The Story of Rocks

The outer crust of Earth is made of a hard, solid material called *rock*. Earth's crust is about 30 miles (48 km) thick. *Geologists*, the scientists who study rock, classify it into three major groups.

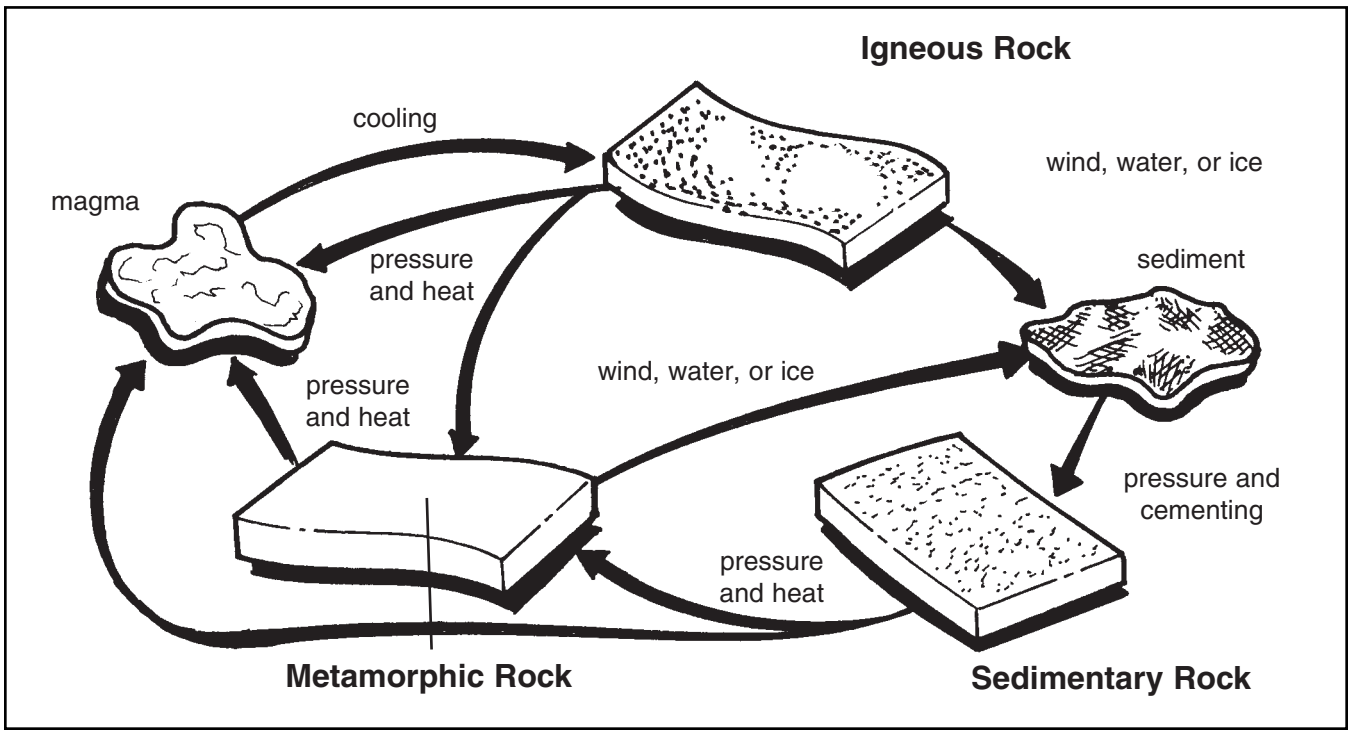
Igneous rock tells the story of volcanoes. Igneous rock is formed when the hot liquid magma or lava from volcanoes cool and hardens. When magma cools below Earth's surface, it becomes *intrusive* igneous rock. When lava cools above Earth's surface, it becomes *extrusive* igneous rock. Obsidian and pumice are the two most common forms of igneous rock usually associated with volcanoes. Obsidian is a glass-like rock formed when lava flows out and hardens very quickly. Pumice is formed when gases bubble out of lava as it hardens, leaving holes in the lightweight, whitish rock.

Sedimentary rock tells the story of changes in the land and sea, of life long ago, and of climate changes. Sedimentary rock is formed from layers and layers of sediments such as sand, mud, shells, tiny pebbles, and decaying plants. These rocks are most commonly found on the bottom of lakes and seas where the weight of the sediment has pushed out the water from between the sediment and the material sticks together to form rock.

