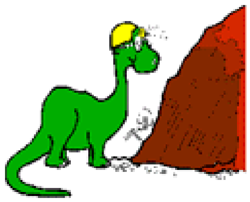
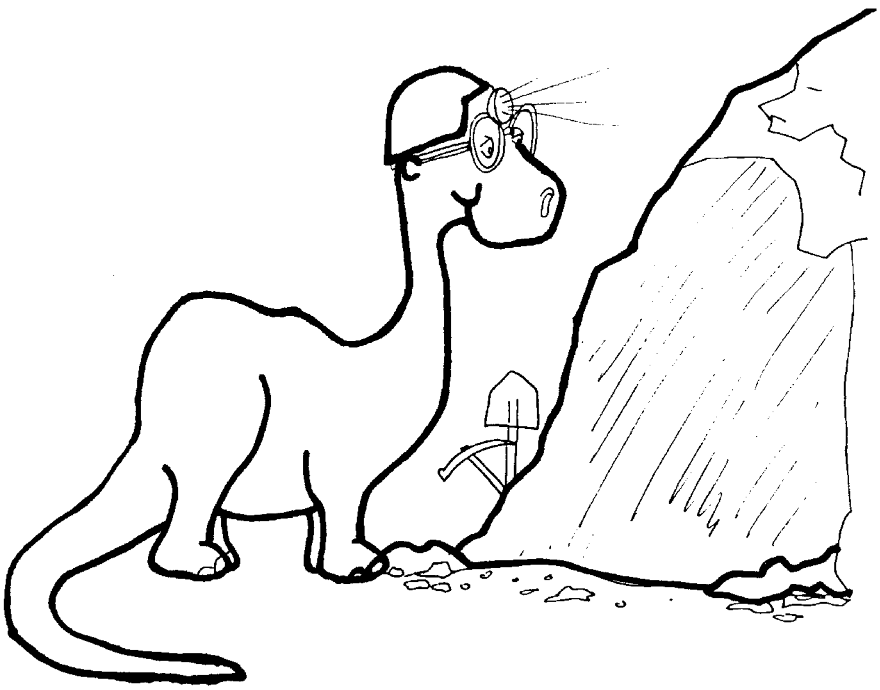


Rock Cycle

Understanding the Earth's Crust

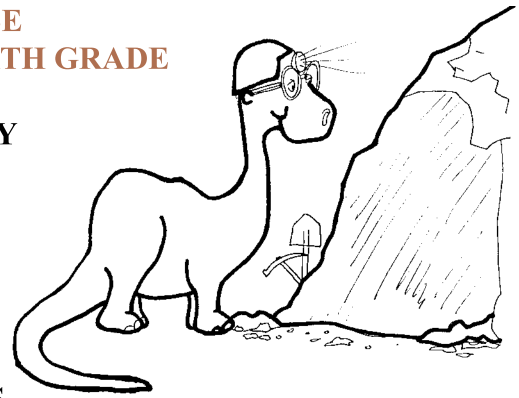
FOURTH GRADE

ROCKS



2 WEEKS
LESSON PLANS AND
ACTIVITIES

ROCK CYCLE
OVERVIEW OF FOURTH GRADE



CHEMISTRY

WEEK 1.
PRE: *Analyzing the structure of the elements.*
LAB *Investigating the chemical bonding of salt.*
POST: *Exploring the historical uses of salt.*

MINERALS

WEEK 2.
PRE: *Observing and describing key characteristics.*
LAB *Exploring the characteristics of minerals.*
POST: *Comparing and contrasting mineral properties.*

WEEK 3.
PRE: *Exploring the different shapes of minerals.*
LAB *Analyzing mineral shapes.*
POST: *Examining minerals that are gemstones.*

ROCKS

WEEK 4.
PRE: *Developing criteria to distinguish rocks.*
LAB *Analyzing how different types of rocks are formed.*
POST: *Exploring the uses of rocks in the Indian culture.*

WEEK 5.
PRE: *Exploring parts of the rock cycle.*
LAB *Analyzing and interpreting the shape of sand particles.*
POST: *Developing a story about rocks.*

PAST LIFE

WEEK 6.
PRE: *Reconstructing fossil organisms.*
LAB *Discovering that "the present is the key to the past."*
POST: *Recognizing fossil bones.*

ROCK CYCLE - ROCKS (4A)

PRE LAB

Students compare library books information on rocks and minerals

OBJECTIVES:

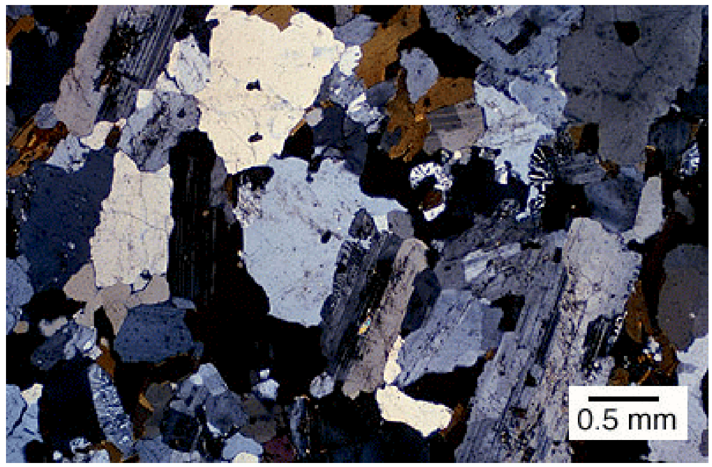
1. Developing criteria to distinguish rocks.
2. Comparing rock characteristics through reference material.

VOCABULARY:

igneous
metamorphic
sedimentary

MATERIALS:

internet
library



Thin section of granite.

