

Earth Science Lab

Topic: Rock Cycle Lab 1

Learning Standards: (New York)

Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity. Students will describe chemical and physical changes, including changes in the states of matter.

Materials:

- Access to the Internet
- Laboratory Handout
- Graphic Organizer as a reference

Introduction:

Students will discuss their hypotheses as to how rock can change into other types as discussed from previous lessons. Reasoning as to why they choose their answer will serve as a method to start the class and lead them into a laboratory exercise on the Earth's rock cycle.

Class Participation:

Students will be broken up into lab groups to complete the laboratory handout listing different characteristics of each type of change that can occur with each different type of rock. Students will also make further inferences and analyze images selected from the internet as to what geological processes have occurred in the. (Supplemental information can be derived from available textbooks and other resources)

Assessments:

Short Term: Upon completion of their labs students will be encouraged to discuss their findings. This exercise will be a valuable asset in aiding their understanding of the Earth's rock cycle. This exercise will also utilize current technology, which will provide experience in using the Internet for research purposes.

Long Term: Practice regents questions will be assigned throughout the year. Supplemental resources such as graphic organizers, labs and review sheets will help the students become more comfortable with scientific material in preparation for the New York State Earth Science Regents Exam. Student will also exhibit a basic understanding of the dynamics that govern our ever-changing environment.

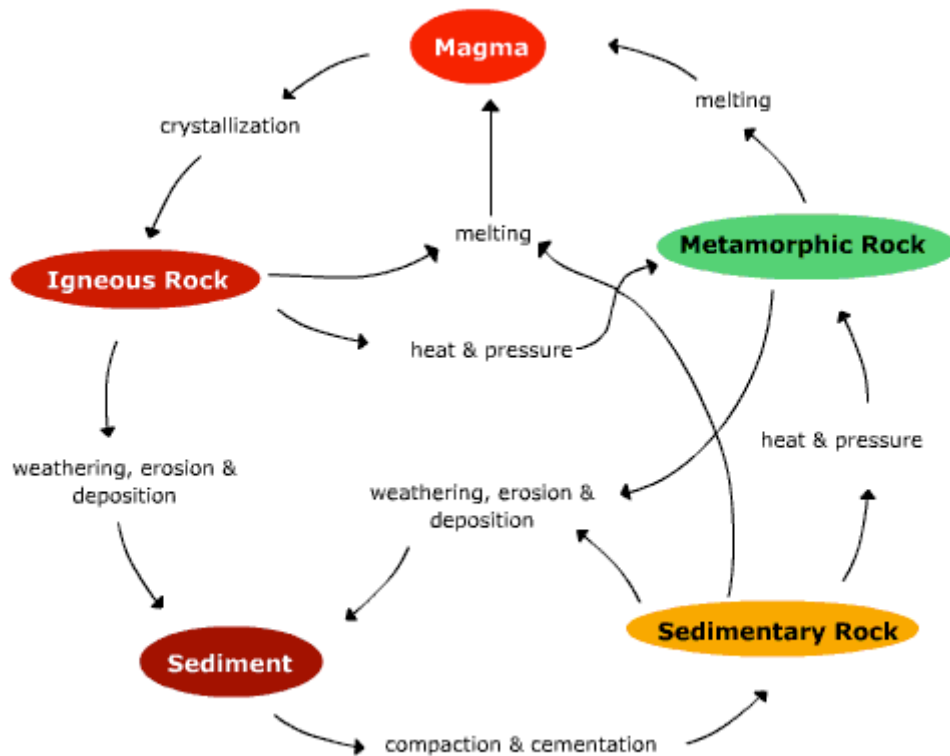
Conclusion: Students will exhibit knowledge of the three different types of rock and their transformation processes. Students will submit their labs for a grade and be documented in accordance with New York State laws and mandates pertaining to the earth science curriculum.