Metamorphic rocks tell the story of changes on Earth. Metamorphic means "changed in form." All metamorphic rock was once igneous or sedimentary rock that was changed by extreme heat or pressure. These are the hardest rocks on Earth and are used as a building material.

Minerals are the building blocks of rocks. There are over 2,000 minerals in Earth's crust making them the most common solid material on our planet. All rocks contain minerals and can be identified by the kinds of minerals that make up their composition. Talc is a very soft mineral used in talcum powder and chalk. The mineral pyrite looks like gold and is sometimes referred to as "fool's gold." Gold, silver, copper, aluminum, coal, and iron as well as topaz, rubies, and diamonds are all minerals found in rock.

The Rock Cycle

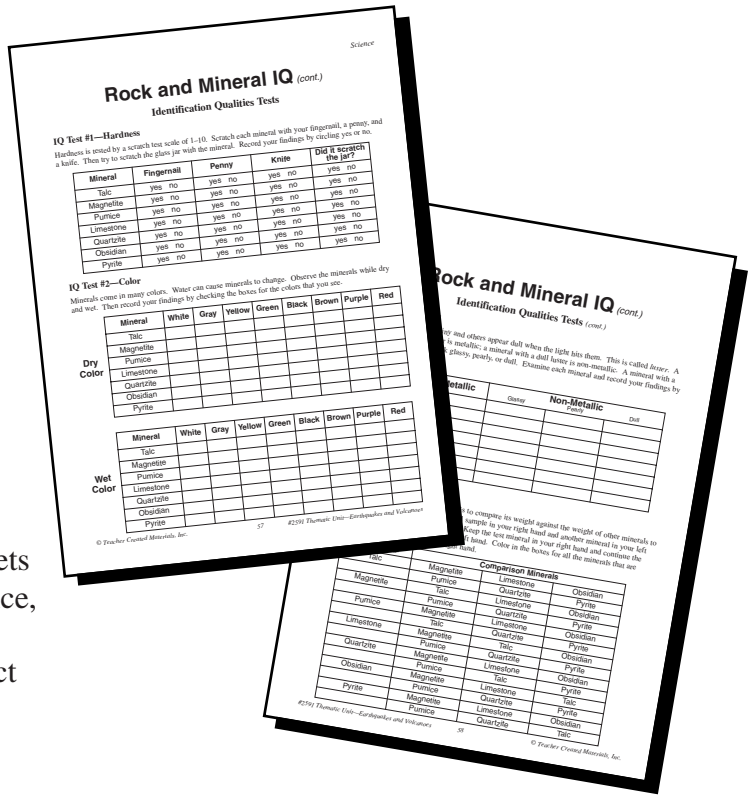


Rock and Mineral IQ

Identification Qualities

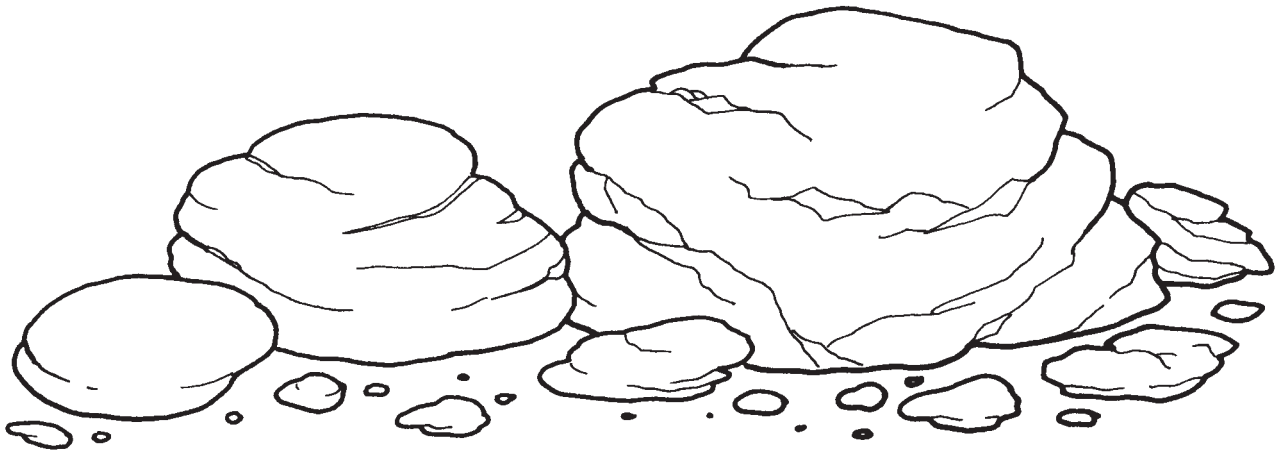
Materials

- copies of pages 57 and 58
- magnifying glasses
- eyedropper
- vinegar
- water
- pennies
- a glass jar
- a paring knife
- five sets of rock samples that should include: talc, pumice, pyrite, quartzite, limestone, obsidian, magnetite (These sets can be purchased at most teaching, science, or book stores at a reasonable price. Students should also be allowed to collect rocks from outside or bring them from home.)


