GEOLOGY
LESSON PLAN

WOLF RIDGE℠
ENVIRONMENTAL LEARNING CENTER

GEOLOGY

CLASS DESCRIPTION: An Earth Science Class

Students will investigate how local and regional landscapes are affected by properties of underlying bedrock. During the first part of class, they search for and examine local rocks and minerals, determine their properties using geologic tools, and learn the common rocks of the north shore. The geological history of Minnesota is told through the lens of plate tectonics, the rock cycle, rock specimens in our geology museum, and features on geologic maps. During a hike to Marshall Mountain, the class compares the patterns seen in the landscaper to a map of local bedrock types as they discover the geologic history of the north shore and Lake Superior.

Total time: 3 hours (two hours outdoors)
Audience: 6-20 students, 4th grade through adult
Activity level: strenuous
Travel: 1 1/4 mile
Total uphill travel: 320 feet

GUIDING QUESTION

How do rocks influence landscapes?

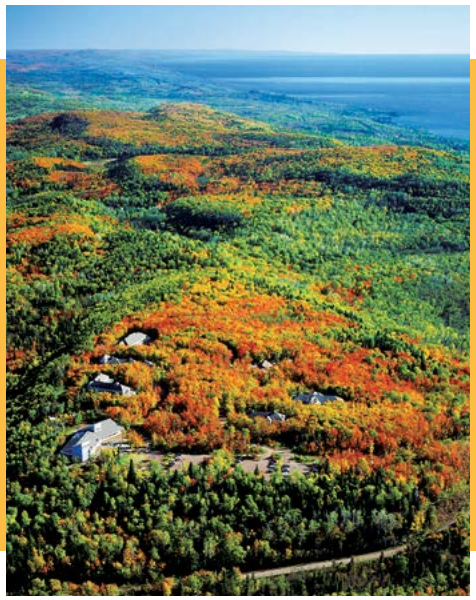
CONCEPTS

1. Noticing patterns helps us organize our thoughts and ask scientific questions about why and how patterns occur.
2. Rocks are earth materials that vary in composition and change over time.
3. The properties and characteristics of rocks give us clues about the materials they are made of and the conditions under which they were formed.
4. The composition, shapes, and relationship of landforms to surrounding rock give us clues about how they were formed.

OUTCOMES

Upon completion of Geology class students will be able to:

1. Describe properties of a rock using geologic terms.
2. Interpret how rock can change between igneous, metamorphic, and sedimentary.
3. Identify the common rocks found around Wolf Ridge and along the north shore of Lake Superior.
4. Interpret the roles of the Midcontinental Rift and glacial activity in creating the landscapes surrounding Wolf Ridge.



GEOLOGY

Revised July 2019

Equipment

Outdoor Rockhounding

(In lab table drawer)

- 1 hand lens per student
- 8 rock testing kits
- laminated "Rocks of the North Shore" grid
- 2 foam blocks

Classroom

- volcano, sand bin, cooking kettle, unlabled MN rock samples, MN Ig/sed/met map, rock cycle poster, plate tectonics poster
- top 10 rock + greenstone samples, rock info cards, MN top 10 map

Geology Museum Stations

(most supplies are in lab table back drawers)

- North Shore/MN Rocks, MN history poster, local bedrock poster
- Property experiments • Glacier model, rock products
- Geologic time, fossils, time poster (in front cabinets)
- 3-D map/photos, glasses

Hike - Instructor Backpack

- *Everybody Needs a Rock*
- cookies from SC2 fridge
- 2 foam blocks
- 11x17 WR bedrock map
- dry-erase marker
- extra magnet bars
- extra flashlites

Hike - Students Carry

- 10-20 laminated bedrock maps
- hand lenses (one/student)
- pencils

Appendices

- Glossary
- Additional Information
  1. Make up of the Earth
  2. Rock Classification & Rock Cycle
  3. Common Rocks of the Area
  4. Weathering and Erosion
  5. Plate Tectonics in MN
  6. Principles of Geology
  7. Iron Formation, MN Mining

Set-up (30 min.)

- Classroom/class prep description
- Safety Management

I. What can we notice about rocks? (30 min.)

A. Find Your Pocket Rock
B. Rock and Mineral Properties Lab
C. Rocks of Wolf Ridge

II. How do rocks and landscapes change over time? (15 min.)

A. Rock Building: Igneous, Sedimentary, and Metamorphic
B. Landscape Changes: Plate Tectonics & Faulting

III. What stories can we discover in MN rocks & landscapes? (15 min.)

A. Rocks of Minnesota
B. Interpreting 3-D Maps & Geology Museum

IV. What stories can we discover in Wolf Ridge's landscapes? (120 min.)

A. Stop 1 - Map Introduction and Gravel
B. Stop 2 - Exposed Bedrock
C. Stop 3 - Bedrock Change and Fault Example
D. Stop 4 - Weathering
E. Stop 5 - Differential Erosion
F. Stop 6 - View from Marshall Mt.
G Stop 7 - Geologic Timeline
H. Stop 8 - Glacial Striations Interpret Sawmill Creek Landscape
I. Stop 9 - Interpret Sawmill Creek Landscape

V. What will you explore next? (5 min)

Clean-up (15 min.)

- Optional Activities
  1. Geology Twister
  2. Speed Geology
  3. Everyone Needs a Rock Story
  4. Geology Timeline with Cards
  5. "Hibbing Grab Bag"
  6. Rock-o (bingo)
  7. Bedrock or Boulder
- References
- Sources
- Spiral Learning Sheet
- Planning Outline