Rock Me: An Instructional Unit to Accompany Antarctic Rock Boxes from the Polar Rock Repository

Jason Cervenec, Byrd Polar and Climate Research Center, cervenec.1@osu.edu

Background

These instructional materials are designed for use in an Earth science course with middle school students in mind, but they can be adapted for younger or older audiences. All of the samples needed to complete the activities are included in an Antarctic Rock Box that can be requested online at http://research.bpcrc.osu.edu/rr/rock_box/.

Throughout this unit, there are many opportunities for students to write. We encourage students to keep a journal in which they can write, draw, and paste information. Depending on the nature of the class and age of students, the format of this journal can be open ended or more structured. This unit has been designed to promote investigation and understanding the process of science as much as delivering content knowledge.

Instructional Goals

- Rocks are important for understanding the Earth's past.
- Rocks are located beneath the soil and are a major component of the soil.
- Rocks provide clues about the conditions under which they were formed and existed.
- Processes on the Earth continue to reform a fixed amount of material from one type of rock to a different type of rock.
- Scientists organize rocks into categories, by how they were formed, to make them easier to study. These categories are igneous, sedimentary, and metamorphic.
- Heat and pressure can completely melt a rock to form magma or "bake" it to cause metamorphism.
- When magma cools, it solidifies (freezes) to form rock. The speed at which magma cools determines the type of rock that forms. The composition of minerals in the cooling magma determines the type of rock that forms.
- Different amounts of heat and pressure result in different degrees of metamorphism.
- Rock can weather into small or large pieces due to wind, water, or freezing, be moved by wind or water, and be deposited in low places.
- Rock that is weathered and deposited can be naturally cemented together once it is buried.
- Rocks can contain the remains of plant and animal parts.
- Rocks and materials produced from them are used daily for useful pursuits in society.

Beyond the Scope of This Unit

This unit does not attempt to discuss stratigraphy, plate tectonics, or the details of geologic processes such as erosion or volcanism. These are topics to be investigated in further detail in subsequent units.

Sequence

Investigation 1: What is a rock? What can we learn from it?

Investigation 2: Classify Various Rocks by Matching Samples with Their Corresponding Descriptions

Investigation 3: Sort the Rocks into “Useful Categories of Organization”

Investigation 4: Another Type of Sedimentary and Metamorphic Rocks

Activity 0: Rock Cycle Game

Activity 1: Concept Map the Rock Cycle

Activity 2: Identification of Processes

Activity 3: Background Reading, Electronic Media & Board Games (optional)

Activity 4: Crayon Analogy

Activity 5: Investigation of Antarctic Samples (optional: Making a Museum Display)

Challenge: Rock Sleuth

Fossil Fun (optional)

Field Experience (optional)