Rock and Mineral IQ (cont.)
Identification Qualities Tests
IQ Test #1—Hardness
IQ Test #2—Color
Rock and Mineral IQ (cont.)
Identification Qualities Tests (cont.)

Procedure

After reading "The Story of Rocks" (page 55) with or to the students, help them to identify the rock and mineral samples. Tell the students that they are going to test the rocks' and minerals' identification qualities or IQ and that they will be able to observe that each has a special composition. Tell them that they will do the same kind of tests that geologists do to identify and classify rocks and minerals. Give the children copies of the charts. Have them conduct the tests as described on the charts. Set up testing centers at different locations in the classroom and allow the students to rotate through the tests. You may choose to divide the students into groups of two or three if there are a large number of students in the class. The students will perform the following tests: hardness, color, luster, weight and appearance. Discuss the results of their testing when they are finished.



Rock and Mineral IQ *(cont.)*

Identification Qualities Tests

IQ Test #1—Hardness

Hardness is tested by a scratch test scale of 1–10. Scratch each mineral with your fingernail, a penny, and a knife. Then try to scratch the glass jar with the mineral. Record your findings by circling yes or no.

Mineral	Fingernail	Penny	Knife	Did it scratch the jar?
Talc	yes no	yes no	yes no	yes no
Magnetite	yes no	yes no	yes no	yes no
Pumice	yes no	yes no	yes no	yes no
Limestone	yes no	yes no	yes no	yes no
Quartzite	yes no	yes no	yes no	yes no
Obsidian	yes no	yes no	yes no	yes no
Pyrite	yes no	yes no	yes no	yes no

IQ Test #2—Color

Minerals come in many colors. Water can cause minerals to change. Observe the minerals while dry and wet. Then record your findings by checking the boxes for the colors that you see.

Dry Color

Mineral	White	Gray	Yellow	Green	Black	Brown	Purple	Red
Talc								
Magnetite								
Pumice								
Limestone								
Quartzite								
Obsidian								
Pyrite								

Wet Color

Mineral	White	Gray	Yellow	Green	Black	Brown	Purple	Red
Talc								
Magnetite								
Pumice								
Limestone								
Quartzite								
Obsidian								
Pyrite								

Rock and Mineral IQ *(cont.)*

Identification Qualities Tests *(cont.)*

IQ Test #3—Luster

Some minerals appear shiny and others appear dull when the light hits them. This is called *luster*. A mineral with a shiny luster is metallic; a mineral with a dull luster is non-metallic. A mineral with a non-metallic luster can look glassy, pearly, or dull. Examine each mineral and record your findings by checking the boxes.

Mineral	Metallic	Non-Metallic		
		Glassy	Pearly	Dull
Talc				
Magnetite				
Pumice				
Limestone				
Quartzite				
Obsidian				
Pyrite				

IQ Test #4—Weight

One way to test the weight of a mineral is to compare its weight against the weight of other minerals to feel which one is heavier. Hold a mineral sample in your right hand and another mineral in your left hand. Ask yourself, "Which is heavier?" Keep the test mineral in your right hand and continue the weight test with different minerals in the left hand. Color in the boxes for all the minerals that are heavier than the test mineral in your right hand.

Test Mineral	Comparison Minerals		
Talc	Magnetite	Limestone	Obsidian
	Pumice	Quartzite	Pyrite
Magnetite	Talc	Limestone	Obsidian
	Pumice	Quartzite	Pyrite
Pumice	Magnetite	Limestone	Obsidian
	Talc	Quartzite	Pyrite
Limestone	Magnetite	Talc	Obsidian
	Pumice	Quartzite	Pyrite
Quartzite	Magnetite	Limestone	Obsidian
	Pumice	Talc	Pyrite
Obsidian	Magnetite	Limestone	Talc
	Pumice	Quartzite	Pyrite
Pyrite	Magnetite	Limestone	Obsidian
	Pumice	Quartzite	Talc

