

Zome System

Builds Genius!

Biology / Art Basic Concept

Lesson Objective:

To demonstrate similarity and difference in animal forms, including humans. Also to investigate geometric relationships within those forms.

Prerequisite Skills:

Previous experience building with Zome System. Knowledge of symmetry concepts is helpful (“What is Reflection Symmetry”).

Time Needed:

One or two class periods of 45-60 minutes.

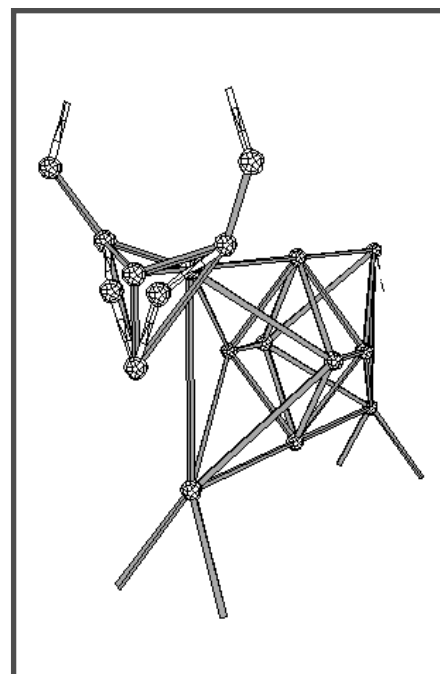
Materials Needed:

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

Procedure:

Introduce the lesson by stating that today we will focus on similarities among animals. *How are animals structured similarly? How do they resemble one another?*

Break the class into groups of 2-3 students, and challenge them to build an animal using Zome System elements. Encourage the groups to make different animals from each other. Give enough time so the models can be as detailed as possible. When the groups are finished, have them place their models on a table in front of the room, with a label stating which animal it is. Begin a discussion about the similarities and differences in each model. *What structural similarities exist in all the different animals modeled?* Encourage discussion until the concepts of bilateral symmetry, rotational symmetry, vertebrate function, and other anatomical characteristics are covered. If students don't use the correct vocabulary for these characteristics, introduce the new words. *Are there any recurring angular*



Animal Forms

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relationships in all of the animals? Roughly what are the angles? Are there differences in how the animals move? Do these differences appear to depend on any of the characteristics already mentioned? Are there any evolutionary advantages to being structured as they are? Why aren't all animals structured the same?

After the initial modeling, have the students develop models of imaginary creatures that demonstrate some of the general features all higher order animals possess, such as bilateral symmetry. Have a representative from each group explain the features of their imaginary animal to the class.

Assessment:

To meet the standard, students will be able to describe bilateral symmetry, rotational symmetry, vertebrate function, and other anatomical characteristics discussed. They will also understand how some features are adaptable for certain animals and not others.

Standards:

- * 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).
- * Science standards addressing animal anatomy and gravity forces.

Transfer Possibilities:

Exploration of symmetry and geometry in the natural world ("Multiple Reflection Symmetry").

