

Sedimentary Rocks

Grade Level: 2

Purpose: This lesson will give your students an introduction to the rock cycle and help them to understand how a sedimentary rock is formed.

Goals: Students will discuss the geologic rock cycle and work with their group to simulate creating a sedimentary rock.

Objectives:

1. As a result of this lesson children will be able to draw the steps of the rock cycle.
2. Children will conduct an experiment that will demonstrate the sedimentary process.

Background: The rock cycle is similar to the water cycle. During this process, rocks are continually developing and changing. Sometimes *magma* which lies below the earth's surface can be forced above ground by *volcanic activity*. Once above the surface this material is called *lava*. After the volcanic eruption, the lava cools. Other magma will remain below the surface and cool there. As the lava or magma cools, it becomes *igneous rock*. Uplifting will eventually bring the underground igneous rock to the surface.

Once on the earth's surface, these rocks erode due to wind or water. Pieces of these igneous rocks are deposited in various places by wind or water. As these pieces settle and mix with other sediments, they begin to harden and form layers. Pressure from new layers on top of them gradually turn them into *sedimentary rocks*.

The third type of rocks, *metamorphic rocks*, are formed when either igneous or sedimentary rocks are changed either by heat or pressure. This cycle is an ongoing part of nature.

Two websites which might help further your understanding of this cycle are: <http://www.bbc.co.uk/education/rocks/rockcycle.shtml>
<http://www.fi.edu/fellows/fellow1/oct98/create/index.html>

Materials/ Preparation

- Chart paper and marker
- Paper for children to draw their own copy of the rock cycle
- Examples of each type of rock
- 8 oz. clear plastic containers (one for every 4 children)
- Sand (1/4 cup per group)
- Dirt (1/4 cup per group)

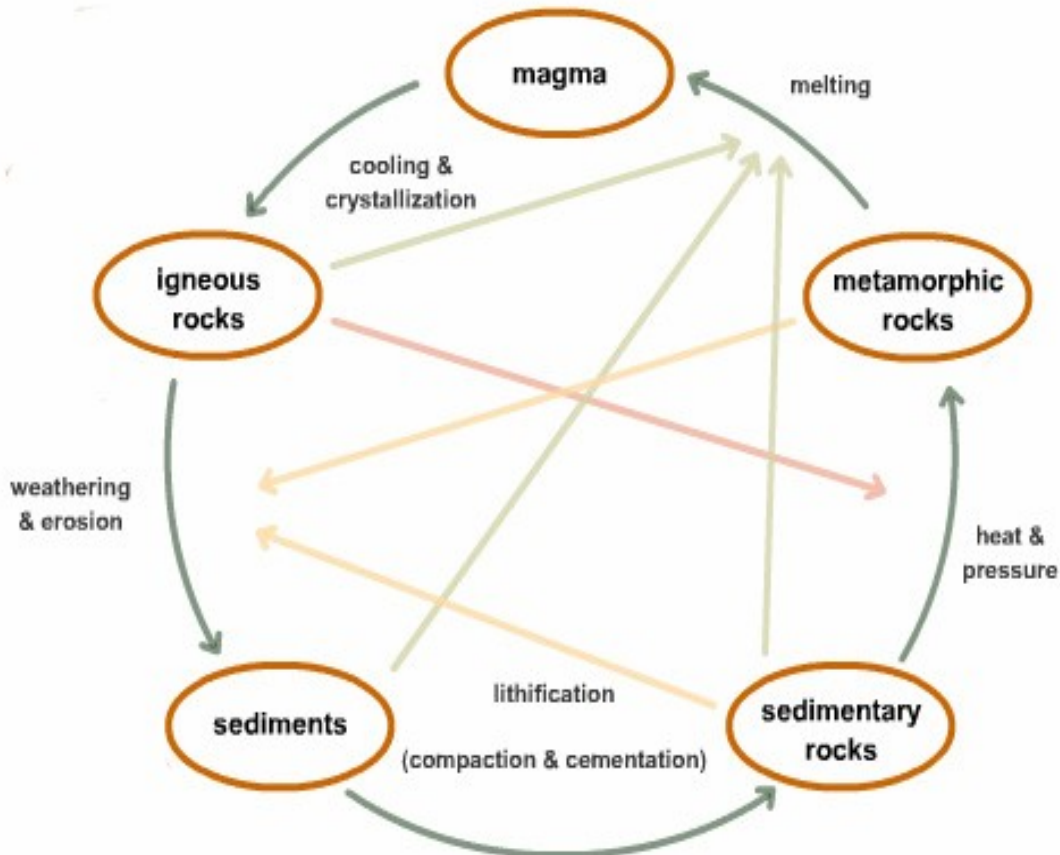
Water
1/4 cup measuring cup (1 per group)
Spoons (one for each group)

OPTIONAL

Ready Reference chart illustrating the rock cycle - available at teacher supply stores
ISM Geology Online – Rock Cycle

Procedure:

1. Discuss with students how the rock cycle functions. Comparing it to other cycles you have already studied in science should help, i.e. water cycle, food webs, plant cycle, etc.
2. On the chart paper draw the cycle explaining it as you draw.



