

Polydron Fun!

Overview

This lesson will focus on engaging students in the geometric world of how the nets of three-dimensional objects relate to finding surface area and volume of objects. Making conjectures regarding the characteristics and properties of these objects is also explored. Students will use Polydron pieces to physically manipulate the objects for better understanding.

Benchmarks

3-4th Grade

Geometry and Spatial Sense

- E. Use attributes to describe, classify and sketch plane figures and build solid objects.

Mathematical Processes

- I. Represent problem situations in a variety of forms (physical model, diagram, in words or symbols), and recognize when some ways of representing a problem may be more helpful than others.

5-7th Grades

Geometry and Spatial Sense

- I. Identify and draw three-dimensional objects from different views (top, side, front and perspective).

8-10th grade

Geometry and Spatial Sense

- A. Formally define geometric figures.
- E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.

Mathematical Processes

- E. Use a variety of mathematical representations flexibly and appropriately to organize, record and communicate mathematical ideas.

Time One block (80 min. blocks).

Materials

Students will need the following: Three Dimensional Figures and Nets Lab Sheet, Three Dimensional Figures and Nets Lab Questions, Three Dimensional Figures and Nets Lab Extension Activity (optional), Isometric dot paper (Extension activity), Polydron pieces, Construction paper shapes and tape (optional if Polydron pieces are not available), pencil

Procedures

1. Each student should receive a copy of Three Dimensional Figures and Nets Lab sheet. Students should be working in small groups (2 to 4 students). Each group should have the appropriate Polydron pieces with the name of the 3D object to construct.
2. Students should carefully snap the pieces together to see exactly what geometric shapes make each object and how they connect to make the object. 3. Students are to sketch the 3D figure and the net of each listed object on their lab sheet.
4. When students finish the lab sheet, they are to complete the Three Dimensional Figures and Nets Lab Questions sheet.
5. Discuss how each 3D object may have a slightly different net. Show students how a 3D object may have a slightly different net using the Polydron Pieces.

Extension Activities

1. Three Dimensional Figures and Nets Lab Extension Activity (optional)
Students may use Isometric dot paper and extension activity sheet. This is another opportunity for students to draw three dimensional objects as solids and as nets.
2. Students may be asked to build the five regular Polyhedra or Platonic Solids using the Polydron Pieces. Using Worksheet II.I Exploring Regular Polyhedra/Platonic Solids is optional.

Assessments

1. Students may be informally assessed as the teacher walks around the room to monitor students understanding while working on the lab sheet with the Polydron Pieces.
2. Students may be formally assessed with the use of the Lab Sheet, the Questions sheet, and/or the Worksheet II.I.

Three Dimensional Figures and Nets Lab (Prisms)

Name _____

Use Polydron Pieces to build the following 3D figures.
Sketch the 3D figure and its net for each of the following.

Prisms

Polydron Pieces Needed	Name of 3D Figure	Sketch the 3D Figure	Sketch the Net
6 squares	Cube		
2 triangles 3 squares	Triangular Prism		
2 pentagons 5 squares	Pentagonal Prism		

Pyramids

Polydron Pieces Needed	Name of 3D Figure	Sketch of 3D Figure	Sketch the Net
1 square 4 triangles	Square Pyramid		
4 triangles	Triangular Pyramid		
1 pentagon 5 triangles	Pentagonal Pyramid		

Three Dimensional Figures and Nets Lab Questions

Name _____

Answer the following in complete sentences using appropriate vocabulary.

1. Compare the 3 prisms you investigated and state the common characteristics of these prisms.
2. Use these characteristics to write your own definition of a prism.
3. Compare the 3 pyramids you investigated and state the common characteristics of these pyramids.
4. Use the characteristics to write your own definition of a pyramid.
5. Without the use of the Polydron Pieces, sketch the nets of the following.

Rectangular Prism

Hexagonal Pyramid

Three Dimensional Figures and Nets Lab Extension Activity

Name _____

Use isometric dot paper to draw the following three-dimensional objects as solids and their nets.

1. cube
2. rectangular prism
3. triangular prism
4. hexagonal prism
5. square-based pyramid
6. rectangular pyramid
7. triangular pyramid
8. pentagonal pyramid