Art on a Cellular Level

Art and Science Educational Resource

Phoenix Airport Museum

Educators and Parents,

With foundations in art, geometry and plant biology, the objective of this lesson is to **recognize patterns** and **make connections** between the inexhaustible variety of life on our planet.

This educational resource is geared for interaction with students of all ages to support the understanding between art and science. It has been designed based on our current exhibition, *Art on a Cellular Level,* on display at Sky Harbor. The questions and activities below were created to promote observation and curiosity. There are no wrong answers.

You may print this PDF to use as a workbook or have your student refer to the material online.

We encourage educators to expand on this art and science course to create a lesson plan.

If you enjoy these activities and would like to investigate further, check back for new projects each week (three projects total). We hope your student will have fun with this and make an art project to share with us. Please send an image of your student's artwork to Airport.museum@phoenix.gov or hashtag #SkyHarborArts for an opportunity to be featured on Phoenix Sky Harbor International Airport's social media.

Art on a Cellular Level exhibition

Sky Harbor, Terminal 4, level 3 Gallery

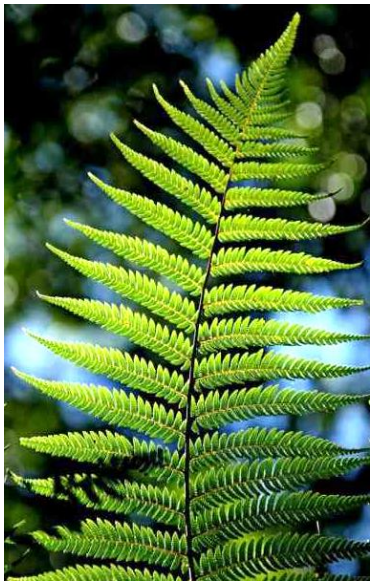
Art is a lens through which we view the world. It can be a tool for storytelling, expressing cultural values and teaching fundamentals of math, technology and science in a visual way.

The Terminal 4 gallery exhibition, *Art on a Cellular Level,* examines the intersections between **art and science**. Both fields involve exploration and discovery. Scientists and artists attempt to understand and describe the world around us by making observations. They strive to see things in new ways and to communicate that vision.

This exhibition features seven Arizona artists who interpret parts of the natural world that we may otherwise need a microscope, telescope or x-ray to see. From the chemicals of stardust to the intricacies of the human body, these artists draw, paint, sculpt or construct the richness of life on our planet.

Lesson 1: Biology revolves around repetition and pattern.

For hundreds of years, people have noticed and studied patterns in nature. Some examples of naturally occurring patterns include spirals, symmetries and fractals (see examples below). These designs can be explained through mathematics. Although these patterns are seen in a variety of life, this lesson focuses on plant biology.



FRACTAL
the same shape repeated in different sizes.
(image: fractalinstitute.org)

SPIRAL
a pattern that circles and repeats around a center point.
(image: askabiologist.asu.edu)

SYMMETRY
both sides of the shape are identical.

Glossary of terms

Pattern: a repeated design or shape.
Repetition: a design or shape that occurs several times in the same way.
Symmetry: a shape or form that looks the same on both sides.
Organic shapes: curved or soft-edged shapes, usually from the natural world like plants.
Geometric shapes: squares, triangles and circles that have clearly defined edges.
Biology: the study of living things, like plants and animals.
Organism: an individual animal, plant or life-form.

OBJECTIVES

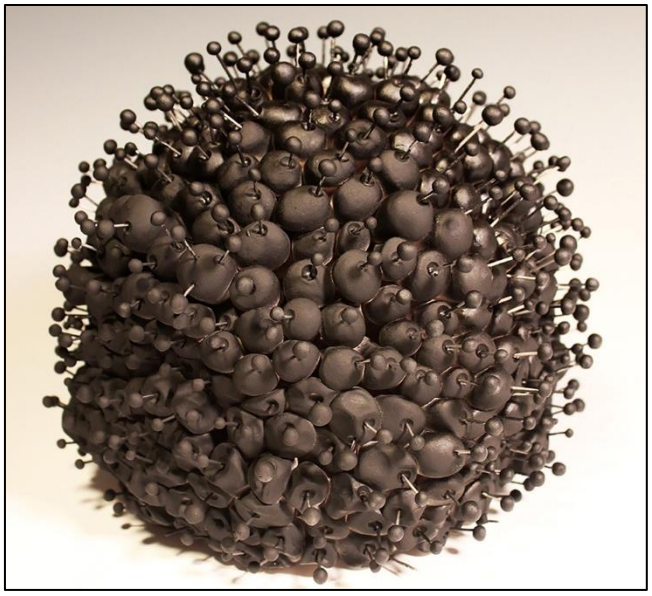
- **OBSERVE** how art and biology both use pattern.
- **IDENTIFY** natural patterns in your own environment.
- **IMAGINE** and create your own pattern using nature.

