

Fearful Symmetry STEM Nova Award for Cub Scouts



The Fearful Symmetry STEM Nova Award is designed to help you explore how symmetry affects your life each day.

Wolf, Bear, and Webelos Scouts are eligible to earn this award.

This packet covers Requirement 2 of 5



REQUIREMENT #2

2. Complete ONE adventure from the following list, OR complete Option A or B.

If you choose an adventure, choose one that you have not previously earned.

Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

Wolf Cub Scouts - Air of the Wolf, Code of the Wolf, Motor Away

Bear Cub Scouts – Forensics, Marble Madness

Webelos Scouts - Art Explosion, Build It, Maestro!

Option A: Complete all of the following:

(a) Explain the difference between the symmetry of the flower of a geranium and the symmetry of the flower of herbaceous periwinkle.

(b) Explain the difference in leaf arrangement (the pattern of where leaves appear on the stem) between a maple tree and a sweetgum tree.

(c) Find another pair of plants that you can distinguish based on some difference in symmetry.

Option B: Complete all of the following:

(a) Using toothpicks and colored marshmallows, or other appropriate materials, make a model of the crystal structure of olivine.

(b) Using toothpicks and colored marshmallows, or other appropriate materials, make a model of the crystal structure of halite.

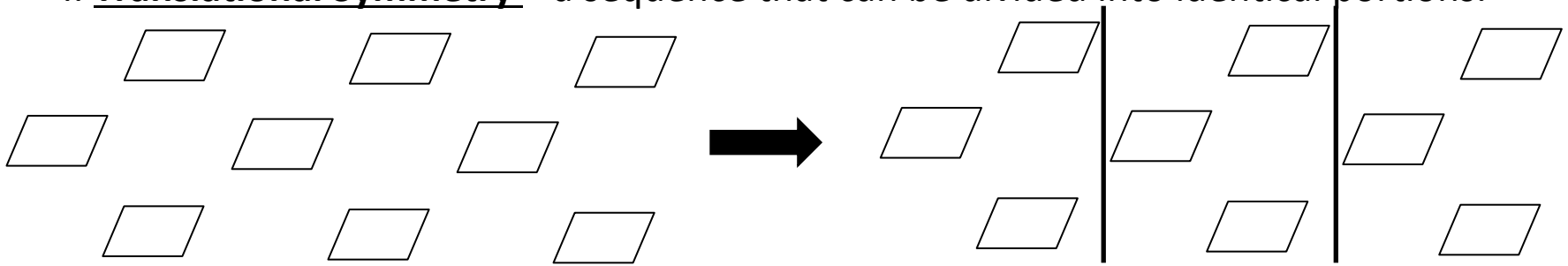
(c) Use your models to guess which of the two minerals is harder.

INSTRUCTIONS:

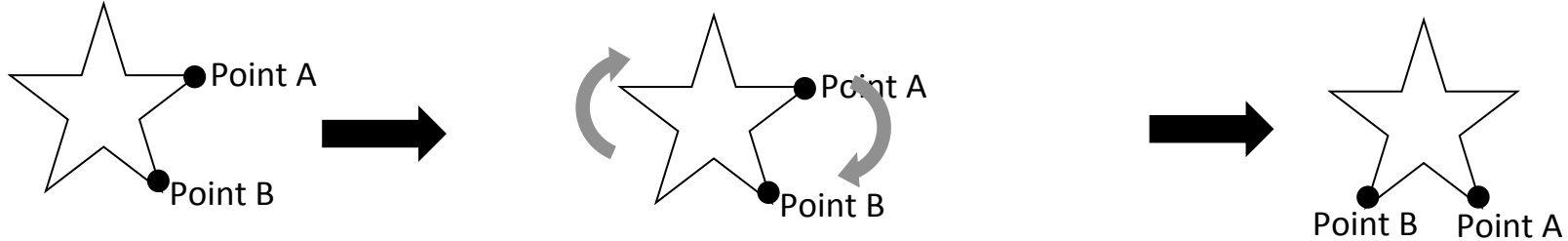
To complete Requirement #2, using Option A, work through the following pages. Then, discuss your answers with your Nova Counselor.

