



Science Unit: *Fossils and the Changing Earth*
Lesson 2: *Intro to Rocks and Minerals*

School Year: 2016/2017
Developed for: Sir Sandford Fleming, Vancouver School District
Developed by: Kathryn Gregory Wodzicki (scientist); Gale Nyden and Monica Treanor (teachers)
Grade level: Presented to grade 6-7; appropriate for grades 4 - 7 with age appropriate modifications
Duration of lesson: 1 hour
Notes: This lesson requires a rock and mineral collection for students to examine; see endnotes for suggestions how to put such a collection together

Objectives for students:

1. To learn about crystals, minerals, and rocks through hands-on exploration.
2. To learn the basics of rock classification and identification by observing and describing different rocks
3. To practice rock identification by sorting a collection of local rocks into four categories: igneous rocks, metamorphic rocks, sedimentary rocks, and human-made objects.

Materials:

- Rock and Mineral collection, organized into 6 stations: 1. Minerals, 2. Rocks, 3. Crystals vs. Grains, 4. Igneous Rocks, 5. Sedimentary Rocks., 6. Metamorphic Rocks
- [Explanatory text](#) and [photos](#) for rock collection
- Samples of local rocks for students to identify; beach pebbles are ideal (it is fun to include some pieces of brick, concrete, sea glass, and asphalt if available).
- Handouts: [Rock observation chart](#), [Rock sorting chart](#),
- [A Field Guide to the Identification of Pebbles](#)



In the Classroom

Optional pre-Exercise Activity

- Split students into groups of 2-3.
- Have them take 5-10 beach pebbles.
- Tell them to split the beach pebbles into 2-4 groups. Let each group decide on which characteristic(s) they will classify their rocks.
- When finished, have the groups look at another groups' classification system. What characteristic did they use to split their rock collection?

Observation Exercise: Free Exploration of Rock and Mineral Collection

- Set out the rock and mineral collection, along with the explanatory text and photos
- Give students 10 minutes to look over the collection



SCIENTIST IN RESIDENCE PROGRAM

Explanation: Rocks and Minerals

- Show students the [slide show](#) and explain: what are minerals? What are rocks? How do they form? Why are they useful?
- Explain that how a rock looks (its texture and other properties) can give clues into how that rock formed.
- Give each student a rock observation chart, and explain the activity (directed observation on rocks). Tell the students that the goal is to make observations on the different rock types that will help them to be able to identify the rocks in the sorting challenge.
- Take one rock that you have a lot of samples of (granite is a good rock to use), and go through the description together, so students understand what types of observations will be helpful.

Science Activity: Directed Observations on Rock Collection

- Split the class into 3 groups. One group gets the Sedimentary Rock tray, one the Igneous Rock Tray, and one the Metamorphic rock tray.
- Give students 10 minutes to examine rocks in that tray and describe them, and then rotate trays.

Science Activity: Challenge: Sorting Mystery Rocks

- Split students into groups of 2-3
- Give each group a sorting chart
- Tell each group to take 5-10 rocks from the beach pebble collection, and sort them into igneous rocks, metamorphic rocks, sedimentary rocks, and human-made objects
- When they are done, show their sorting to another group. Does that group agree with their classification?
- Have each group check their sorting with you

Wrap-up discussion

- What characteristics are useful for identifying rocks?
- What types of rocks have fossils?

Vocabulary:

Rock	Solid made up of one or more minerals.
Mineral	A non-living, solid material; the building blocks of rocks
Crystal	A solid with a highly organized microscopic structure; often has a shape with flat surfaces
Grain	A small particle of rock
Igneous	Rock formed from cooled molten rock
Metamorphic	Rock that has undergone changes due to heat or pressure
Sedimentary	Rocks that form from pieces of pre-existing rocks or from organisms at the earth's surface

Extensions

1. For more practice identifying and classifying, have students do a mineral identification exercise
2. Learn more about crystals by making borax snowflakes
3. Explore how cooling rate determines crystal size in igneous rocks - by making fudge.



How to Obtain a Classroom Set of Mineral and Rock Specimens

- Gravel and stone yards. Gravel and stone yards typically carry basalt, granite, limestone, and river rocks, which often have pebbles of different types of metamorphic rocks. For a small donation, you can fill a large ziploc with samples.
- Stone/Tile/Countertop suppliers. Stone/Tile and or Countertop suppliers typically carry beautiful polished granite and marble, along with more exotic igneous and metamorphic rocks. Ask if they have any broken pieces, or you may be able to buy samples for a small fee.
- Rock and Mineral shops. Rock and mineral shops will be happy to help you put together a class collection of rocks and minerals, and the samples will likely be bigger and more interesting - and more representative of local geology - than collections available online. In the Vancouver area, I recommend Amethyst Creations on 4th avenue.
- Gem and Mineral shows.
- MineralsEd Workshop. Participating in a MineralsEd workshop (<http://www.mineralsed.ca/s/ResourceUnits.asp>) currently includes a kit with four rocks: granite, pumice, conglomerate, and slate, and one mineral (magnetite)
- Online scientific suppliers, such as Boreal, sell mineral and rocks kits

References

1. Gray, Theodore. 2009. *The Elements*. Black Dog & Leventhal.
2. Green, Dan. 2016. *The Rock and Gem Book*. DK/Smithsonian.
3. Van der Flier Keller, Eileen. 2006. *A Field Guide to the Identification of Pebbles*. Harbour Publishing. Online version: <http://www.pdac.ca/pdf-viewer?doc=/docs/default-source/publications---news-activities/060220-pebble-guide.pdf>
4. <<http://www.empr.gov.bc.ca/Mining/Geoscience/EducationalResources/Documents/IC1987-5-idrocks.pdf>> Van der Flier Keller, Eileen, and McMillan, William J. 1987. *The Identification of Common Rocks*. BC Geological Survey. [notes on how to identify common rocks found in BC]
5. <<http://www.rocksandminerals.com/hardness/mohs.htm>>. Rockman. Mohs Hardness Test. [explanation of a simple rock hardness testing method]