

# Zome System

*Builds Genius!*

## Perimeter Puzzles

### Mathematics Basic Concept

#### Lesson Objective:

Students will learn the concept of a perimeter and learn how to measure it in a structure.

#### Prerequisite Skills:

Knowledge of basic geometric shapes ("Geometric Shapes," "2-D Polygons," and "Try the Triangle,").

#### Time Needed:

One class period of 45-60 minutes.

#### Materials Needed:

- Two Zome System Creator kits for 25-30 students.

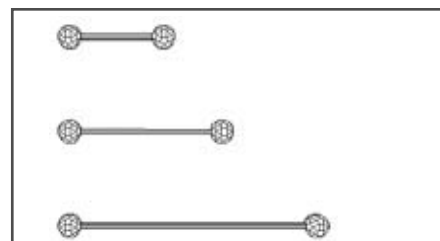
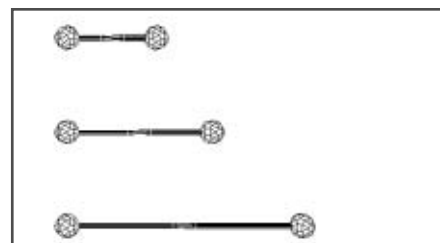
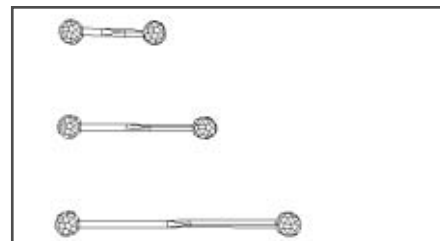
#### Procedure:

Begin by asking the students how many of them have a fence surrounding their backyard, apartment building, or playground? *What is the purpose of having a fence* (for safety, to keep the dog in a yard, privacy, etc.)? *Who builds fences? How do people go about planning for a fence? How do they know how much materials they will need for their fence?* Allow students to discuss the idea that it is necessary to measure in order to determine the amount of fencing, etc.

Draw a 4 sided figure on the board. Ask students how many sides the figure has. Ask them how they know that the answer is 4. They will response, "by counting". Explain that when someone creates a fence or a boundary around something they *count* the distance. This distance is known as **perimeter**.

The challenge for the class is to calculate the perimeter of various geometric shapes using Zome System. Have students copy the chart in their math journals.

Divide the class into teams of 3-4 students, and distribute the Zome System pieces. The teams are to build the following geometric shapes and then calculate their



<u>Size</u>	<u>Color</u>	<u>Measurement</u>
short	yellow	1
short	red	2
short	blue	3
medium	yellow	4
medium	red	5
medium	blue	6
long	yellow	7
long	red	8
long	blue	9

perimeters; square, pentagon, rhombus, right triangle, equilateral triangle, rectangle. All students should record their team's activities and findings in their math journals.

Finally, each team should be asked to build a fence around one of the desks in the classroom. The fence is to be built it using the most cost effective plan. Students should refer to the chart previously copied into their math journals. The measurement on the chart is equal to the cost of each strut. For example, one small yellow strut costs \$1.00. One long blue strut costs \$9.00. Discuss appropriate strategies before building occurs. *Can we predict how much the fence is going to cost? Which color fence is going to be the cheapest? Is a fence that resembles one of the polygons above going to be cheaper or more expensive than a free-form shape?*

Students should experiment with various approaches. All work should be included in math journals. Conclude the class with a large group discussion of results. The lesson can be extended to include actual measurement of the struts in order to find perimeter.

### Assessment:

Observe students as they work, and check written work in math journals. To meet the standard students must build the listed polygons and determine their perimeter. To exceed the standard they must complete the team "fence" and define the budget for this construction.

### Standards Addressed:

- \* Mathematics standards addressing **mathematical connections** (NCTM Standard 4).
- \* Mathematics standards addressing **geometry and spatial sense** (NCTM Standard 9).
- \* Mathematics standards addressing **measurement** (NCTM Standard 10).

### Transfer Possibilities:

More advanced work on measurement ("What is Area?" and "Measurement of Space II - Volume") and budgeting for construction projects, and other economic concepts ("Tallest Tower in the World" and "Bridge Building Unit").