OVERVIEW

- Learn about the Phoenix Airport Museum exhibition *Art on a Cellular Level* exhibition at Sky Harbor International Airport.
- Examine artwork in the exhibition inspired by natural organisms.
- Identify patterns, repetition, organic/geometric shapes in both artwork and nature.
- Create your own artwork.

MATERIALS NEEDED:

- **Paper**
- **Something to draw with** (colored pencil, pens, paint, crayons or markers)
- **Access** to plants (preferably outdoors)



Danielle Wood

Tempe, Arizona

This sculpture is titled ***Pins and Needles.*** It is **non-objective**, meaning it does not represent a specific person, thing or organism. It was created with clay (ceramic) and fired in a kiln to make it hard and durable. The dark color was achieved with a glaze that was also fired in a kiln.

Artist statement: *"My work contains forms patterned after organisms found in the ocean - an environment that still holds much mystery and intrigue. There is a beauty and mystery below the surface that is intriguing and often overlooked."*

QUESTIONS:

- Is the overall shape of the sculpture **organic** or **geometric**?
- Does the sculpture look **symmetrical**? Why or why not?
- This artwork uses **repetition** to create a larger shape out of many smaller shapes. What do you think one individual shape looks like? Think about the base and the attachment. Try drawing it on a piece of paper.
- What similarities do you see between this sculpture and the following objects?

(**Sea Urchin**, courtesy of Scientific American)

(**Bacteria**, image courtesy of newscientist.com)

Explore further: The artist was inspired by organisms in the ocean. Can you see similarities in ocean life such as *anemones* or *coral*? Research images online.

Mary Meyer

Gold Canyon, Arizona

This artwork is titled, ***Forms of Life.*** It is a grouping of small sculptures displayed together in a frame that hangs on the wall. Each sculptural object was formed with black clay (ceramic) and fired in a kiln to make hard and durable. Mary Meyer highlighted details and textures on each object with gold coloring and graphite (pencil).

Artist statement*: "My series* ***Forms of Life*** *was inspired by research of fossils and early life classifications. This work reflects my ongoing interest in biological evolution and our human connection with all constructs of life.*

QUESTIONS:

- Look at the sculptural objects above. How do each of them use line, shapes or points to create patterns?
- Choose one object. What kind of organism do you think it would belong to? Why?
- What similarities do you see between the artwork of Mary Meyer and Danielle Wood? Think about the materials used, their artist statements, color, texture and shape.

Explore further: The artist was inspired by *fossils*, which are the remains or traces of plants and animals that lived long ago. Research images of plant or *multicellular* fossils online.

PROJECT 1

OBSERVE the patterns of nature in your own backyard or neighborhood.

Explore your own environment in the search of pattern. Think about how seed pods use **repetition**, how leaves use **symmetry** and how barrel cacti and sunflowers both grow in a **spiral pattern** (see below). Look at the whole plant and its parts.

(Images: sciencemag.org)

- **Collect** (or photograph) 5 different samples. Take notes on each specimen – is it an organic or geometric shape? Explain how each uses repetition or pattern.

Examples:

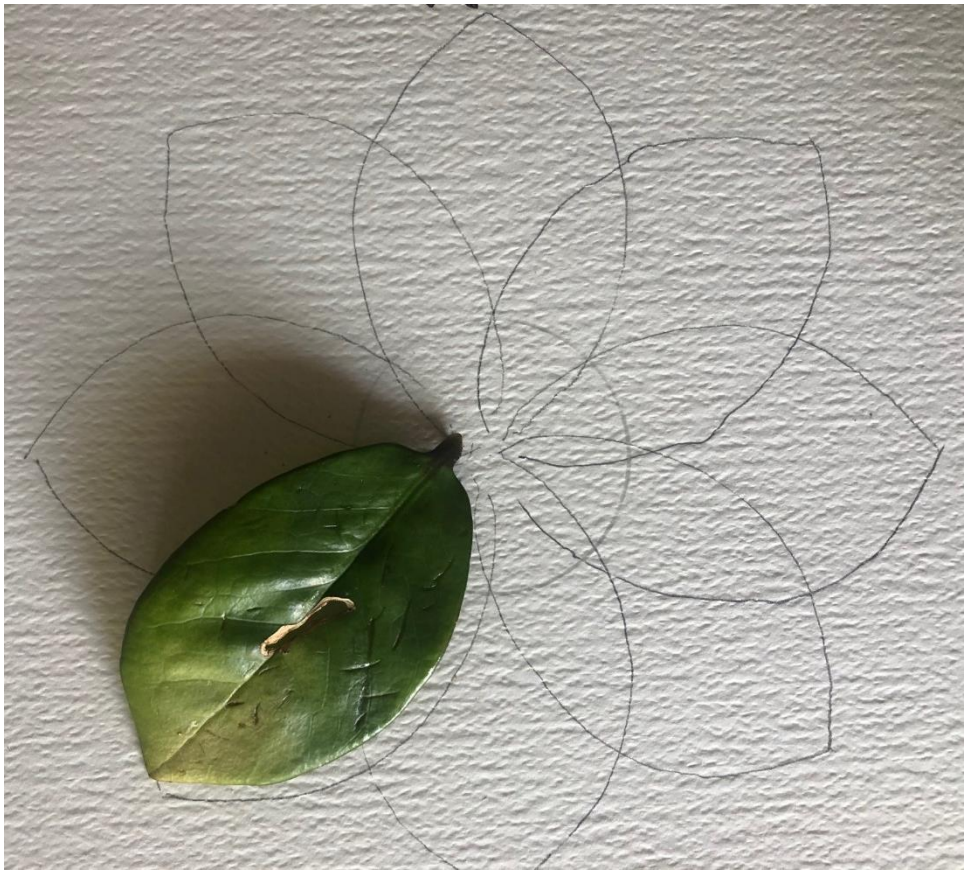
- **Compare** the objects (or photos) side by side in your “field notes”. Do they use similar patterns?

