

## Zome System

*Builds Genius!*

### Art / Mathematics Basic Concept

#### Lesson Objective:

Students will become familiar with **Cubism** as a movement in modern art, and draw parallels between art and mathematics. They will also be able to define a structure's **vertices**, **edges**, and **faces**.

#### Prerequisite Skills:

Knowledge of basic geometric shapes ("Geometric Shapes," "2-D Polygons," and "Try the Triangle,"). Previous exposure to the use of geometry in art ("Printing with Zome System," "Printing Cubes and Pyramids," and "Trying Tessellation").

#### Time Needed:

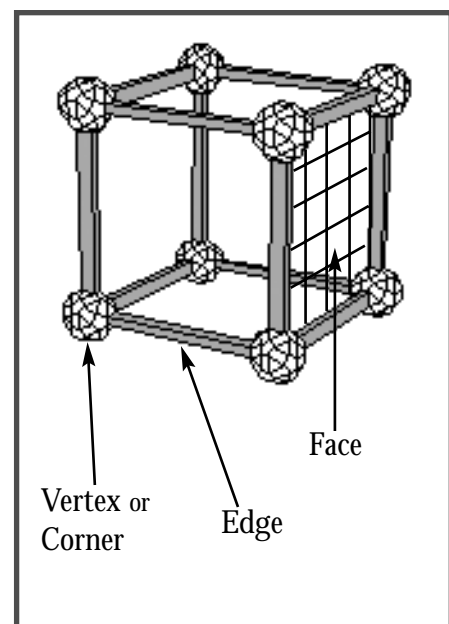
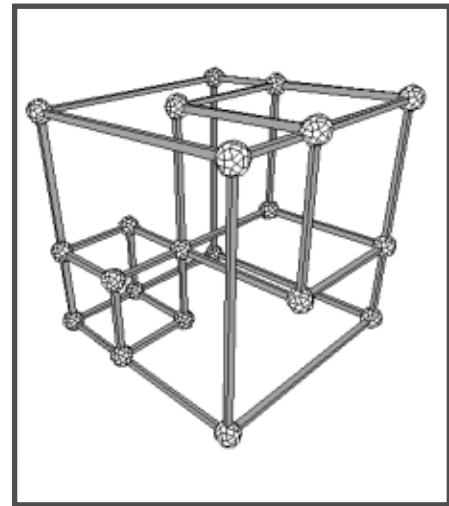
One class period of 45-60 minutes.

#### Materials Needed:

- Two Zome System Creator Kits for 25-30 students
- Getting to Know the World's Greatest Artists: Picasso by Mike Venezia
- Opaque projector if available.

#### Procedure:

Read the book for the class. As you read elicit responses and comments from students. *What do you notice about Pablo Picasso's style? When was Picasso born? Where was he born? Have you seen any other work that reminds you of his work? Can we always tell what the paintings are supposed to represent?* Highlight the section on *Cubism*. Show the pictures in this section and have students discuss what they notice. (If possible you may want to project them onto a screen using an opaque projector.) Explain that Cubism is an art form, made popular by Picasso, that uses geometric elements such as cubes and angles to give the appearance of the picture being broken into many pieces.



Discuss the difference between 2 dimensions and 3 dimensions. Encourage students to use classroom examples as they create a definition.

Divide the class into teams of 3-4 students, and distribute the Zome System pieces. The first challenge for the teams is to create as many different cubes and distorted cubes as possible in 15 minutes.

When they are finished, students should walk around the room to view the different types of cubes. *How many different versions are possible? Are they really all cubes? Did the color of strut used affect the type of cube produced? How?*

Students should then return to their own cubes. Ask them to close their eyes and touch the cubes. Have them trace around the cube with their fingers. *What different parts do they feel?* As a class define the elements of a cube, including vertex, face, and edge.

Students should individually create a Zome System structure using Cubism principles. When the structure is completed they can draw the structure in their journals. The drawing should identify the vertices, faces, and edges.

### Assessment:

Observe students work, and review their notes and drawings. Students have met the standard when they create various distorted cubes and define their vertices, faces, and edges. To exceed the standard they must construct a Zome System structure using Cubism principles.

### Standards Addressed:

- \* Mathematics standards addressing **geometry and spatial sense** (NCTM Standard 9).
- \* Fine Arts standards addressing the **impact of philosophical and artistic ideas throughout history**.

### Transfer Possibilities:

Identification of elements in other geometrical structures ("2-D and 3-D Shapes," "Attention Angles!" "Cubes - I," and "Cubes - II"). Continued work on Cubism using other media. History of other 20th century art movements ("Mondrian Lines").

