Math 5 - Act. 19: Prisms, Pyramids, and Nets

Summary

Students willl discover how many faces, edges, and vertices on a prism and a pyramid.

Group Size

Small Groups

Materials

    Solid figures of prisms and pyramids
    Nets which cover the prisms and pyramids
    Graph paper
    Scissors
    Tape
    Solid colored paper, two contrasting colors
    Ruler
    Marshmallows or gumdrops (not too fresh)
    Toothpicks

Background for Teachers

Each geometric solid has a flat side called a *face*. They have *edges* which connect the faces. The corners are known as *vertices* (plural), or *vertex* (singular).
A jacket for a geometric solid that can be folded to cover the surface of the solid is called a *net*. A net is a way of representing the polyhedron in two dimensions.

Intended Learning Outcomes

2. Become mathematical problem solvers.

Instructional Procedures

Invitation to Learn
Divide the class into four groups. Give groups A and B a sheet of the same colored paper. Give groups C and D a sheet of the contrasting paper. Have groups A and B measure and cut a rectangle that is 2" by 3." Have group C cut 2 rectangles that measure 2" by 4." Have group D cut 2 rectangles that measure 3" by 4." Collect all six sides and tape them together to form a rectangular prism. Point out the faces, vertices and edges of the figure. Ask the students to identify the shape of each of the faces. Are all of the faces alike? In table form, have them record the numbers of faces, edges, and vertices.
Instructional Procedures
    Give each group a supply of marshmallows and toothpicks. Have them design a jacket (net) that would go around the outside of the prism to protect it.
    Have them try their jacket on the solid figure and adjust as necessary.
    When they have a jacket that encloses the prism, have them unhook a few of the vertices and lay the net out flat.
    Have the students record the number of faces, vertices, and edges in a table.
    Using the graph paper, draw the design of the marshmallow/toothpick structure.
    Repeat the process for a pyramid.

Extensions

Possible Extensions/Adaptations

Have students construct or design nets for other polyhedra. Add their edge/vertex/face information to the chart and look for a pattern to predict additional information. Let the students discover the equation "face + vertex - 2 = edges" using leading questions such as:

Find the sum of the number of faces and vertices.

Compare this with the number of edges. What is the difference?

Add the sum of faces/vertices for other shapes. What is that difference?

Can you write an equation that would fit this problem?

Home/Family Connections

Students and their families can construct a variety of polyhedron nets at home.

Authors

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