Shaping Up

By: Nancy Volk

How Does Nature Shape Up?

The world around us is composed of many different shapes. Sometimes these shapes are put together to make more complex designs. Nature also is composed of shapes and designs. Sometimes the designs and patterns serve a purpose, or are an adaptation; at other times they may be aesthetic. Think about the needles on a conifer or pine tree. Why are they long and thin?

Compare this to the shape of a maple leaf, which would have much more surface area, curves and points. What purpose does the broad leaf have for the Maple tree?

Grass is made of an elongated leaf with **parallel** lines running through this. What purpose do the parallel lines serve for the plant? You will be going on a nature walk with specific items for you to discover or complete. See how many questions you can generate as a class.

MOST*

HELPFUL TERMS

Acute Angle
Arc
Circle
Cone
Cube
Diagonal
Ellipse
Equilateral Triangle
Fractals
Hexagon
Horizontal
Isosceles
Obtuse Angle
Octagon
Parallel
Parallelogram
Pentagon
Perpendicular
Polygon
Pyramid
Quadrilateral
Rectangular Prism
Rhombus
Right Angle
Right Triangle
Scalene Triangle
Sphere
Square
Tessellation
Tetrahedron
Trapezoid
Triangle
Vertical

Inside This Packet

Activity: The Power of Observation

Being a scientist has a great deal in common with being a good artist. Being able to be an astute observer is important. Here is an activity to help you practice your observation skills.

Activity 1:

Your instructor is going to walk around the room with a variety of items on a tray. Take a look at the tray of items for five seconds (count to yourself from 1000 to 1005), and then close your eyes for five seconds. Then as quickly as you can, name or draw as many of the items on the tray as you can remember. When you are finished, place your pencil down. Your teacher will review the items, and check them off as they are named on your sheet.

How did you do?

Hardly anyone can name all of the items, but we can improve with practice. Try another tray of items. Repeat the same procedures.

How did you do this time?

Activity 2:

Strengthen the power of observation. In order to draw items, our brain analyzes an image, and we convert this to paper. It requires a careful sense of observation to be accurate.

How many leaves does the flower have?

How many petals on the stem?

Are the leaves opposite one another?

What are other questions that can be asked to help strengthen our power of observation?

Now try to ask these questions of the object/plant that your teacher has selected to sketch. Work at making a careful sketch of the object. Feel free to look back at the object as often as needed to capture its essence.

Activity: Shape Walk Adventure

In this activity, you will be going on a walk to look at nature. Place your responses in the worksheet provided or your science notebook according to your teacher's instructions.

What to do:

1. As you walk, look for shapes that have already been discussed in the reading. See how many shapes you can find. (Refer to the "Shape Chart" provided)
2. Sketch a design that you find appealing, then break your sketch down into what shapes you can find in the design.
3. Back in the classroom, use the shapes you found and create your own design. Use colored pencils to add vareity to your design.
4. Is there a reason for the shape you have found in nature? Research this question. Is the adaptation of the shape helpful to the life of the plant, animal or organism?
5. Record all the questions in a classroom notebook. One student can be the secretary for this task.
6. Using the sketch made from the plant you observed, find a book on taxonomy to determine its proper name. Exchange your experience with a friend in the classroom, and listen to their information from their shape walk adventure!

As a Class:

- Design a nature board that incorporates the sketches made by students, and what they have learned about plants, animals, and other organisms from the nature walk.
- Take the same walk throughout the different seasons. In the Fall, Winter, and Spring; take note of what appears the same, and what appears to be different from each walk that the class has taken throughout the year.
- Take pictures of the items of interest to place on the classroom nature board
- Use the new vocabulary discovered through the learning experience as spelling words, vocabulary words, and for the word wall.

MATERIALS NEEDED

Notepad (1 per student)

Access to Research Tools

Sketch Paper

Colored Pencils

Students should be able to:

Design a texture book and use appropriate texture terms.

Find the shapes of objects in nature and describe them.

Sketch an object from nature.

Identify a living organism

Generate questions about living organism's adaptations.

Discuss findings with a peer.

Shape Walk Adventure Student Worksheet

Name: _____ Date: _____

1) List the shapes that you found on the walk.

