

# Zome System

Builds Genius!

## Squares and Rectangles

### Mathematics Basic Concept

#### Lesson Objective:

Students will learn the properties of squares and rectangles, and the difference between them.

#### Prerequisite Skills:

Students need to have played with Zome System before.

#### Time Needed:

One class period of 45 to 60 minutes.

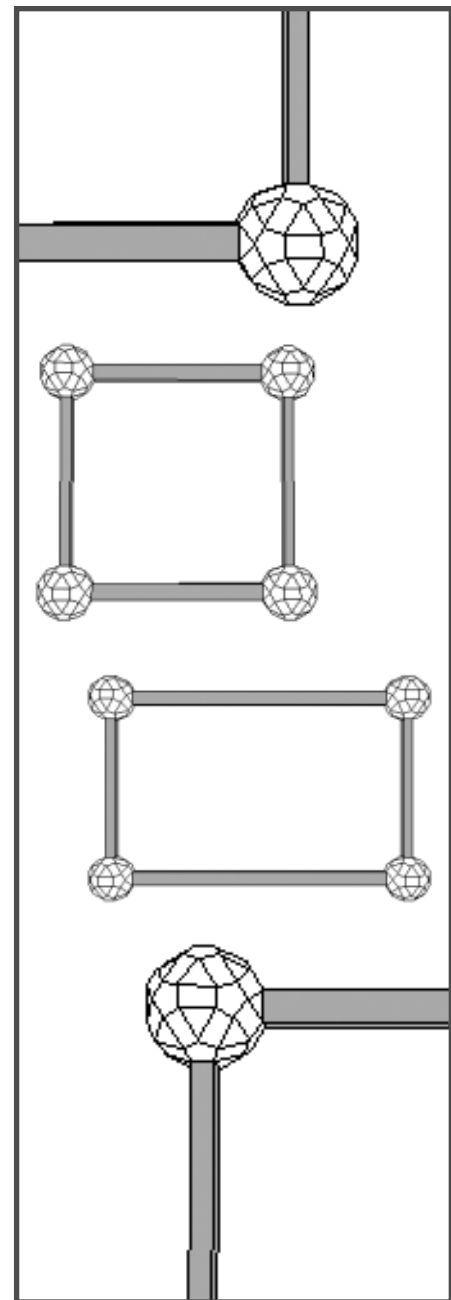
#### Materials Needed:

- One Zome System Creator Kit for 25-30 students

#### Procedure:

Prepare for the class by building a Zome System square and a rectangle. Show the students the square and the rectangle, and hold a short initial discussion. Record student ideas on the board or on chart paper. *How many sides do the shapes have? Are the two shapes exactly the same? What color struts were used? Does anything in the classroom have the same shape as one of the two shapes? What are the two shapes called?* Divide the class into pairs, and distribute the Zome System pieces evenly. The challenge for the student pairs is to build as many different versions of the two shapes as possible in a 15 minute period. They must also devise a method of sorting and classifying their shapes. Circulate and assist while they are working. Some students may build rhombuses, kites and other parallelograms, or they may build forms that are not plane.

Ask each pair of students to hold up a few of the shapes they have built to show the rest of the class. *How many different shapes did they find? Was it possible to build the shapes with all three colors of struts? Which different groups did they divide their shapes into? By size? By color? Was it possible to build the square in more than one size? In more than one color?*



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*Is a shape built with two long blue struts and two long red struts a rectangle or a square. Are the red and the blue struts the same length? Why was it not OK to build diamonds and other shapes with four sides? What is the same about squares and rectangles and what is different? Are the sides the same size or different? Are some sides the same and some different?*

Record the similarities and differences pointed out by the students in a table on the board: Rectangles have four sides, two short sides and two long sides. Rectangles are long and skinny. Rectangles are not squares. Squares have four sides. Every side is the same length. Squares are not rectangles.

Older students (i.e., second graders) can instead write their findings directly in their math journals. All students can do drawings of a square and a rectangle.

End the class by again looking at forms in the classroom and have students determine if they are squares or rectangles.

### Assessment:

Ask students to build a square and a rectangle using Zome System and describe the properties of each shape. Their report can be delivered either orally or written. Key words/terms to look for: number of sides, same or equal, long or short. Students have met the standard when they can differentiate between the two forms. To exceed the standard they must verbalize definitions of squares and rectangles.

### Standards Addressed:

\* Mathematics standards addressing **geometry and spatial sense** (NCTM Standard 9).

### Transfer Possibilities:

Expansion into more advanced shapes and 3-dimensional forms.

