

ROCKS AND MINERALS

Science and Social Studies Standards Covered:

SC (1)-

1. Select appropriate tools and technology resources needed to gather, analyze, and interpret data.
2. Identify basic properties of objects.
7. Identify components of Earth's surface, including soil, rocks, and water.

SC (2)- 8. Identify evidence of erosion and weathering of rocks.

SC (3)- 11. Describe Earth's layers, including inner and outer cores, mantle, and crust.

SC (5)- 10. Identify spheres of Earth, including the geosphere, atmosphere, and hydrosphere.



The Alabama Museum of Natural History (AMNH) is part of the University of Alabama Museums and is located on the UA campus in Smith Hall. Opened in 1910, it is the oldest natural history museum in Alabama, and one of the oldest natural history museums in the nation. AMNH's mission is to broaden the knowledge of natural sciences and human culture through collections and quality programs of research, instruction, and service.

Rocks and Minerals: Have you ever wondered what the difference between a rock and a mineral was? Have you ever seen a diagram of the rock cycle and thought 'What is that?' This Rocks and Minerals program is designed to answer those questions and many more. It discusses the definitions of both rocks and minerals, and explores their characteristics and how they are formed. The program includes hands-on experience with rocks and minerals as well as the chance to test minerals for various characteristics. Your students will get to let loose their inner geologist and use these tests to try and figure out the names of some mysterious mineral samples. This program is free and takes place in your classroom.



ROCKS AND MINERALS

Did you know?

The Alabama Museum of Natural History is right on the University of Alabama campus? It is housed in Smith Hall near the Gorgas Library.

Did you know?

AMNH is a great destination for school field trips. Guided tours cost \$2 per student. If you would like a hands-on component added, a tour and Discovery Lab is only \$5 per student.

For information

regarding field trips, you can call (205) 348-7550 or email programs@ua.edu.

For more info or to schedule this in-school program for your room, email programs@ua.edu

www.amnh.ua.edu



Suggested Pre-visit activities:

- The Rock Cycle diagram
- Moh's Hardness Scale diagram
- Identifying Minerals

Suggested Post-Visit activities:

- Rocks vs. Minerals (look for your grade in upper right hand corner to determine correct page)
- *Smaller than Your Pinky, Bigger than Your Fist*
- Other mineral activities



Books about rocks and minerals:

- *National Geographic Kids: Everything Rocks and Minerals* by Steve Tomecek
- *The Magic School Bus: Rocky Road Trip* by Judith Bauer Stamper
- *Rocks and Minerals: A Gem of a Story* by Dan Green

Videos and websites about rocks and minerals:

- National Park Service-Rocks & Minerals
- United States Geologic Survey (USGS)-Primary Education
- Brain Pop Jr. –*Rocks and Minerals*, Brain Pop-*Types of Rock*



