

Rockin' Rocks

Standards of Learning

Science 5.1, 5.7

English 5.1

Math 5.8, 5.10

Objective

Students will:

- Participate in an experiment representing the rock cycle
- Draw and label a diagram of the rock cycle

Materials

- *The Magic School Bus: Inside the Earth* by Joanna Cole

If this book is unavailable you may substitute another introductory book on types of rocks and their formation.

- Deep mixing bowl
- Strainer (large enough to fit across the bowl)
- Food blender
- Measuring cup
- Rolling pin
- Water (will need a total of 10 cups)
- White school glue (will need a total of 5 teaspoons)
- Kitchen timer
- 10 sheets of construction paper (3 blue, 5 yellow, 2 white)
- Approximately 30-45 sheets of newspaper
- The Rock Activity Instruction Sheet (handout provided)
- The Rock Activity Observation Sheet (handout provided)
- The Rock Cycle Diagram (handout provided)
- White, unlined paper
- Crayons/markers/colored pencils

Background Knowledge

This lesson focuses on the different types of rocks and provides an interactive activity for modeling igneous, sedimentary, and metamorphic rock. The activity needs to be done over a number of days, approximately 2-4 days, depending on drying time. Prior to beginning the activity, make the Rock Cycle Diagram sheet into a transparency, and be sure to carefully read the instructions.

In this lesson students will learn about the three basic types of rocks and how they are formed. Igneous rocks are created from the crystals of cooling magma. They may form above or below ground. Igneous rock can change into sedimentary or metamorphic rock. Wind and rain may cause pieces of the igneous rock to fall off (weathering). When these various sediments become cemented together, this forms sedimentary rocks. Metamorphic rocks may be created from either igneous or sedimentary rocks when they undergo heat and pressure.



Procedure

1. Read the book, *The Magic School Bus: Inside the Earth*, by Joanna Cole aloud to the class.
2. Ask the students the following questions in reference to the page(s) listed:
 - What are rocks made of? (Page 11)
 - What are sedimentary rocks? (Page 18)
 - How are they formed? (Page 18)
 - How did fossils form in rock layers? (Page 19)
 - What are metamorphic rocks? (Page 24)
 - How are they formed? (Page 24)
 - What are igneous rocks? (Page 26)
 - How are they formed? (Page 26)
 - In what ways are volcanoes useful? (Page 32)
3. After reading, tell the students that you will be doing an experiment to represent the different types of rocks found in the Earth.
4. Set up the materials on a front table and follow the instructions on The Rock Activity Instruction Sheet.

A few days later, after the activity is complete.....

5. After completing the activity, ask the students what the activity demonstrated.
6. Tell the students that the activity demonstrated three of the different types of rocks found in the Earth.
7. Review how the three different types of rocks are formed with the students using The Rock Activity Observation Sheet.
8. Place the Rock Cycle Diagram sheet on the overhead.
9. Tell the students that this represents the cycle that rocks go through in order to form other rocks.
10. Ask them to take out an unlined, white piece of paper and drawing utensils.
11. Tell the students to draw and label their own diagrams of the rock cycle.
12. After all the students have completed their diagrams, ask them the following questions:
 - How did our experiment represent each of the 3 types of rocks?
 - How do you think the Earth would be different if rocks did not change in the ways they do?

References

Classroom of the Future. *Cycles: The Rock Cycle*.

<http://www.cotf.edu/ete/modules/msese/earthsysflr/rock.html>

Cole, J. (1987). *The Magic School Bus: Inside the Earth*. New York, NY: Scholastic Inc.

ISBN: 0590407597

This book can be ordered from the Barnes & Noble website, www.barnesandnoble.com.

VanCleave, J. (1996). *Rocks and Minerals: Mind-Boggling Experiments You Can Turn into Science Fair Projects*. New York, NY: John Wiley & Sons, Inc.

ISBN: 0471102695



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The Rock Activity: *Instruction Sheet*

This activity demonstrates the different types of rocks found in the Earth's surface: igneous, sedimentary, and metamorphic.

Check off each step as you complete them.

Materials:

- Deep mixing bowl
- Strainer (large enough to fit across the bowl)
- Food blender
- Measuring cup
- Rolling pin
- Water (will need a total of 10 cups)
- White school glue (will need a total of 5 teaspoons)
- Timer
- 10 sheets of construction paper (3 blue, 5 yellow, 2 white)
- Approximately 30-45 sheets of newspaper

Procedure:

Day 1: Creating Igneous, Sedimentary, and Metamorphic Rocks

- ___ Place the strainer across the mouth of the bowl.
- ___ Tear one **blue** sheet of construction paper into about 16 pieces.
- ___ Tear one **yellow** sheet of construction paper into about 16 pieces.
- ___ Place the torn pieces into the blender.
- ___ Place 2 cups of water and 1 teaspoon of glue in the blender.
- ___ Turn on the blender to mix the paper, water, and glue. A paper mulch will form.
- ___ Pour the paper mulch into the strainer, over the bowl.
- ___ Set the timer for 20 minutes and leave the paper and bowl alone.
- ___ After 20 minutes, lay 10-12 newspaper sheets on the table.
- ___ Pick up the wet paper mulch from the strainer and place on the newspaper.
- ___ Label this newspaper and paper mulch: ***Igneous Rock***.
- ___ Put the newspaper and paper mulch labeled *Igneous Rock* aside to let dry.