Instructor Diagnosis and Amendments:
Amendments:

Administrative Approval and Suggested

Rock Cycle Lab: Understanding Through Technology

Objective: Students will exhibit an understanding of the **Earth's rock cycle** and inference the outcome of several different geological scenarios. Students will navigate an interactive website reviewing the rock cycle as well as analyze several images from around the globe.



Please Visit an Interactive Demonstration of the cycle above at:

http://www.classzone.com/books/earth_science/terc/content/investigations/es0602/es0602page02.cfm?chapter_no=investigation

Feel free to browse the adjacent sites that accompany the demonstration homepage.

Write three new ideas you have discovered while navigating the homepage listed.

Observations:

Below are several websites that portray different **geological processes**. Briefly explain what processes are occurring and what might be the outcome if it were to continue for a greater length of time.

1. <http://www.pnsn.org/history/Dan.Johnson/lavafieldbeautiful.jpg>

2. <http://www.pbase.com/bigapplejohn/erosion>

3. http://www.scienceclarified.com/images/uesc_09_img0505.jpg

4. <http://whyfiles.org/091beach/images/house.mov>

Questions:

1. What are some of the contributing factors that govern the **rock cycle process**?

2. What are some of the **geological processes** concerning the rock cycle occurring in your local area? (**Land formations, waterways, etc.**)

3. **Geologists** have **hypothesized** about other **terrestrial planets** where the rock cycle has been altered. Coupled with your knowledge of the Earth's rock cycle and the concept of **uniformitarianism**, please provide a detailed hypothesis as to what the environment would portray in the following scenarios if these processes discontinued or suddenly changed.

a. Internal heat on a planetary scale no longer existed.

b. All sources of **chemical** and **physical** erosion no longer existed.

c. **Meteorite showers** became more prevalent as evidence by greater **frequency, intensity** and **duration** over thousands of **millennia**.

Conclusion: Write a précis (**summary**) on the importance of the rock cycle and how it influences our ever-changing environment.

Answer Key: Rock Cycle Lab: Understanding Through Technology

Observations:

- 1.** Lava spouts and tributaries of liquid rock. Different igneous rocks will form depending on surrounding pressure and cooling rates.
- 2.** Different types of erosion either chemical or physical have reduced the size and shape of these structures. The salts and ph levels of ocean water perform chemical erosion while the constant physical impacts damage adjacent shorelines.
- 3.** Folded bands of metamorphosed rock due to extreme pressure. Often found in mountain chains.
- 4.** Mass wasting of beachfront property, a tribute to man's false sense of superiority over Nature.

Questions:

- 1.** The rock cycle enables our planet to create new igneous, sedimentary and metamorphosed rock. Igneous rock is created by pressure and heat while folding or bending rock layers creates metamorphic rock. Sedimentary rock completes the cycle by weathering away landscapes returning its constituents towards the ocean floor. Here it may subside below existing continental crust heating up and fueling the cyclical cycle geologists observe today.
- 2.** Beach erosion, mass wasting, mountain formation, and deposition.
- 3a.** Without an influx of internal heat there would be a vast decrease of the production of new intrusive igneous rock. Starting material for other types of rocks would no longer be able to be metamorphosed into mountain chains. Erosion would eventually flatten the landscape leaving a bleak, sparse flat landscape.
- 3b.** Although impossible to eliminate all forms of erosion, if it were to slow down mountain chains and extensional structures would prolong without weathering. Their details would be persevered in time leaving a detailed record of their geological lifespan.
- 3c.** Meteor showers are a powerful source of erosion. In this case physical weathering due to impact pressure and heat would pulverize the surrounding landscape. Most forms of life would cease to exist do to the resulting harsh environment. If sufficient amounts of impacts created enough heat, lakes of igneous rock would blanket the surface known as maria.

Conclusion:

The rock cycle may appear violent in nature but is the natural formation of mountains, rivers, beaches and other geological landscapes. Without the contributing factors of heat, pressure, erosion and deposition our landscape would portray a dynamically different perspective.