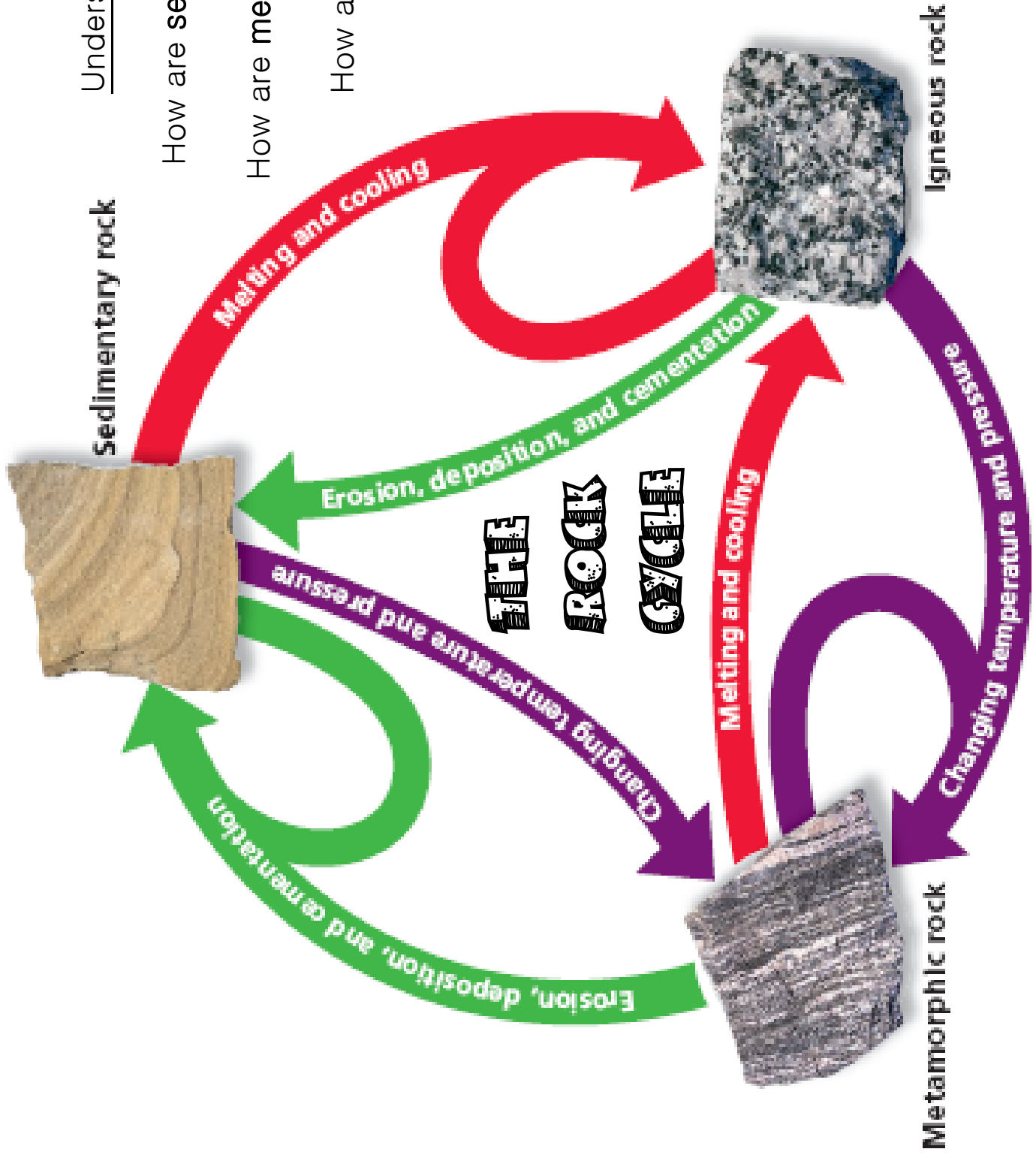
Understanding the Diagram:

Sedimentary rock

How are **sedimentary** rocks formed?

How are **metamorphic** rocks formed?

How are **igneous** rocks formed?



Metamorphic rock

Igneous rock

MAKE YOUR OWN MINERAL TESTING KIT

ALL YOU NEED IS:

- Your fingernail
- A penny
- A steel nail
- Piece of glass with smooth edges
- Vinegar
- Eyedropper
- White ceramic plate
- Rock and mineral samples
- Moh's Hardness Scale
- Black light (optional)
- A box or container for your kit

WHAT TO DO:

- ⇒ Your fingernail, the penny, the nail, and the glass plate are all used to test hardness. You can start to determine the type of mineral you have based on Moh's Hardness scale.
- ⇒ The vinegar and eye dropper are used to test for calcium carbonate. If a mineral fizzes when vinegar is dropped on it, it has calcium carbonate in it. Calcite and aragonite are two minerals with calcium carbonate.
- ⇒ The ceramic plate is used to test for streak color. Drag a mineral across the plate to discover what streak color it leaves.
- ⇒ You can test for fluorescence with the black light. Only a few minerals fluoresce.

MOH'S HARDNESS SCALE

Hardness	Mineral	Description
1	Talc	Fingernail scratches it easily.
2	Gypsum	Fingernail scratches it.
3	Calcite	Copper penny scratches it.
4	Fluorite	Steel knife scratches it easily.
5	Apatite	Steel knife scratches it.
6	Feldspar	Steel knife does not scratch it easily, but scratches glass.
7	Quartz	Hardest common mineral. It scratches steel and glass easily.
8	Topaz	Harder than any common mineral.
9	Corundum	It scratches Topaz.
10	Diamond	It is the hardest of all minerals.