- ___ Again, place the strainer across the mouth of the bowl.
- ___ Tear one **blue** sheet of construction paper into about 16 pieces.
- ___ Tear one **yellow** sheet of construction paper into about 16 pieces.
- ___ Place the torn pieces into the blender.
- ___ Place 2 cups of water and 1 teaspoon of glue in the blender.
- ___ Turn on the blender to mix the paper, water, and glue. A paper mulch will form.
- ___ Pour the paper mulch into the strainer, over the bowl.
- ___ Set the timer for 20 minutes and leave the paper and bowl alone.
- ___ After 20 minutes, lay a few newspaper sheets on the table.
- ___ Pick up the wet paper mulch from the strainer and place on the newspaper.
- ___ While the first paper mulch (dark mulch made of blue and yellow paper) is sitting on the newspaper, tear one **yellow** sheet and one **white** sheet into about 16 pieces each.
- ___ Place the torn pieces into the blender.
- ___ Place 2 cups of water and 1 teaspoon of glue in the blender.
- ___ Turn on the blender to mix the paper, water, and glue. A paper mulch will form.



- ___ Pour the paper mulch into the strainer, over the bowl.
- ___ Set the timer for 20 minutes and leave the paper and bowl alone.
- ___ After 20 minutes is up, you will have created a light paper mulch.
- ___ Divide the **dark** paper mulch in half and use half to create a thin layer on the newspaper.
- ___ Divide the **light** paper mulch in half and use half to place a layer on top of the dark mulch.
- ___ Use the other half of the **dark** mulch and place a layer on top of the light mulch.
- ___ Use the other half of the **light** mulch and place a layer on top of the dark mulch.
- ___ You should now have **alternating layers** of mulch.
- ___ Place these alternating layers of mulch on 10-12 newspaper sheets.
- ___ Label this newspaper and paper mulch: **Sedimentary Rock**
- ___ Put the newspaper and paper mulch labeled *Sedimentary Rock* aside to let dry.
- ___ Again, place the strainer across the mouth of the bowl.
- ___ Tear one **blue** sheet of construction paper into about 16 pieces.
- ___ Tear one **yellow** sheet of construction paper into about 16 pieces.
- ___ Place the torn pieces into the blender.
- ___ Place 2 cups of water and 1 teaspoon of glue in the blender.
- ___ Turn on the blender to mix the paper, water, and glue. A paper mulch will form.
- ___ Pour the paper mulch into the strainer, over the bowl.
- ___ Set the timer for 20 minutes and leave the paper and bowl alone.
- ___ After 20 minutes, lay a few newspaper sheets on the table.
- ___ Pick up the wet paper mulch from the strainer and place on the newspaper.
- ___ While the first paper mulch (dark mulch made of blue and yellow paper) is sitting on the newspaper, tear one **yellow** sheet and one **white** sheet into about 16 pieces each.
- ___ Place the torn pieces into the blender.
- ___ Place 2 cups of water and 1 teaspoon of glue in the blender.
- ___ Turn on the blender to mix the paper, water, and glue. A paper mulch will form.
- ___ Pour the paper mulch into the strainer, over the bowl.
- ___ Set the timer for 20 minutes and leave the paper and bowl alone.
- ___ After 20 minutes is up, you will have created a light paper mulch.
- ___ Divide the **dark** paper mulch in half and use half to create a thin layer on the newspaper.
- ___ Divide the **light** paper mulch in half and use half to place a layer on top of the dark mulch.
- ___ Use the other half of the **dark** mulch and place a layer on top of the light mulch.
- ___ Use the other half of the **light** mulch and place a layer on top of the dark mulch.
- ___ You should now have **alternating layers** of mulch.
- ___ Cover these alternating layers with 2-3 sheets of newspaper.
- ___ With the rolling pin, roll back and forth 3-4 times across the top of the newspaper and paper mulch layers. Press as hard as you can in order to flatten the layers.
- ___ Remove the newspapers on top and place the flattened, alternating layers aside.
- ___ Label this newspaper and mulch: **Metamorphic Rock**.
- ___ Allow all three types of rock to dry and solidify, which may take 2-3 days.

Day 3 or 4: Observing Igneous, Sedimentary, and Metamorphic Rocks

- ___ Hand out The Rock Activity Observation Sheet to the students.
- ___ Tell them to read the first part of the sheet about igneous rock.
- ___ Ask them to then observe and record their observations of the model igneous rock created in class a few days ago.
- ___ Tell them to do the same for sedimentary rock and metamorphic rock.



Name: _____

Date: _____

The Rock Activity Observation Sheet

Igneous Rock

After the paper mulch has been drying for 2-3 days, it will have changed from a paper mulch into a lumpy solid. This solid represents igneous rock. The way in which the paper, water, and glue blended is similar to the way in which different rocks under Earth's surface melt and blend together to form magma. This magma then rises to the surface through a volcano eruption and is called lava. As the magma and lava cool, they solidify to form igneous rock. The way in which the paper, water, and glue dried and solidified represents the cooling of the magma and lava into igneous rock.

- In the space below, record observations about the igneous rock model you created.

Sedimentary Rock

After the paper mulch has been drying for 2-3 days, it will have changed from alternating layers paper mulch into an alternating layers lumpy solid. The two layers of mulch represent two samples of lava. In nature, as igneous rock is formed, weathering can cause small particles of the igneous rock to break off. These particles build up in layers, as represented by your alternating layers paper mulch, and eventually form sedimentary rock.

- In the space below, record observations about the sedimentary rock model you created.

Metamorphic Rock

After the paper mulch has been drying for 2-3 days, it will have changed from alternating layers of pressed paper mulch into alternating layers of a pressed solid. These pressed layers represent how metamorphic rock is formed through pressure applied to the rock. Metamorphic rocks form when igneous or sedimentary rock is changed by heat and/or pressure.

- In the space below, record observations about the metamorphic rock model you created.



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The Rock Cycle Diagram