3. If you would like to have your students view an animated version of the rock cycle go to this website:
<http://www.fi.edu/fellows/fellow1/oct98/create/index.html>
4. Leaving your chart up for the class to view, hand out paper for each of the students to draw their own copy of the rock cycle.
5. Have samples of each type of rock out for the class to view. Remind the class of the properties studied in previous lessons and allow ample time to observe the rocks. If you would prefer on-line viewing you can return to the website:
<http://www.fi.edu/fellows/fellow1/oct98/create/index.html>
You can also view them at the ISM website – ISM Geology Online animated Rock Cycle.
6. When pupils seem to grasp the concepts of the rock cycle, prepare for an experiment on sedimentary rocks. Distribute an 8 oz. Container, consider a clear container like a pop bottle a measuring cup, and a spoon to each group. Allow students to fill their containers with 1/4 cup sand and 1/4 cup dirt. Then pour enough water into each container to cover the soil and sand with two inches of water. After the water is added, ask students to predict what will happen once you stir all of the contents of the container.
7. Stir or shake vigorously for at least one minute. Then set the containers down and watch as the sand and dirt settle. Have the students draw what they observe. Check the containers again in 15 minutes and then again the next day. Draw the containers again and have students write about the differences they observed. Place the containers in an area where they won't be disturbed and continue to observe throughout the week.

Extensions: Have students act out the rock cycle. You will need cards labeled igneous rock, sedimentary rock, and metamorphic rock to hang around the neck of 3 students. Various other students can depict a volcano, an earthquake, rain, wind, and pressure. Watch the video *The Magic School Bus Inside the Earth*.

Assessment: Assessment is ongoing as the students progress through the lesson.

- The drawing of the rock cycle should show the volcanic activity, erosion and sedimentation activity, and finally the changing of rocks to the metamorphic process.
- The drawings of the sedimentation process from steps 6 & 7 should accurately depict what has happened.
- Students' notes and science journal entries would also indicate their level of understanding.
- A student assessment rubric for evaluating cooperative learning can be found at the end of this lesson. It can, and should, be modified to meet

the needs of your particular group. Other samples for creating a rubric can be found at the following Web sites:

<http://www.stclair.k12.il.us/services/scilit/hlsticrb.htm>

<http://www.col-ed.org/smcnws/scientific.html>

Lesson Specifics:

Skills: It encourages the Applied Learning Skills of communicating and working on teams

Optimum class size - 16 – 24 students

Duration - about 45 – 60 minutes.

Illinois State Board of Education Goals and Standards:

12.E.2a: Identify and explain natural cycles of the Earth's land, water and atmospheric systems (e.g., rock cycle, water cycle, weather patterns).

12.E.2b: Describe and explain short-term and long-term interactions of the Earth's components (e.g., earthquakes, types of erosion).

Print Resources:

The Marshall Cavendish Science Project Book of the Earth, Steve Parker, Marshall Cavendish Corp., 1986, ISBN 0-86307-629-7

Earth Alive!, Sandra Markle, Lothrop, Lee & Shepard Books, 1991, ISBN 0-688-09361-2

RUBRIC – Cooperative Group Work

Student Name _____

CATEGORY	Excellent	Good	Satisfactor y	Needs Improvemen t
Contributions	Provides useful ideas when participating in the group. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group. A strong group member who tries hard.	Sometimes provides useful ideas when participating in the group. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group. May refuse to participate.
Focus on the task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.
Working with Others	Almost always listens to, shares with,	Usually listens to, shares, with, and supports	Often listens to, shares with, and supports the	Rarely listens to, shares with, and supports the efforts of others.

	and supports the efforts of others. Tries to keep people working well together.	the efforts of others. Does not cause "waves" in the group.	efforts of others, but sometimes is not a good team member.	Often is not a good team player.
Attitude	Always has a positive attitude about the task(s).	Often has a positive attitude about the task(s).	Usually has a positive attitude about the task(s).	Rarely has a positive attitude about the task(s).