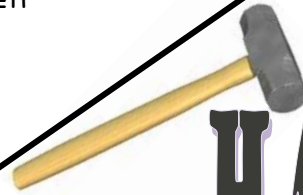
IDENTIFYING MINERALS

Minerals can be identified by looking at a set of characteristics. Some of these characteristics are...

Streak Color

The color a mineral makes when streaked across a

How resistant a mineral is to being scratched.



HARDNESS

CLEAVAGE

How minerals break apart.

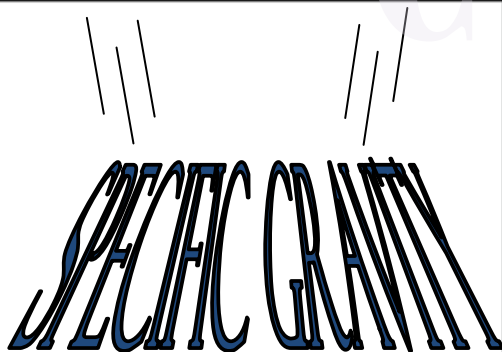
The color of a mineral.

Color



Luster

How light shines off of the surface of a mineral.



How heavy a mineral is when compared to an equal amount of fresh water.

Crystal Habit

The shape of the crystal formed by the mineral.

Whether or not a mineral glows when exposed to ultraviolet light (black light).

Fluorescence

ROCKS vs. Minerals

What is the difference between a rock and mineral? Read each fact and decide whether it is about a rock or a mineral. Cut out the words at the bottom and glue them next to the correct fact.

A hard substance made up of minerals.	
A hard substance made up of certain elements.	
Can be put into three main groups.	
Are grouped into many different groups.	
Use to build buildings, sidewalks, bridges, and many others.	
Seen as valuable and used in jewelry.	

Cut these out and paste them next to the correct fact.

Mineral	ROCK
Mineral	ROCK
Mineral	ROCK

ROCKS vs. Minerals

What is the difference between a rock and mineral? Read each fact and decide whether it is about a rock or a mineral. Cut out the words at the bottom and glue them next to the correct fact.

A naturally occurring solid substance that is usually made of minerals.	
A nonliving solid that has a regular arrangement of atoms and molecules.	
Fossils are remains of plants and animals that have turned into this.	
Grouped into several types.	
Diamonds and gold are...	
Salt comes from the _____ Halite.	
Grouped into three main types.	
Coal and amber are...	

Cut these out and paste them next to the correct fact.

Mineral	ROCK
Mineral	ROCK
Mineral	ROCK
Mineral	ROCK

Smaller than Your Pinky, Bigger than Your Fist: Square, Round, Hard-What is a Rock?

By Betty B. Graham

Focus: Rocks are fascinating tactile objects that compel children and adults to hold, feel, rub, and otherwise examine them. Studying rocks is a beginning for inquiry and investigation which leads to different discoveries and, in turn, to new investigations.

These discoveries may be on different levels. They might be as basic as discovering a color never seen before—an earth red, shiny black, or copper blue-green. Or they might be as advanced as discovering that many rocks indigenous to the area are sedimentary and contain fossils. This in turn might lead to investigating the types of fossils in the sedimentary rock. Other discoveries might include the number of holes in a rock, the variability in the size of those holes, the number of different materials making up the rock, or the nature of those materials—whether they are small specks, crystals, or large chunks.

Challenge: What is a rock? How are rocks similar? How are they different? Can big rocks become small rocks, sand, and dirt? Can sand and dirt become rock?

Time: 40 min.

Materials and Equipment: Each student will need-2 scavenger hunt lists (School-yard hunt and take-home assignment), A lunch-sized paper sack, 2 plain sheets of paper (14cm x 20 cm or larger), a hand lens, water (optional for washing rocks), a paper towel.

Procedure:

1. Begin class by asking the students what a rock is and how a rock is different from a seed, a sugar cube, a fingernail, a button, a paper clip, or other objects. Ask them if a rock is a living thing.
2. Ask a class, prepare two scavenger hunt lists which might include categories such as color, size, shape, or texture. See the sample list at the end of this activity. The Class Time list introduces students to making choices and decisions to recognizing shapes, sizes, and color. The Take Home list expands on the Class Time list; however, a student may bring a rock that is a “perfect this-or-that” from the other list.
Explain that the object of a scavenger hunt is to search for and find as many things on a list as possible.
3. Give each student a paper sack and a Class Time scavenger hunt list, and proceed outside to try to find as many rocks as possible that match the categories on the list. Urge students to choose their rocks carefully to fit the descriptions.

