Rock Art

Subject Area: Humanities

Core Curriculum Content Standards: 1.3.5.D.1, 1.3.5.D.5, 1.2.8.A.3, 1.3.12.D.2,
Next Generation Science Standards: 4-ESS2-1, MS-ESS2-2, 5-ESS3-1, 5-PS1-3

Session Description:
The Northern Highlands region in New Jersey possesses a rugged, mountainous landscape which includes many different types of rocks, which includes a combination of sedimentary, metamorphic, and igneous rock. These rocks are unique in that they are each formed over many years through different processes and minerals. For thousands of years, humans have expressed themselves using rocks in many forms of artwork. Rock art has been used to depict aspects of culture, as well as for aesthetic pleasure for thousands of years. Today’s artists use rock to create pictures or structures in a way that does no harm to nature, with the purpose that all can continue enjoy art in its most natural form. This lesson will take the students on a journey of self-expression, as they design a sculpture garden together while learning about New Jersey geology.

Objectives:
• Gain an understanding of New Jersey geology by learning the history behind common rocks found in the area.
• Learn the three types of rocks that are found in Northern New Jersey (sedimentary, metamorphic, and igneous) and understand the differences between each type.
• Learn how rocks have been used in various cultural and artistic expressions
• Become familiar with the art movement known as Land Art,
• Learn the styles of contemporary artist, Andy Goldsworthy, who specialize in Land Art.
• Try two different types if rock art: painting and sculpture. Individual students will first create a 2-D picture using self-made paint from rock. The group will then collaborate to create an original body of artwork along the trails.

Materials List:
• 10-12 dixie cups
• 10-12 small paintbrushes
• White drawing paper
• 2 bottles of white acrylic paint
• Samples of sedimentary, metamorphic, and igneous rocks
• Plastic magnifying glasses
• Small pieces of soft rock
• Book of artwork by Andy Goldsworthy (flagged pages for reference)
• Pictures of cave paintings at Chauvet’s Cave
• Geographic map of New Jersey
• A camera

**Procedure:**

1) Welcome the group to the site. Give a brief description of the New Jersey School of Conservation and introduce the topic. Ask the students how they would define art. Can they give examples? Explain to the students that they will be artists using one of New Jersey’s most abundant resources, rocks, to create a one-of-a-kind work of art.

2) Ask if they know what a rock is. Have they seen one before? Ask for them to give a description of what a rock is made of. Build on their answers. A rock is a natural occurring solid aggregate of one or more minerals. What is a mineral? A mineral is a substance that is naturally occurring in nature. Minerals are considered pure substances. Explain that an easy way to understand what a mineral is to envision what it takes to make a chocolate chip cookie. Chocolate, sugar, eggs, butter, and flour are all pure substances that when together, make a rock (cookie), and those minerals can never be separated from the cookie.

3) Explain to the students why this area is perfect for rock art. Show the students the geographical map of New Jersey, and discuss the Highlands region:
   a. This region is right along the edge of the Appalachian Mountains
   b. The area is characterized by mountainous terrain, dense forests, lakes, and streams
      i. **Fun Fact:** Highest point of the Highlands (as well as New Jersey) is in High Point State Park in Sussex County which is 1,803 feet above sea level.
   c. Healthy habitat for amazing NJ wildlife such as Black Bears, bobcats, Wood Turtles etc.
   d. It is also the oldest part of New Jersey, in part, due to the ancient rocks that make up this area.

4) Explain that as we explore the trails, we’ll be noticing that there appear to be many rocks scattered along the trails and land. This not random, it’s how the land is. Most of the rocks in New Jersey, as well as the Eastern United States, formed in the Precambrian Era. This means that the oldest rocks were formed around 1 billion years ago, and the youngest rocks were formed around 960 million years ago. Three types of rocks were formed during this period and all can be found in New Jersey. Each is composed of specific minerals. Certain types of each rock can be found in the New Jersey Highlands. Pass around an example of each type of rock for the students to observe as you mention them.
   a. **Sedimentary:** formed by gravel, sand, and silt by water erosion or deposition. What is erosion? Erosion is the process by which the surface of the Earth’s worn away by the action of water, glaciers, wind, waves etc.
      i. Can be referred to as “water rocks”
      ii. The youngest rocks, since they are found on Earth’s crust and have not been trapped underground as many years as other rocks
      iii. Purple Conglomerate, or Puddingstone, is a common sedimentary stone found in New Jersey
   b. **Metamorphic:** formed through heat and pressure beneath the Earth’s crust.
i. Can be referred to as “pressure rocks”
ii. Makes up most of the bedrock of New Jersey’s Highlands terrain
   1. This is the rock you see most along the trails, boulder-like and numerous. These rocks have been shaped by erosion, particularly glaciers. A glacier is an extended mass of ice formed by snow falling accumulating over the years and moving very slowly. The last glacier to pass through New Jersey was the Wisconsin glacier over 10,000 years ago.
iii. Most commonly seen metamorphic rock is gneiss (pronounced “nice”)
iv. Composed of metamorphosized sedimentary rock
v. Can be identified by the appearance of layering, or foliation, of different minerals within the rock

c. Igneous: an extremely hard rock formed and crystallized from magma.
   i. Granite is the most common igneous rock found in the Highlands (makes up 50%)
   ii. Composed of common minerals like quartz (show example)
   iii. They are the oldest rocks found, formed in the beginning of the Precambrian Era, about 1 billion years old.

5) At this point, remind the students that an understanding of the rocks around us can be useful to us as artists. Ask the students what kinds of art they have heard of, or are familiar with. Ask them what materials or skills might be needed for certain kinds of art? Painting? Sculpting? Knowing what resources you have can inspire you to create any form of art that has meaning to you. Art exists in many forms and can be used for different purposes. Ask the students if any famous pieces of art come to mind?