- **Create** your own pattern using nature using a piece of paper, pencil and one or more of your examples.

    - Draw a circle on your sheet of paper.

    - Put a dot at the center of the circle.

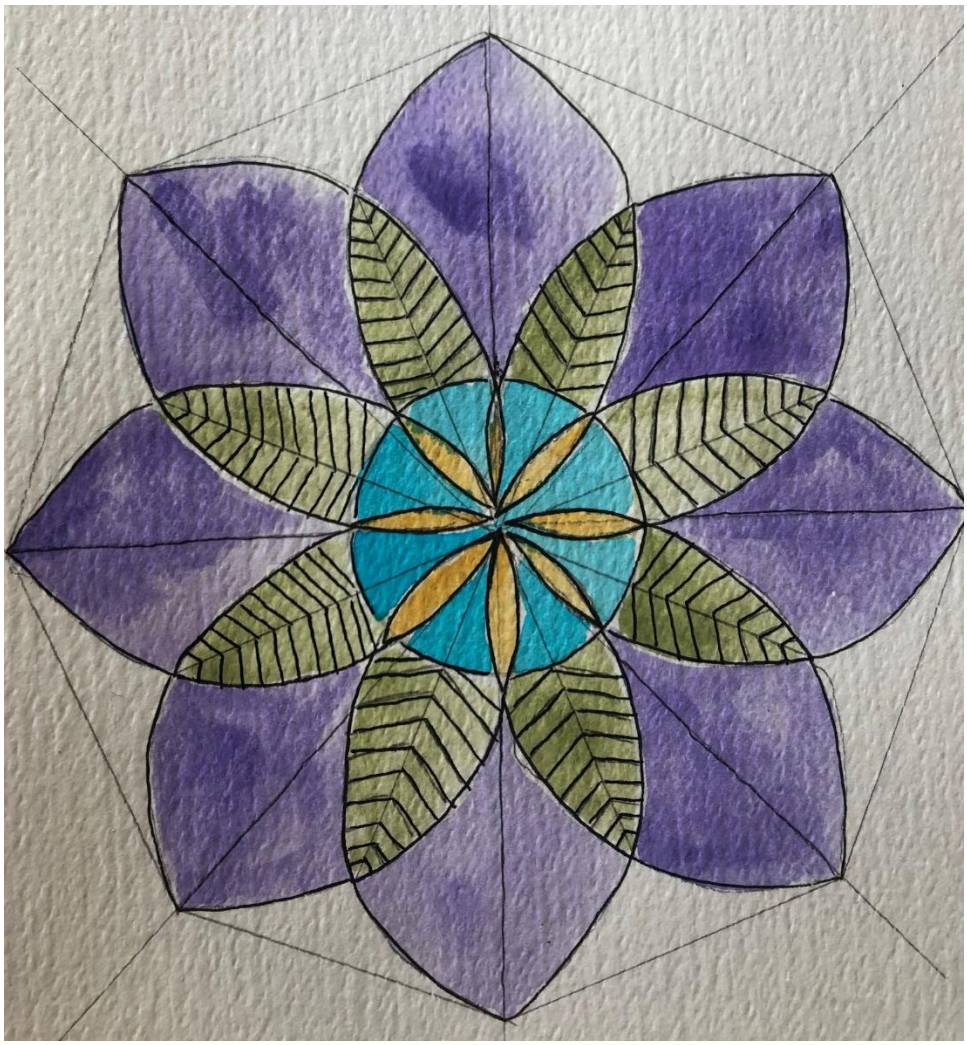
    - Use one of the specimens you have collected (such as a flower petal, leaf, etc.) to trace, aligning the bottom of your sample with the **center point**.



    - Continue rotating your sample until you have completed a full circle. **Overlapping** the shape works best. Think about what you know about symmetry to create a balanced pattern.

- Identify the new shapes that have emerged from overlapping the sample.

- Once your pattern is complete, make the similar shapes match with color, lines or texture. Get creative!



- Share your artwork with Sky Harbor for an opportunity to be featured on social media!

  Email an image to airport.museum@phoenix.gov or hashtag #SkyHarborArts

This is 1 of 3 online Art and Science Lessons made possible by the Phoenix Airport Museum at Phoenix Sky Harbor International Airport.