4. After 15 or 20 minutes, return to the classroom and place each student's collection of rocks on a paper towel with the student's name on it. (Washing and drying of the rocks is optional.) The number and maturity of the students should determine how to share.
5. Return the paper sacks, and distribute the Take Home scavenger hunt list for a home assignment. The students may borrow some rocks from rock collectors, but they should NOT buy rocks to fit the list. Point out that they might find only a few of the rocks on the list, but the looking, searching, and observing is the challenge.
6. During the next class, repeat step 4 for the rocks brought from home, and have each student examine his or her rocks from the two scavenger hunts with a hand lens.
7. Have each student show and tell why some of their rocks were chosen to represent particular categories.
8. Then, have students draw one of their rocks from each scavenger hunt on a sheet of the plain paper. Observations may also be in words. Title the paper "My Observations (or What I Discover with all My Senses.)"

Further Challenges

Compare the rocks collected for the scavenger hunts to large rock specimens in the classroom and discover the kinds of rocks and/or minerals that have been collected. Can they match their rocks to components of the large specimens? For example, a small pink rock may be the same as the feldspar in a chunk of granite.

Have them research the kinds of rocks found around the school. Are they naturally occurring in your area? If not, how and why were the rocks moved to the school grounds?

Class Time Scavenger Hunt List

A scavenger hunt means to look for things on a list and then collect them. Look for the rocks described below in your school yard. Bring the ones you have found when you are called.

- A rock smaller than your pinky.
- A rock larger than your fist.
- A square rock.
- A smooth rock.
- A rock that has several different colored specks in it.
- A very rough rock.

Observe the rocks using a hand lens.

Take Home Scavenger Hunt List

Bring as many of the following rocks as you can find to class.

- A rock that is all the same color.
- A rock that has different colored specks in it.
- A rock that is flat.
- A rock that is bumpy.
- A rock that is shiny.
- A rock that is dull.
- A rock that is dull but has shiny pieces in it.

Be fair, try to find your own rocks. If you know a rock collector, ask if you may bring a rock from their collection. Do not buy rocks for this activity. Do your best!

Other Rocks and Mineral Activities:

- —Make equal weights of sand and dry plaster of Paris. Pour it into a transparent plastic container to make a layer of about one inch (2 cm). Now add a mixture of fine gravel and plaster. Do the same for various mixtures of colored sand, or pebbles, all with plaster of Paris. Throw a seashell or two on a layer.

Now fill the container with water. Next day you will have your own sedimentary rocks. The water will have caused the plaster to recrystallize and cement the whole mass together. The seashells will be present as fossils.

- Make a snowball (ice shavings). Pick up a handful of snow and compress it to form a lump sturdy enough to be used to throw. In the center of the snowball, the light fluffy crystals of snow will have recrystallized in a more compact form, because of the pressure of your hands. This is quite close to the metamorphic process.
- —Create colored tags for the students to wear. Each color represents a certain kind of mineral in a molten material (magma or lava). Hang colored pieces by a string to make things easier.
 - Split the class into at least 4-5 groups that have identical tags. There should be enough for every student to have one.
 - Spread the class out randomly. Have them as far away from each other as possible.
 - After the students have spread out, yell "CRYSTALLIZE!" and have students hurry to find others with their same name tag.
 - After a few seconds, yell "STOP!" and have students stop where they are.
 - Look around the class. How many groups have formed? Are there any groups? Use the size of each "crystal" to discuss the texture of the new rock created.
 - Repeat steps 3-5 with different time intervals.
 - The goal is to create 'extrusive' rocks, where either no or few crystals were formed, 'intrusive' rocks where large crystals were formed, and for more advanced students, porphyritic or vesicular rocks were formed. Consider a 'large' crystal to be three or more students of like crystal color that have found each other.
 - You may want to start each round by giving the students a scenario to think about. - Perhaps they are lava that has just come from a sea floor spreading ridge or has exploded from a violent volcanic eruption. Perhaps they are magma that has eased its way into the sediments of the continental crust. Then allow them the appropriate time to "crystallize".
 - During the activity you may want to pull students aside and allow them to see what is happening. A video camera looking down onto the room allows students to see the game after it has been played.