



Lesson:
Lunar Geologists: Mining for Moon Rocks

Grade level: 1+

Activity duration: 30 minutes

Objectives:

1. Students will use Moon Rocks Earth Rocks kits to make observations
2. Students will practice careful and thorough “rock” collection techniques
3. Students will use data collected by the Clementine Spacecraft to observe relationships between mineral concentration and topography of the Moon.

Materials:

- Moon Rocks Earth Rocks kits
- NASA Poster: *Our Moon in a New Light*
- Visual: Images from Clementine Spacecraft (enough copies for students to share in pairs)
- Worksheet: Moon Rocks Earth Rocks Research
- Paper plates (1 per student) (provided by teacher)
- Chocolate chip cookies (1 per student) (provided by teacher)
- Toothpicks (1 per student) (provided by teacher)

Context:

This activity can be used after studying the formation of the Moon. Moon rocks provide evidence of the Moon's history.

Lesson Procedure:

1. Introduce activity by asking students how we know so much about the history of the Moon. Show the students one of the Moon Rocks Earth Rocks kits and ask where they think the rocks came from. While these actual rocks came from Earth, they have the same mineral composition as the rocks that astronauts brought back from the Moon in the 1970s.
2. Divide students into pairs or groups of three and pass out the Moon Rocks Earth Rocks kits.

3. While students are observing the rocks ask, “Why are these rocks commonly found on the Earth *and* the Moon?” Refer to Moon formation lesson to guide students to the answer.
4. Ask if students have ever seen rocks that look like these, and where they saw them?
Optional extension to volcanoes on Earth and the Moon.
5. Explain to students that astronauts collecting moon rocks have to be very thorough in their collection in order to get the clearest picture of what the Moon's past was like. Now, they will have the opportunity to carefully and completely excavate a chocolate chip cookie.
6. Pass out plates with a chocolate chip cookie and a tooth pick. Students should not eat their cookie “moon dust” or chocolate chip “moon rocks” until you have approved their excavation site.
7. Ask students why they think it is important for lunar geologists to be careful and complete in their work. If students don't bring up the origin of the Moon, remind them that the reason we know how the Moon formed 4.5 billion years ago is because of the geological samples that astronauts brought back from the Moon.
8. For older students, introduce spectroscopy as a more thorough method of geological data collection that doesn't involve hauling 800 pounds of moon rocks back to Earth. Use NASA Poster: *Our Moon in a New Light* as a visual. Each mineral in these rocks emits a different wavelength that can be detected by a spectrometer.
9. Hand out the images from the Clementine Spacecraft. Explain to students that rocks like Olivine and Ilmenite have high concentrations of Iron and rocks like Anorthosite are low in Iron. Have students find an area on the map where Anorthosite would be found and an area on the map where Olivine or Ilmenite would be found.
10. Ask students if they see any correlations between the Topographic map and the Iron map? Why are these correlations present?
11. *Optional: Have students choose a Moon rock to research. Use Moon Rock Earth Rock Research worksheet or develop your own format.*