

# The Rock Cycle

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<b>Strand</b>	Earth Patterns, Cycles, and Change
<b>Topic</b>	Investigating the rock cycle
<b>Primary SOL</b>	5.7 The student will investigate and understand how Earth’s surface is constantly changing. Key concepts include a) identification of rock types; b) the rock cycle and how transformations between rocks occur; f) weathering, erosion, and deposition.
<b>Related SOL</b>	5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which b) estimates are made and accurate measurements of elapsed time are made using proper tools; e) independent and dependent variables are identified; f) constants in an experimental situation are identified; j) models are constructed to clarify explanations, demonstrate relationships, and solve needs. 5.7 The student will investigate and understand how Earth’s surface is constantly changing. Key concepts include d) the basic structure of Earth’s interior.

## Background Information

Sedimentary rocks are formed in layers, are found near water sources, and may contain fossils. Igneous rocks are formed when molten lava cools and hardens. Metamorphic rocks are sedimentary or igneous rocks that have been transformed through heat, pressure, and/or chemicals. These three major types of rock can change during the rock cycle.

## Materials

- Samples of sedimentary rocks or pictures of sedimentary rocks
- Loose leaf paper
- White paper for a flip chart
- Copies of the Rock Types visual
- Old crayons
- Sharpeners
- Paper cups
- Wax paper
- Hot plate
- Iron
- Heavy books
- Old towel
- Old cooking pot

- Copies of the Rock Cycle diagram

## Vocabulary

*igneous, metamorphic, sedimentary, rock cycle*

## Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

### Introduction

1. Write the names of the three types of rocks on the board. Ask students what the root of the word sedimentary is (*sediment*). Discuss the meaning of the word sediment. Explain that sedimentary rocks are formed when sediments, which are found near water sources, are highly compressed by pressure and/or heat. Show students samples or photographs of sedimentary rocks. Ask students to list on loose leaf paper some of the characteristics they see. They should observe that sedimentary rocks are gritty, sometimes have visible lines or layers, and can be broken pretty easily.
2. Define the words igneous and lava, and tell students that igneous rocks form when molten lava cools. Tell them that the speed at which the lava cools determines the size of the crystals within the rock. Show students samples (or photographs) of igneous rocks, and have them list their characteristics.
3. Define the word metamorphic, and ask students whether they know a similar word. They should know the word metamorphosis and that it is used to describe the change of a tadpole into a frog or a caterpillar into a butterfly. Tell students that metamorphic rock is also the product of a change. It is rock that has been changed through intense heat and pressure into a different kind of rock. A metamorphic rock can be formed from a sedimentary rock, an igneous rock, or even another metamorphic rock. Show students samples (or photographs) of metamorphic rocks, and have them list their characteristics.
4. Use the students' lists of rock characteristics to make a class list of the characteristics of the three different types of rocks under their names on the board.

### Procedure

1. Have students make a trifold of the three types of rocks. The trifold will include pictures, examples of rocks, and include key words to remember how each rock is formed, such as the pictures in the attached Rock Types visual.
2. Have students get into groups of 4-6. Have each student take a different color crayon and sharpen the crayons until they have filled about half of the cup with crayon shavings.
3. Students should put all the different color shavings in a pile on wax paper. Fold the wax paper to create a seal around the wax shavings.
4. Students will place a heavy book on the wax paper and take turns pressing firmly on the wax paper for at least 5 minutes.
5. Students will open the wax paper and discuss the results of adding compacted pressure to sediments. Once students determine that this was similar to sedimentary rocks, they can add their observations to their flip chart.

6. Students will then bring the wax paper over to an adult. Students should watch as the adult adds heat and pressure to the “sedimentary rock” by laying the old towel on top of the wax paper and ironing it, creating a “metamorphic rock.” Students will observe the new rock and add their observations to their flip chart.
7. When all groups have completed the first two rock changes, take all of the crayon shavings and put them in an old sauce pot. Heat crayons until they are melted and let it cool down enough to remove the solid from the pot. Discuss with students that this process has made an igneous rock. The top of the “rock” will be brown but the bottom will be multicolored.

### *Conclusion*

1. Have students finish working on their flip chart by adding their observations about the igneous rock. Hand out the Rock Cycle Diagram and discuss with students how the process modeled in class resembles the rock cycle.

### **Assessment**

- **Questions**
  - What was added to the sedimentary rock pieces to turn them into metamorphic rock?
  - What was added to the metamorphic pieces to turn them into igneous pieces?
- **Journal/writing prompts**
  - Explain how this experiment simulates the real rock cycle.
- **Other**
  - Have students draw and label the rock cycle.
  - Students choose to be a rock that goes through the rock cycle and becomes another kind of rock. Write a story as if you were the rock going through the changes. Make sure you are specific.

### **Extensions and Connections (for all students)**

- Assess scientific accuracy the trifold showing the three rock types.
- Have students discuss how a sedimentary rock could turn into igneous rock, a metamorphic rock into sedimentary rock, or an igneous rock into either sedimentary rock or metamorphic rock.

### **Strategies for Differentiation**

- Listen to a rock cycle song, and provide students with the lyrics to illustrate.
- Provide students with an alternative to writing and making a trifold by creating a multi-media presentation. Allow students to provide examples of each rock and go more in depth with the rock cycle description.
- Act out the rock cycle.

# Rock Types

## Sedimentary



Conglomerate

Limestone

Sandstone

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## Metamorphic



Gneiss

Marble

Quartzite

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## Igneous



Basalt

Obsidian

Pumice

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