6) Rock Art has been seen throughout history. Can you think of any well-known works of art in which rocks have been the primary material? Take some of their answers and build on them. Introduce four main historical rock art examples:
   a. Sculpture: Many statues in Greek and Roman history have been carved from marble, a non-foliated, metamorphic rock
   b. Ice Age Paleolithic cave paintings: The earliest form of rock art, even human art was found in Southern France in 1994. They were cave paintings made by early man, as early as 33,000 years ago. The cave is called Chauvet cave, after Jean-Marie Chauvet who first discovered it, along with a group of scientists. The paintings are the earliest example of how humans were capable of an artistic culture.
   c. Painting: Much of modern painting, whether it is craft or professional, uses synthetic paints, which are chemically made. For example, any paints you use in school or buy at a craft store are probably chemically made, unless specified otherwise. Historically, artists used the rich colors of plant pigments, foods, oils, and even rocks as the dye. The binder for these homemade paints was eggs. Today we will be using an acrylic binder, and rock will be your dye.
   d. Land Art: Some modern artists have had successful careers in rock and land art, where structures are created purely out of natural materials, including rocks, for the enjoyment of others. What’s unique about this form of art work is that the artist is always conscious of the natural surroundings, and makes sure that the art work does has little to no impact on the environment.
i. The idea of Land Art began in the 1960s, and was an artistic movement in which artists sought to grow public awareness about the environment, by using resources found in nature. These resources could be rocks, trees, leaves, soil, or even natural settings such as islands and volcanoes. Since the environment is the canvass, the art can be very small or extremely large (even seen from high in the sky).

ii. One such artist who became very popular within the movement is British Land Artist Andy Goldsworthy. A resident of Great Britain, Andy Goldsworthy is considered an artist and environmentalist, whose works are meant for other to be enjoyed in nature, and his creations are only made using natural resources including thorns, flowers petals, and ice. One of his most important beliefs about his art is that when he is finished, it is to be left in nature, for nature to change it, as it changes everything. His works are known for having minimal impact on the Earth, unlike other land artists whose works require changing the landscape, moving trees etc.

iii. One of his famous works exists not too far away in upstate New York at the Storm King Art Center in Windsor, NY. It is a 2,278 foot stone wall that snakes through trees and appears to cross a pond, before ending at the park’s edge at the NYS Thruway.

7) Tell the students that will be experimenting with the last two art methods. They will first create a simple painting using homemade rock paint. Distribute the art paper, dixie cups, and brushes. Place a tray of rocks on each table and instruct the students to grind the rocks together until the grains cover the bottom of the cup. When they finish, pass around the acrylic paint, have them mix, and give them several minutes to paint. When they are finished, have them paint their names on their papers, and leave them on the tables. They will come retrieve them at the end of the lesson.

8) Bring the group outside. Preface the activity by giving a brief explanation of how to behave on the trails and how to respect everything around them. WHAT THEY WILL BE DOING IS A PRIVILEDGE that groups who are ill-behaved do not get to do.

9) As you walk along the trails, point out examples of each of the different types of rocks that were discussed. When appropriate, ask the students to locate the different types of rock. What type of rock makes up the bedrock of the Highlands? Can they find puddingstone on the trail? What mineral makes granite look like its sparkling in the sunlight?

10) When you come to the designated spot, explain that now they will be given the opportunity to try their hand at sculpture art using the rocks in the area. Have some pictures of various works by Andy Goldsworthy to provide different examples. Outline the area in which they will be allowed to work. Give them about 30 minutes, explaining that you will not be giving them any instruction on what or how to create. Divide the students in half, or by thirds, depending on the size of the class. Step back and watch the magic.

11) After the students have finished, have them look at their art work. Poll their thoughts on their project. What was the inspiration for their creation? How does their work make them feel? What it difficult to work with such a large canvass? Do they feel that more can be done to improve it?
Wrap of the activity by stating that their artwork will stay in nature as it’s supposed to. They are welcome to visit their art anytime they like. However, since it is a part of nature, do they think it will change over time? What might happen to the rocks? What will happen is what happens to all rocks over time; they will erode, water might move the soil and cause the art to move or tumble. How does this make them feel? Conclude the activity by taking a picture of the class in their sculpture garden. Head back to the classroom and have the students collect their rock paintings. Email the picture to the teacher.

WRAP UP:

1) Have the students do a “Think,Pair,Share” to the following questions:
   a. What activity/creation was your favorite and why?
   b. How did creating the painting and sculpture garden make you feel as artists?
   c. What was the most interesting fact about New Jersey geology that you learned today?

RAINY DAY OPTION:
Students will gain a deeper understanding of New Jersey geology by studying mineral hardness using Mohs’ Hardness/Streak Test.

1) The class will be divided into two groups; each will receive a test kit, with 9 mineral samples, black construction paper, and a streak plate for the group. Briefly explain the importance of Mohs’ Hardness/Streak Test in identifying minerals. Instruct the students to each take a mineral.

2) Explain that they will be attempting to figure out the hardness of each mineral as a group. Each student should take a few seconds scratching their mineral on the streak plate, over their black construction paper. They should then observe each of their results, and use them to order the stones from softest to hardest. Give them 10-15 minutes to work.

3) When the students have their results, reveal the answers and discuss their meanings. This activity will be completed before the students mix their rock paint and create their pictures. Students should understand that different minerals have different hardness, and therefore, only certain types of rocks and minerals can be ground for paint.

BACKGROUND INFORMATION:
http://www.minsocam.org/MSA/collection_corner/article/mohs.htm
BIBLIOGRAPHY:


http://stirlinghillminingmuseum.org/education/Highlands_VFT_S_Final.pdf