Nature Kaleidoscope

Project Area: Environmental Science

Skill Level: Intermediate—Intermediate—Advanced

Learner Outcomes:

⇒ Be able to define new vocabulary words.

⇒ Differentiate between a healthy soil and unhealthy using simple field indicators.

⇒ Use an observational metric to evaluate biodiversity between different habitats.

TN Science Curriculum Standard GLEs:

GLE 0807.5.5

CLE 3255.4.5

GLE 0807.Inq5

Success Indicator: Describe the level of biodiversity of the habitat they observed.

Science Skills: Collect data, interpretation, comparing

Life Skills: Observing, Reflecting

Tags: Biodiversity, soil health, metrics

Materials

Clipboard
Flags or colored rope and stakes
Measuring tape or meter stick
Garden trowel
Tweezers
Container for soil sample
Notecards
Thick black sharpies
Scissors
Colored Markers
Pencils

The shapes we see in nature show us a lot about biodiversity

Ask your students

⇒ What does biodiversity mean? What does biodiversity look like in nature? Ask them to describe the difference in shapes they envision in their schoolyard (turf grass field) as compared with that of an old forest or wet meadow. Highlight that biodiversity is expressed by having a variety of shapes.

Vocabulary Word	Definition
Biodiversity	The variety of different types of life found on earth.
Soil Health	The continued capacity of soil to function as a vital living ecosys-
Organic Horizon	Soil layer that is dominated by organic material.
Metric	A standard of measurement.
Transect	A straight line or narrow section across the earth's surface, along
Habitat	An ecological area that is inhabited by a particular species of plant, animal, or other type of organism.

Advanced Preparation:

Go out into the school yard and identify a transect of habitats ranging from grassy fields to a forest (or a simple stand of trees). Place flags out along the transect to mark where the student groups' "habitat" plots will be located. Space the plots out so the habitats will encompass some variability in vegetation and topography if possible.

ACTIVITY: Using Indicators and Metrics

Divide the class into groups of 3-5. Allow them to work together to mark off a "habitat" plot along the previously indicated transect. These plots should be at least 5 yds by 5 yds. Ask the students to take a soil sample and place it in a tray. Use the worksheet to evaluate the soil health metric scores, identifying with a simple tally of the indicators that are present (one tally if it is present, maximum score is 8). Then ask students to draw shapes of the living things they see in the habitat in the space on the worksheet. Point out thinks like leaf shapes, grass shapes, tree or shrub twig structures, flower shapes, insects, mushrooms, etc.

The students are going to use these shapes to make their pattern for a kaleidoscope. So the simpler the better. Try to impress upon them that they should just capture the general characteristic shape or outlines. The more complex their shapes, the longer it will take to complete their kaleidoscope. However, make sure they accomplish some variability and creativeness with their shapes. It would be best to first create your own kaleidoscope to become familiar with the methodology and comfortable with the time requirements.

Credits: Andrea Ludwig and Jennifer DeBruyn

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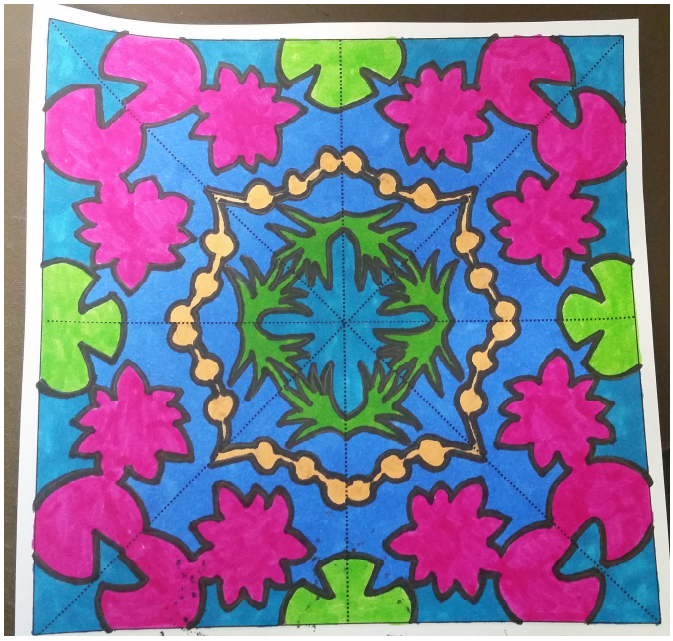
Notes on this activity:

The students are asked to select 4-6 of their favorite shapes that they draw from their habitat to create stencils by redrawing them on a notecard and cutting them out. This allows for the students to try different arrangements of shapes (and overlap them if they like!) before committing to the final kaleidoscope design. Make sure that some of the shapes touch or go outside of the triangle pattern. Once they are satisfied with the shape layout, ask them to trace the stencils with pencil then go back over with a thick black marker.

To save time and if you think the students will understand the process enough, you can skip the stencils and ask that they redraw their shapes in an interesting pattern in the triangle. Be sure to trace the pencil lines in thick black marker so that the lines bleed through. Cut out the triangle after the black lines are drawn.

The students should then put the triangle pattern behind the Kaleidoscope square matching up with one of the blank triangles. Then the students should trace the pattern in pencil.Then flip the pattern over and move to the next triangle. Repeat the flipping (in the same direction!) and tracing until all triangles are filled. The lines touching the edges of the triangle should match up with those on the next triangle; if not, you hve flipped the wrong way. Then trace in black marker and color in the different shapes of the Kaleidoscope.



If possible, cut out the Kaleidoscope square and trace a black border around it. Then mount on a piece of black poster board or construction paper. The square is 8" x 8", an easy dimension to frame.

References:

Geometry in Nature - http://list25.com/25-examples-of-perfect-geometry-found-in-nature/

Discovery Education, Looking for Biodiversity - http://www.discoveryeducation.com/teachers/free-lesson-plans/looking-for-biodiversity.cfm

Teach Kids Art— http://www.teachkidsart.net/kaleidoscope-lettering-design

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