, MS

Grade Level: 7

1. Teaching Objectives

The student will be able to define and identify edges, faces, and vertices.

The student will be able to create nets of three dimensional figures.

2. Instructional Activities

- The teacher will ask the students what are solids.
 - Elicit the response a three dimensional figure.
- Give the students a set of solid figures. (sphere, cone, square pyramid, cylinder, cube, rectangular prism, tetrahedron, dodecahedron, and octahedron)
 - Ask the students to divide the figures into groups.
 - Give each group an opportunity to share their classifications.
- The teacher will show her groupings. One group will include the sphere, cone, and cylinder. The second group will include the cube, rectangular prism, tetrahedron, dodecahedron, and octahedron.
 - Ask the students, “Why do you think I put the solids into the classifications I did?”
 - Elicit the response that the second group is made of polyhedra. A polyhedron is a three dimensional closed figure with faces that are polygons.
- Tell the students, “Today we are going to build polyhedra and explore the characteristics of them.”
- Hand out the activity sheet Building Three Dimensional Figures. (Attachment 1)
 - Review the definition of face. A face is a plane figure that serves as one side of a solid figure. Using one of the geometric solids show the students the faces.
 - Review the definition of edge. An edge is the line segment where two faces of a solid figure meet. Using one of the geometric solids show the students the edges.
 - Review the definition of vertex. A vertex is the point at which two line segments, lines, or rays meet to form an angle. Using one of the geometric solids show the students the vertices.
- Hand out the material suitable to build solids that can be opened.
- Instruct students to build a cube. Tell the students that a picture of a cube is found on the activity sheet.
 - The teacher will monitor and make sure everyone builds a cube.
 - Instruct the student to count the number of vertices, edges, and faces. Tell the students to record the data on the activity sheet.

- Demonstrate to the students how to correctly open up the solid to create a net
 - Define net for the students. Net is a blueprint, or pattern, for a three dimensional model.
 - Tell the students to open the figure to form a net.
 - Tell the student to draw the net on a separate sheet of paper.
 - Tell the students to draw another example of a net.
 - Tell the student to compare the two nets and write a comparison on the activity sheet.
- Instruct students to build a tetrahedron. Tell the students that a picture of a tetrahedron is found on the activity sheet.
 - The teacher will monitor and make sure everyone builds a tetrahedron.
 - Instruct the student to count the number of vertice, edges, and faces. Tell the students to record the data on the activity sheet.
- Tell the students to open the tetrahedron to form a net.
 - Tell the students to draw the net on a separate sheet of paper.
 - Tell the students to draw another example of a net.
 - Tell the students to compare the two nets and write a comparison on the activity sheet.
- The teacher will go over the activity sheet with the students.
 - Allow students an opportunity to ask questions.
- Tell the students to build any polyhedron he or she would like.
 - Tell the students to draw the polyhedron created on the activity sheet.
 - Tell the students to count the number of vertices, edges, and faces. Tell the students to record the data on the activity sheet.
- Tell the students to open the polyhedron to form a net.
 - Tell the students to draw the net on a separate sheet of paper.
 - Tell the students to draw another example of a net.
 - Tell the students to compare the two nets and write a comparison on the activity sheet.
- Allow several of the students an opportunity to share their polyhedron and net.
- Allow students an opportunity to ask questions.
- Explain to students how to return supplies.

3. Materials and Resources

Solids: sphere, cone, square pyramid, cylinder, cube, rectangular prism, tetrahedron, dodecahedron, and octahedron.

Polydron™ A construction manipulative in which triangles, squares, pentagons, and hexagons snap together. Allows user to construct a very wide range of two-dimensional and three-dimensional geometric and abstract shapes.

Paper

Pencil

Building Three Dimensional Figures

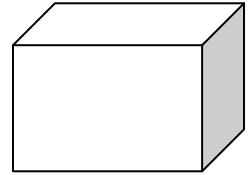
Navigating through Geometry in Grade 6-8. National Council of Mathematics 2002.

4. Assessment

- The teacher will observe students as they work in their groups.
- The concept will be covered on the next chapter test.

Building Three Dimensional Figures

1. Using the pieces provided construct a cube.
2. Count the number of vertices. _____
3. Count the number of edges. _____
4. Count the number of faces. _____
5. Open the solid to form a net. Draw the net on a separate sheet of paper.
6. Draw a different net that can be used to make the same solid.
7. Describe the relationship between the nets you have drawn and the solid.



1. Using the pieces provided construct a tetrahedron (triangular pyramid).
2. Count the number of vertices. _____
3. Count the number of edges. _____
4. Count the number of faces. _____
5. Open the solid to form a net. Draw the net on a separate sheet of paper.
6. Draw a different net that can be used to make the same solid.
7. Describe the relationship between the nets you have drawn and the solid.

