Zome System

Builds Genius!

Try the Triangles

Mathematics
Basic Concept

Lesson Objective:
Students will positively identify the three types of angles possible in a triangle. They will also learn to use a protractor

Prerequisite Skills:
Knowledge of the three types of angles, ability to identify triangles.

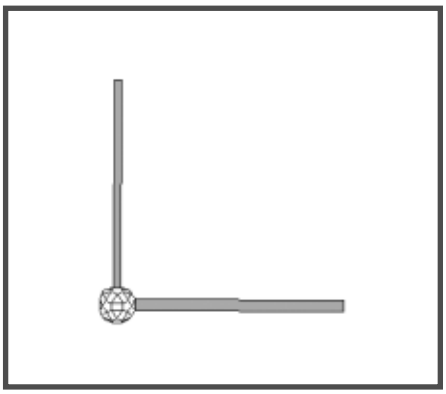
Time Needed:
One class period of 45-60 minutes.

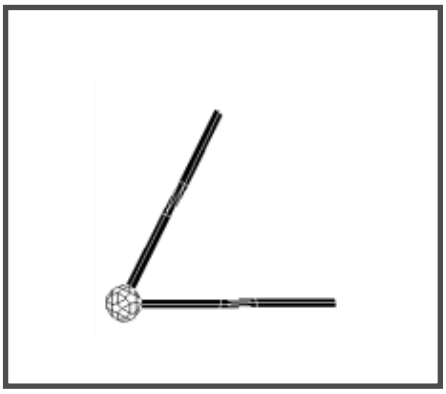
Materials Needed:
- One Zome System Creator Kit for 25-30 students
- Notes on a Triangle (video produced by Dale Seymour Publications and Cuisenaire Company of America, Inc.)
- One protractor per 3-4 students

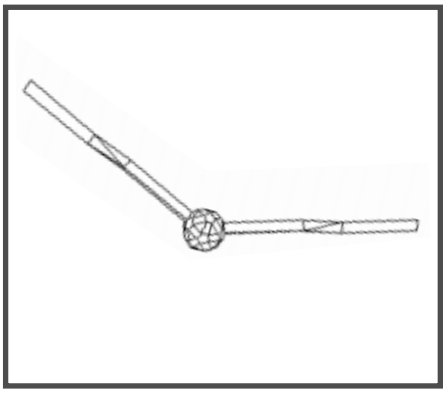
Procedure:
Begin with a review of the different types of angles: right, acute, and obtuse.

View the video once and just let the students watch. When the video is over ask about their observations. *What did you notice? What is the name of the shape in the video? How do we know that a shape is a triangle?* View the video a second time and ask students to focus on the shapes that appear.

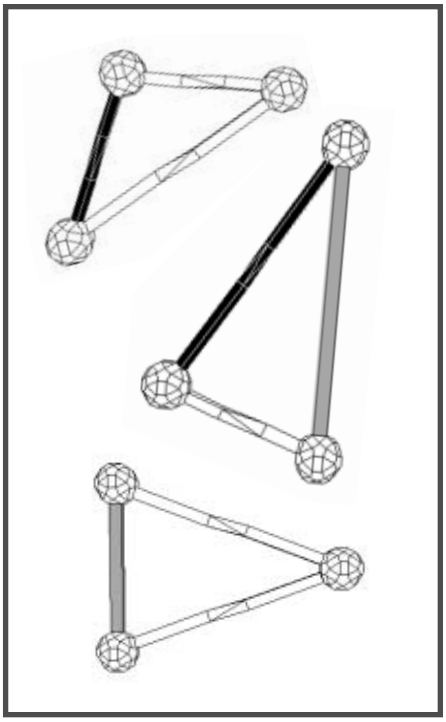
Distribute the Zome System elements once the video is completed, and ask the students to create as many different triangles as they can. All the triangles should be recorded in their math journals, including a sketch with the types of struts labeled. *How many different ones is it possible to build? Can you build them all in one color? Can you build any using all three colors?* Allow approximately 20







minutes for experimentation.



When the students have completed their building time they are to share their results with teammates. The teams should sort their triangles into categories of their own choosing. *Do some of the triangles have anything in common? How can they be divided into groups?* Each team should make a short presentation of the categories they have chosen.
As a class, decide what categories are constant throughout the class (i.e. right triangles, equilateral triangles, etc.). All students should enter the definitions into their math logs.

Discuss how someone would measure angles. *How do we know that two angles are the same or different? Can we guess, or is there a more precise system we can use?* Review the concept of a protractor. For some students the use of a protractor might be new. Discuss how the measurement of a triangle is equal to 180°. Each team should measure the combined angles on a few of their triangles and see if that rule applies to all triangles.

If time allows you can also introduce the concept of congruency. Hold a short discussion about the various triangles the students have built, and define the word congruent together.

Assessment:
Observe students while they work. Question them to ensure that they can identify the types of triangles in the structure and measure the various angles. Review drawings and definitions in students' math journals. To meet the standard students must be able to show which angles in a triangle are acute, right, and obtuse. To exceed the standard they must correctly verbalize a rule showing how the combined angles of a triangle equals 180°.

Standards Addressed:
* Mathematics standards addressing geometry and spatial sense (NCTM Standard 9).
* Mathematics standards addressing measurement (NCTM Standard 10).

Transfer Possibilities:
More work on triangles ("Similar Triangles," and "Triangle Tiles"). Exploration of platonic solids and other 3-dimensional structures containing triangles ("Finding Plato's Solids I," "Finding Plato's Solids II," "3-D Triangles." and "3-D Triangle Tiles"). Work with triangles is also a natural lead-in to three-fold symmetries in geometry, art, and nature ("What is Reflection Symmetry?," and "Multiple Reflection Symmetries").