The Art & Science of Observation

Teacher Packet
Program Overview

*The Art and Science of Observation Program* demonstrates how the power of observation becomes a tool for understanding. Students will examine numerous plants found in a desert or sub-tropical environment. They will discover secrets about the climate in those regions revealed through the plants’ adaptations.

Likewise, sculptures have stories to tell—about the artist, the site or location, the patron or the creative process. Students will learn why some artists prefer one material over another.

Both artists and scientists are careful observers. We hope to help your students develop this important and useful skill.

Curriculum Standards and Benchmarks:

This tour program will give your students an adventure during which they will experience a variety of biomes, observe unique plants and study intriguing sculptures. The tour will utilize careful observation, detailed description, hands-on activities and simple sketching exercises. Curriculum connections include:

**ART**

Strand III– Analyzing in Context
2. Identify various purposes for creating works of visual art.

3. Understand there are different responses to specific artworks.

Strand V– Connecting to Other Arts, Other Disciplines, and Life
1. Explain how visual arts have an inherent relationship to everyday life.

**SCIENCE**

Strand II - Reflecting on Scientific Knowledge
4. Develop an awareness of and sensitivity to the natural world.

Strand III - Ecosystems
2. Describe the basic requirements for all living things to maintain their existence.
Classroom Activities

Picturing Plants: the Power of Observation

Objective: to demonstrate the power of careful observation

Materials needed: a collection of pine cones, drawing paper, pencils, colored pencils or markers

1. Ask students to fold a piece of drawing paper in half. On one half of the paper, direct the students to create a large drawing of a pine cone from memory. Beneath the drawing, instruct them to describe their imagined pine cone (small, brown, oval-shaped, etc.).

2. Explain to students that scientists and artists both are careful observers. They often sketch objects they see as well as record their thoughts and ideas. Students should select a pine cone from the class collection—and like a scientist or artist—study it closely.

3. On the unused half of their paper, students should create as precise a drawing of their chosen cone as possible. It may be drawn from the top, bottom or the side.

4. Special attention should be paid to such details as color variations, overlapping scale pattern, signs of damage, and other unusual features. Beneath the drawing, ask them to describe their observed cone (brittle, rough, colorful, thin, rounded, etc.).

5. Discuss how the two drawings compare. How did careful observation change the students’ idea of a pine cone?
Classroom Activities

Sitting Pretty: Realistic versus Abstract Art

Objective: to illustrate two categories of art

Materials needed: drawing paper, pencils, colored pencils or markers, teacher’s chair, clothesline and clothespins.

1. Students will make two drawings to illustrate two main categories of art: realistic and abstract.

2. Ask the students to make a drawing of the teacher’s chair; emphasis should be on the exact representation of detail. Special attention should be paid to relative size, shape, proportion, color and pattern. Label this drawing REALISTIC.

3. For the second drawing, the students should distort their original drawing in some way. For example, students may want to make chair the more throne-like to emphasize authority; or add more wheels or feet to show how very busy the teacher is; or change the coloring to reflect the personality of the teacher. The drawing should be recognizable as a chair, or part of a chair, but should not be a precise rendering. Label this drawing ABSTRACT.

4. Display all the realistic drawings together and all the abstract drawings together on a classroom clothesline art gallery. Have the students vote for their favorite drawing. Does the class as a whole prefer realistic art or abstract art?
Classroom Activities

Descriptive Sculpture: What’s in a Name

Objective: to demonstrate how titles can influence our interpretation of art

Materials needed: image of Hagar (included), tape, chalk, paper, pencils

1. Ask students to study carefully the enclosed image of Hagar but without mentioning its title. Tape the image to the board and ask the students to brainstorm what they think the work represents. Write their responses below the image.