Review the types of symmetry.

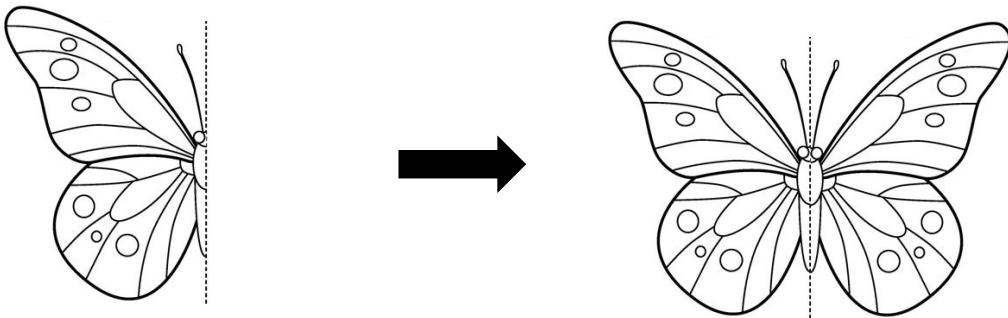
I. Translational Symmetry – a sequence that can be divided into identical portions.



II. Rotational Symmetry – an object that looks the same after it has had some rotation.



III. Reflection Symmetry – when one half of an object is the reflection of the other half.



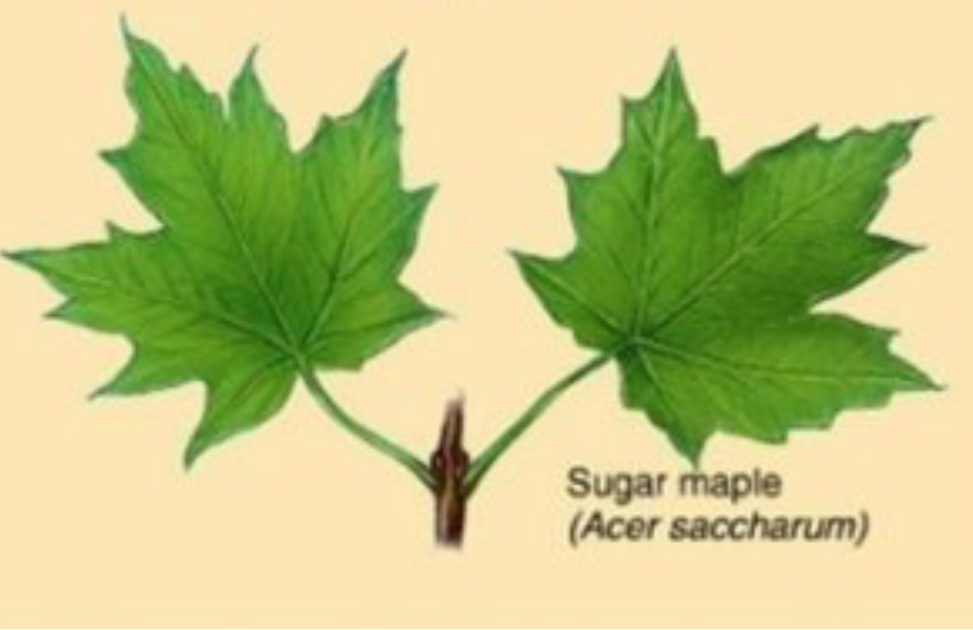


Geranium Flower



Herbaceous Periwinkle

- a. Explain the difference between the symmetry types of these two flowers. Then, review your answer with your Nova Counselor.



Maple Tree Leaf



Sweetgum Tree Leaf

Review this video about Leaf Arrangement.

*Click on "Leaf Arrangement" video in bottom row.

https://forestry.ca.uky.edu/tree_id_videos

b. Explain the difference between the pattern of where the leaves appear on the stem (this is called leaf arrangement). Then, review your answer with your Nova Counselor.



c. Look at these two plants and their different symmetry.
One plant is the Araucaria Arucana. It has reflection symmetry and rotational symmetry.
The other plant is the Aloe Polyphylla. It has rotational symmetry.
Write the correct name of each plant on the lines above. Then, review your answers with your Nova Counselor.