

GEOSPACE

Grades K – 5

Lab Time: 1 1/2 to 2 hours

DESCRIPTION

Cylinders, cubes, spheres, cones and free-forms fill the air as students construct their own “geo-worlds” using paper engineering techniques. Geometric understanding begins with basic shapes and solids in the lower grade levels and progresses to complex polyhedrons in upper grade levels. Age-appropriate geometric and measurement terms are applied. This process learning experience is a powerful way for school age children to integrate familiar shapes in their environment with basic forms used by artists, engineers and architects.

OBJECTIVES

KINDERGARTEN – 1st GRADE

Students will:

- Explore and describe the properties of a circle, triangle, rectangle and square
- Discover and discuss geometric solids in their immediate environment
- Make the following geometric solids: cone, sphere, cylinder, cube
- Use the geometric solids to create a representation of a scene or space within an open-sided box

2nd AND 3rd GRADES

Students will:

- Discuss dimension in defining a point, line, geometric shape and geometric solid
- Explore and describe the properties of a circle, triangle, rectangle and square
- Discover and discuss geometric solids in their immediate environment
- Make the following geometric solids: cone, sphere, cylinder, cube, rectangular prism, triangular prism, square pyramid (3rd grade)
- Use the geometric solids to create a representation of a scene or space within an open-sided box

4th AND 5th GRADES

Students will:

- Discuss dimension in defining a point, line, geometric shape and geometric solid
- Explore and describe the properties of a circle, triangle, rectangle and square
- Discover and discuss geometric solids in their immediate environment
- Make the following geometric solids: cone, sphere, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid
- Have an understanding of the Platonic solids and create an icosahedron (5th grade)
- Use the geometric solids to create a representation of a scene or space within an open-sided box

ACADEMIC GOALS AND STANDARDS

Grades K, 1, 2

NCTM Principles and Standards for School Mathematics – Geometry

Students should:

- recognize, name, build, draw, compare, and sort two- and three-dimensional shapes
- describe attributes and parts of two- and three-dimensional shapes
- investigate and predict the results of putting together and taking apart two- and three-dimensional shapes
- recognize and create shapes that have symmetry
- create mental images of geometric shapes using spatial memory and spatial visualization
- recognize and represent shapes from different perspectives
- recognize geometric shapes and structures in the environment and specify their location

NCTM Principles and Standards for School Mathematics – Connections

Students should:

- understand how mathematical ideas interconnect and build on one another to produce a coherent whole
- recognize and apply mathematics in contexts outside of mathematics

Grades 3, 4, 5

NCTM Principles and Standards for School Mathematics – Geometry

Students should:

- identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes
- classify two- and three-dimensional shapes according to their properties and develop definition of classes of shapes such as triangles and pyramids
- predict and describe the results of sliding, flipping, and turning two-dimensional shapes
- build and draw geometric objects
- identify and build a three-dimensional object from two-dimensional representations of that object

NCTM Principles and Standards for School Mathematics – Connections

Students should:

- understand how mathematical ideas interconnect and build on one another to produce a coherent whole
- recognize and apply mathematics in contexts outside of mathematics

Illinois State Learning Goals

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

Early Elementary

8.A.2a

- Identify, describe, extend and create geometric and numeric patterns.

Late Elementary

8.A.2a

- Identify, describe, extend and create geometric and numeric patterns.

State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

Early Elementary

9.A.1a

- Identify related two- and three-dimensional shapes. including circle-sphere, square-cube, triangle-pyramid, rectangle-rectangular prism and their basic properties.

9.B.1a

- Identify and describe characteristics, similarities and differences of geometric shapes.

9.B.1c

- Identify lines of symmetry in simple figures and construct symmetrical figures using various concrete materials.

Late Elementary

9.A.2a

- Build physical models of two- and three-dimensional shapes.

9.A.2b

- Identify and describe how geometric figures are used in practical settings (e.g., construction, art, advertising).

9.B.2

- Compare geometric figures and determine their properties including parallel, perpendicular, similar, congruent and line symmetry.