

# Dirt, Rocks & Worms



Audubon Center  
of the North Woods

**Purpose:** Students will learn about the layers of the earth, the three types of rocks (igneous, sedimentary, and metamorphic), how the rocks form, and how they are all related through the rock cycle; soil formation and why soil is important to us; and the impact worms and humans have on our soil.

## Concepts:

- All rocks are made of minerals
- Igneous rocks form from volcanic activity, sedimentary rocks form from the eroded pieces (sediments) of other rocks, and metamorphic rocks are formed when existing rocks are subjected to heat and pressure.
- A rock's life is never ending: it is always changing from one type to another via the rock cycle.
- Soil is formed from both organic and inorganic materials, and can take many years to form.
- Worms break down organic material to speed up the soil formation process and help aerate the soil so plants have room to grow; though all Minnesota worms are invasive, and can do more harm than good.
- Human agriculture and land-clearing practices lead to major soil erosion

## Learning Outcomes:

Students will be able to:

- Students will understand the rock cycle and restate how rocks are formed
- Students will be able to name, analyze and describe the layers of a soil horizon
- Students will recognize why soil is important
- Students will be able to differentiate between the advantages and disadvantages of worms
- Students will understand the impact humans have on our soil

## Minnesota Academic Standards:

### Science:

- 4.3.1.3.1 Recognize that rocks may be uniform or made of mixtures of different minerals.
- 5.3.1.2.2 Explain how slow processes, such as water erosion, and rapid processes, such as landslides and volcanic eruptions, form features of the Earth's surface.
- 8.3.1.2.2 Explain the role of weathering, erosion and glacial activity in shaping Minnesota's current landscape.
- 8.3.1.3.3 Relate rock composition and texture to physical conditions at the time of formation of igneous, sedimentary and metamorphic rock.

**REVISOR:** JEFF TYSON 2011

**CLASS LENGTH:** 1 ½ HR – 3 HR

**AGES:** GRADES 4<sup>TH</sup> – 8<sup>TH</sup>

**SEASON:** F, SP, S

**GROUP SIZE:** 10-15

**SAFETY:** Students will be engaged in outdoor activities including walking on uneven terrain, and standing around slow moving creeks and lakes. Physical challenges include hiking about 1 total mile each class.

### MATERIALS:

Rock hammers, goggles, Earth Layer/Rock Cycle visual, Lots and lots of rocks (place on tables for each student), microscopes, rope, A chunk of dry clay, Sediment jars (settled), M & Ms or goldfish crackers, enough for everyone to have two), Mineral cards, Baking soda rock and vinegar acid rain, colored clay, Worm collection jar, Soil recipe, container and ingredients, Shovel, Worm identification sheets, worm ID books, ground mustard, large water jugs, wooden square frames, rubbing alcohol

**PRE-CLASS PREP:** Layout all types of rocks around tables setup in International Classroom, setup 2 sand, 2 silt, 2 clay stations with microscopes. There is a lot to this class, so spend at least 20 minutes setting up and getting organized.

### CLASS OUTLINE:

- I. Pre-lesson preparation (15 min)
- II. Introduction (15 min)
- III. Rock Formation and Cycle (1:30 min)
  - A. Earth Layers and Rock Cycle
  - B. Igneous Rocks
  - C. Mineral Game
  - D. Weathering
  - E. Review
  - F. Sedimentary Rocks
  - G. Metamorphic Rocks
- IV. Soil Hike (45 min)
  - A. Dirt vs. Soil
  - B. Soil Recipe
  - C. Soil Horizon
- V. The Wacky World of Worms (40 min)
  - A. Creepy Crawlers
  - B. The Search is On
  - C. You're SOO immature
- VI. Conclusion (5 min)