_____

_____

_____

_____

2) Sketch one of the plants that you discovered on the Shape Walk Adventure.
Be sure to include the names of the shapes in your diagram sketch.

3) Create your own design using the shape chart to assist you.

Shape Walk Adventure Student Worksheet

Name: _____ Date: _____

4) Research the shape of the organism, as well as its functions. Place your notes and findings below.

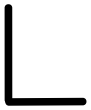
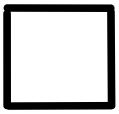
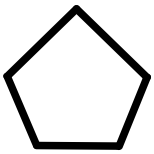
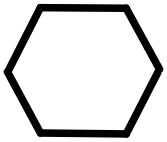
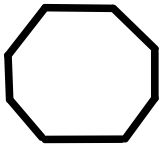
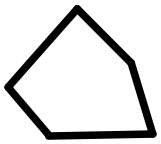
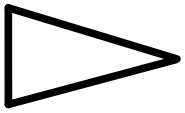
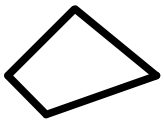
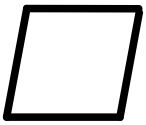
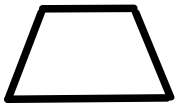
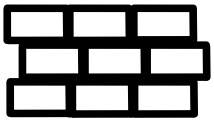
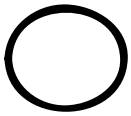
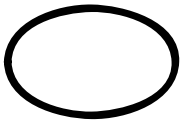
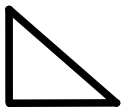
5) List the questions asked during the Shape Walk Adventure.

6) List the proper name for the organism using a taxonomy.

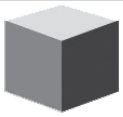
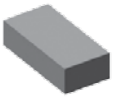
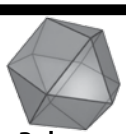
_____

7) List the information that you learned while listening to another peer's report about their shape walk.

Lines and Plane Figures

Horizontal Line	Vertical Line	 Diagonal Line	 Parallel Lines
 Perpendicular	 Curve	 Right Angle	 Acute Angle
 Obtuse Angle	 Triangle	 Square	 Rectangle
 Pentagon	 Hexagon	 Octagon	 Polygon
 Equilateral Triangle	 Scalene Triangle	 Isosceles Triangle	 Quadrilateral
 Parallelogram	 Rhombus	 Trapezoid	 Tesselation
 Circle	 Arc	 Ellipse	 Right Triangle

Solid Figures

 Cube	 Cylinder	 Rectangular Prism
 Pyramid	 Tetrahedron	 Octahedron
 Polygon	 Sphere	 Cone

Teacher Notes:

This is a wonderful lesson to complete for differentiated learning within the classroom for a diverse group of learners. It integrates art and science in a interdisplinary manner. It can be as simple as taking a walk and sketching shapes, to as complex as researching the reason plants may have various shaped leaves, identification of organisms, and creating one's own art from the inspirational shape walk.

Throughout this activity, the level of difficulty can be modified depending on the needs of the learner. (Ex. shapes can be simple or quite complex in terms of vocabulary).

Encourage students to look and observe with their eyes. They should not touch or pick plants without your assistance. Know what plants are poisonous, and should be avoided (ex. Poison Ivy). The students should stay on the path provided by the teaching staff.

Other Lesson Connections:

Work this activity into a math unit on geometric shapes and fractals

Work with the art teacher to develop a lesson around fractals

Use protractors, strings, measuring tape to quantify angles, lengths, and diameters for drawings/sketches

Work with ELA to create writing descriptions about the walk using new vocabulary words

Discuss: How do humans impact nature?

New York State Standards

Standard 1: Math:
Key Idea 1: M1.1c
Key Idea 2: m2.1
Key Idea 3: M3.1a

Standard 2: Science: Key Idea 1: s1.1, s1.1a, s1.1b

Standard 4: Key Idea 1; Key Idea 3; Key Idea 7

Standard 6:
Key Idea 3

Standard 7: Interdisciplinary Problem Solving: Key Idea 1; Key Idea 2

General Skills: i, ii, iii, iv, vi, vii, viii, x, xi, xiii, xiv, xvi