2. Ask the students to suggest a title for the work.

3. Reveal the actual title. Read the story of Hagar from the Bible (Genesis 16:3).

4. Now ask the students again what they associate with the sculpture. Have their responses changed?
Classroom Activities

Amazing Adaptations

Objective: to illustrate that both plants and animals adapt to their environments

Materials needed: vocabulary list, research capabilities, paper and pencils

Discussion points:
1. Define a biome (see Vocabulary List). Describe a biome: desert, tropical rainforest, (include others, if you wish); these two will be featured on the tour.
   a. Discuss that each biome has unique plants and animals inhabitants. Name an animal that lives in the desert. Name a plant that lives in the desert.
   b. The reason many of the plants and animals are unique to a particular region is that each has adapted to live within a specific biome. For example, the reason polar bears are not found in the desert is that they have adapted to the arctic tundra biome where temperatures are very cold. They could not live in the desert.
2. While the adaptations that animals make to their environment may be more familiar to us, plants have similar survival strategies.
3. In a desert biome, plants and animals must devise strategies to conserve water and to protect themselves from being eaten. Many desert plants have strategies similar to their animal counterpart.
4. Research the following desert animals: armadillo, bat, javelina and meerkat, then match the animal with its adaptation on the chart.
5. Research the following desert plants: saguaro cactus, night blooming cereus, giant carrion flower and lithops (living stones), then match the plant with its adaptation on the chart below. (Answer sheet follows.)

<table>
<thead>
<tr>
<th>Desert Animal</th>
<th>Animal Adaptation</th>
<th>Desert Plant</th>
<th>Plant Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emits a strong scent to discourage predators</td>
<td></td>
<td>Emits a strong scent to attract specific pollinators</td>
</tr>
<tr>
<td></td>
<td>Nocturnal – is active at night when the temperature is cooler</td>
<td></td>
<td>Flowers bloom at night to attract nocturnal pollinators</td>
</tr>
<tr>
<td></td>
<td>Digs underground tunnels for protection</td>
<td></td>
<td>Largest portion of plant is found underground.</td>
</tr>
<tr>
<td></td>
<td>Protective body covering</td>
<td></td>
<td>Spines – protection against predators</td>
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**Amazing Adaptations: Answer Sheet**

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<tbody>
<tr>
<td>Javelina</td>
<td>Emits a strong scent to discourage predators</td>
<td>Carrion flower</td>
<td>Emits a strong scent to attract specific pollinators</td>
</tr>
<tr>
<td>Bat</td>
<td>Nocturnal – is active at night when the temperature is cooler</td>
<td>Night blooming cereus</td>
<td>Flowers bloom at night to attract nocturnal pollinators</td>
</tr>
<tr>
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SCIENCE TERMS

Adaptation- A modification of an organism or its parts that makes it more fit for existence under the conditions of its environment.

Biome- A large community of living organisms of a single ecological region. Climate and rainfall determine the biome. Living things adapt to the conditions of a particular biome. Deserts, temperate forests, and tropical rainforests are biomes.

Desert- A land community having less than ten inches of rainfall each year. Deserts often have hot days and cold nights and scattered vegetation.

Temperate Forest- A land community having definite seasons. Michigan lies within the Temperate Deciduous Forest.

Tropical Rainforest- A land community having much rainfall and warm temperatures; usually located near the equator.

Ecosystem- A place where living and non-living things interact.

Parts of a Plant:
  Fruit- holds the seeds of the plant.
  Leaf- creates food for the plant.
  Roots- hold the plant in the soil and absorb water and minerals.
  Stem- supports leaves and transports water and food.
  Flower – contains the reproductive parts of the plant.
Casting- The process of making sculpture by pouring a liquid material into a mold.

Categories of art
Realistic- a recognizable and true-to-life representation of subject matter
Abstract- subject matter has been simplified or changed but is still recognizable

Maquette- A small model made by a sculptor as a preparation for a larger finished work.

Medium- A material or technique with which an artist works. Some types are bronze, marble, clay, plaster, paint, charcoal, pastel, etc.

Methods of creating sculpture
Additive- a method of sculpting in which the artist builds up a three-dimensional form by continually adding clay or another soft material (often cast in metal for durability).

Subtractive- a method of creating sculpture by carving or chiseling.

Fabrication- construction of sculpture by joining multiple parts together.

Assemblage- a form of fabrication in which non-traditional materials are assembled into 3-dimensional structures.

Modeling- Making a sculpture using a soft, flexible substance such as clay or wax.

Sculpture- Three-dimensional forms or figures. Freestanding and relief are two types of sculpture.

Freestanding –sculpture that can be walked around.

Relief–sculpture which is created from a flat background, like a decoration on a building.

Sketch-Preliminary drawing created before a final composition to help the artist think through ideas.

Symbol-An image or idea representing something else.