



## **Sample Lesson: “Chip Off the Same Rock”**

### **Objective**

Accurately discuss the physical nature of the moon and describe moon composition, the presence of water, various land forms, moon atmosphere, etc.

### **National Standards Met**

NCSS 3—People, Places and Environments  
NSES 2—Physical Science

# Chip Off the Same Rock?

## Objectives

- Students will be able to identify similarities of the rock formations found on Earth and the Moon.
- Students will be able apply knowledge of the rock cycle to lunar rock formation.
- Students will be able determine if evidence support the, "Giant Impact" theory.

## Grade level

7-12

## Subject Areas

Science

Language Arts

## Time Line

6-7 days based on 70 min. class periods

## Background

This lesson may serve as an introduction on lunar geology or an extension activity for rock classification and cycle as outlined in the textbook. The activities in this unit will emphasize the ability to look at fact versus theory to demonstrate scientific investigation, multi media use, reading and writing. Students should have an understanding of the rock cycle and be able to distinguish the difference between igneous, metamorphic, and sedimentary rock types.

## Day One

### Materials

Lunar Rock samples from NASA collected by NASA astronauts (contact NASA or local Space Foundation to become lunar certified)

Copy of "Giant Impact Theory"

Internet access or printed pictures of lunar rocks rock classification handout

magnifying glasses

Earth rock samples

Journal

Colored pencils

Pen.

## Lesson

1. This lesson is designed to get the student's mindset for exploring similarities and differences in the lunar rock versus earth rock. During this exploration students will be introduced to the, "Giant Impact Theory".

Through investigation the student will be able to conclude on their own if they feel this theory has validity.

2. Procedure: Set the class up to have four stations; lunar rocks, *Giant Impact Theory*, pictures of lunar rocks, and samples of earth rock. Depending on class size you may need to break the stations down even further. *Additional stations could include other moon origin theories, moonscape, and craters on the moon.* Divide students into groups of two-three. Journals will be kept by each group and turned in for evaluation.
3. Station one: Lunar rock samples from NASA. At this station have students draw diagrams of what they see. Using terms learned earlier from the study of the rock cycle have them describe the rocks. They should focus on terms that were used in rock classification; for example, cleavage, luster, and color. Have students also record the type of rock (metamorphic, igneous, and sedimentary) they think it is; students must give reasoning for their decision. Record their findings in their journal.
4. Station two: Copies of the, "Giant Impact Theory". Students will need to read the theory and then write a summary in their journal of what this theory explains or they may draw a picture that explains the theory. *For a copy of the theory go to: [www.wordiq.com/definition/Giant\\_Impact\\_theory](http://www.wordiq.com/definition/Giant_Impact_theory)*
5. Station three: Provide internet access or pictures of lunar rock samples. Check out these two web sites for lunar rock samples; [www.nasm.si.edu/exhibitions/attm/wl.ba.1.html](http://www.nasm.si.edu/exhibitions/attm/wl.ba.1.html) or
6. [www.union.edu/PUBLIC/GEODEPT/COURSES/petrology/moon\\_rocks/sample\\_disk.htm](http://www.union.edu/PUBLIC/GEODEPT/COURSES/petrology/moon_rocks/sample_disk.htm) at this station each student should be noting in their journals how the rocks appear in comparison to NASA samples. Some of the pictures are from a microscope so students will be able to see the separation of minerals. Encourage them to draw what they see. *If the student has not been to station one yet they will need to journal the comparison at that station, but they can still make note of what they see.*
7. Station four: Provide Earth rock samples. Provide samples of rocks that are similar to lunar samples. *Contact your local University Geology Department or Mineralogy Society they will sometimes provide samples to share with the students.* At this station students should be journaling on what they see in each rock. They should be using terms learned earlier during rock classification. Encourage students to draw what they see. Each student should also identify similarities and differences in the earth and lunar rocks. *If they are starting at this station they will need to wait on writing comparisons they see once they have been to the other stations.*
8. Conclusion: As a class discuss what the students noticed about lunar and earth rocks. Have them also share what they think about the, "Giant Impact Theory".

## Evaluation/Assessment

- Collect journals from each group and look for details used in their investigation. When reviewing their journals credit is given for labels of rocks, drawings, correct terminology, and expression of their thoughts. Correct spelling must be used on rock names and terminology.

## Day two and three

Materials

Comparison Matrix

Multi media resources

Journals from day one

A pen

## Lesson

1. The purpose of this lesson is to expand on their knowledge of lunar and earth rocks. They will be also utilizing skills in reading, writing, and technology to complete this task.
2. Procedure: Students will work in the groups from day one. They will need to use multi media resources to find information on lunar rocks and earth rocks. Each group will make a comparison matrix of at least three lunar and earth rocks. *See attached matrix.*

## Day four and five

Materials

Journals

Comparison matrix

Computer access to create a slide show.

## Lesson

Students will utilize their research to create a slide show on lunar and moon rocks. The purpose of this lesson is to show the similarities and differences of lunar vs. moon rock. Slide show should provide pictures of the rocks, labels, description of rock, location of rock on the moon or earth, and a final summary on how this information supports or does not support the, "Giant Impact Theory".

## Day six

### Evaluation/Assessment

- Grading of the slide show assignment will be based on the group's ability to explain the similarities or differences of lunar and earth rocks, creativity of slide show design, how their idea of the, "Giant Impact Theory, is supported, use of a variety of references for

research and appropriate grammar usage in written and oral form through their slide presentation. Students need to make a connection to the discovery of lunar rock by NASA astronauts and how technology has allowed us to learn more about the moon as well as the earth and how this help them determine how facts can support a theory.

### Extension

Have students explore other moon origin theories and Apollo Missions

### Resources

NASA lunar samples Colorado School of Mines – Geology Department for rock samples

Rock classification handouts from Earth Systems Science Courses

Binder, Otto. The Moon Our Neighboring World. New York: Golden Press, 1961. ISBN 61-5450

Encarta '98 Encyclopedia: Microsoft

<http://www.cas.usf.edu/~jryan/moonrocks.html>-10k

<http://www.enchantedlearning.com/subjects/astronomy/moon/>

<http://www.nasm.si.edu/exhibitions/attm/wl.ba.1.html>

[http://www.science.nasa.gov/headlines/y2002/18oct\\_earthrocks.htm](http://www.science.nasa.gov/headlines/y2002/18oct_earthrocks.htm)

<http://www.solarviews.com/eng/moon.htm>

[http://www.union.edu/PUBLIC/GEODEPT/COURSES/petology/moon\\_rocks/sample\\_disk.htm](http://www.union.edu/PUBLIC/GEODEPT/COURSES/petology/moon_rocks/sample_disk.htm)

[www.wordiq.com/definition/Giant\\_Impact\\_theory](http://www.wordiq.com/definition/Giant_Impact_theory)

Lunar and Earth Rock Comparison Matrix

Type of Lunar Rock	Description of Lunar Rock	Similar Earth Rock and Describe Similarities and Differences of the Two Rocks