BACKGROUND:

The Rock Cycle is a way to conceptually understand the creation and destruction of igneous, sedimentary, and metamorphic rocks on and within the crust of the Earth. Rocks form in many environments.

Identification of rocks can be difficult for beginners. Many people try to match a rock sample with a picture. This rarely works, as the same type of rock can have a great variety of appearances. Geologists classify rocks using two basic features: mineral composition and texture (appearance).

All igneous rocks began as magma (molten rock) which cooled and crystallized into minerals. Igneous rocks may look different because of two factors: (1) they may have cooled at different rates and (2) the "mother" magma (original melted rock) was of a different composition. Variations in these two factors have created many different types of igneous rocks. When the magma cools at different rates, it creates different sized minerals. Quick cooling magmas have small minerals (with the exception of obsidian, which is actually composed of silica, but has no crystalline structure). Basalt, for example, has small minerals, most of which can only be seen under a microscope. Quick cooling magmas are generally the ones which are erupted onto the earth's surface; they are thus called volcanic rocks. Magma that cools slowly creates rocks like granite, which have large minerals that can be seen with the naked eye. These igneous rocks cool inside the earth, and are called plutonic igneous rocks. Geologists classify igneous rocks based on both their crystal size and composition.

Sedimentary rocks form at the Earth's surface in two main ways: (1) from clastic material (pieces of other rocks or fragments of skeletons) which have become cemented together, and (2) by chemical mechanisms including precipitation and evaporation. Sedimentary rocks are usually associated with liquid water, which facilitates erosion, transportation, deposition, and cementation. However, sedimentary rocks may also form in dry, desert environments or in association with glaciers. Geologists classify sedimentary rocks using the composition of their components and their appearance.

Metamorphic rocks are formed from igneous, sedimentary, or preexisting metamorphic rocks that have been changed by great pressures and temperatures within the crust and upper mantle of the Earth. The temperatures were not enough to melt the rock, otherwise, an igneous rock would have formed. The pressures were much greater than those required to simply break the rocks into pieces. They were high enough to change the chemical make up of the rock by forcing the elements in it to "exchange partners." Different grades of temperature and pressure will cause the same original rock to form very different metamorphic rocks. Slate, which forms from the sedimentary rock shale, is very dense, smooth and does not contain visible minerals. However, if more pressure and temperature are applied to a slate, it could turn into schist, which has visible layers of minerals. If yet higher temperature and pressure are applied, the schist could turn into gneiss, which shows visible bands of minerals. Metamorphic rocks are named using their physical appearance and mineral composition. These characteristics are quite variable, depending on the pre-existing rocks and the range of temperature and pressure.

PROCEDURE:

Gathering information about rocks is sometimes difficult for students. Children love rocks, but good information is difficult to find. In this activity, students are asked to find and critique reference materials.

1. Provide books on rocks and minerals for the students to read. You may want them to go to the local library and find a book on rocks and minerals. Since there may not be many sources, you may want the students to work in teams. Let them compare and contrast the style of the books for content and readability. If you have internet access, you can search for sites on rocks. Note that on a search engine "rock" will more often than not, bring up sites on "rock and roll." It may help to search for specific types of rocks.

2. Ask students the following questions to see which books or sites they would recommend to someone who wants to learn more about rocks and minerals. The answers to these questions are subjective, since each student will probably have a different opinion.

A. Which book explains that minerals make up rocks?

B. Which book explains clearly that there are three different types of rocks, sedimentary, igneous, and metamorphic?

C. Does one book make it very clear that rocks are formed on the crust of the earth by different processes?

D. Which book is easy to read?

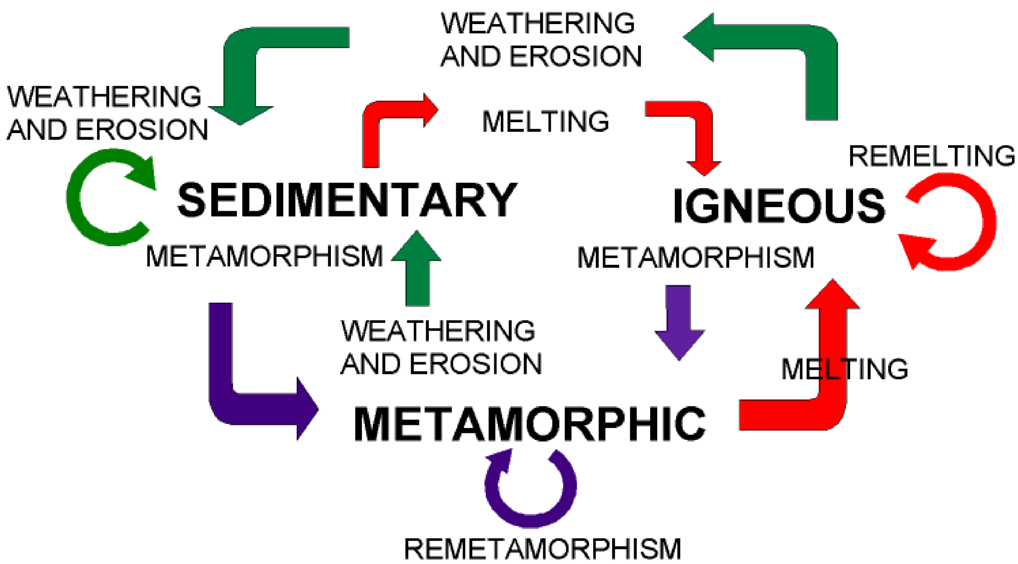
E. Which book has the most information?

F. Which book has ideas for home activities?

G. Which book would you recommend to a friend who wants to learn more about rocks and minerals?

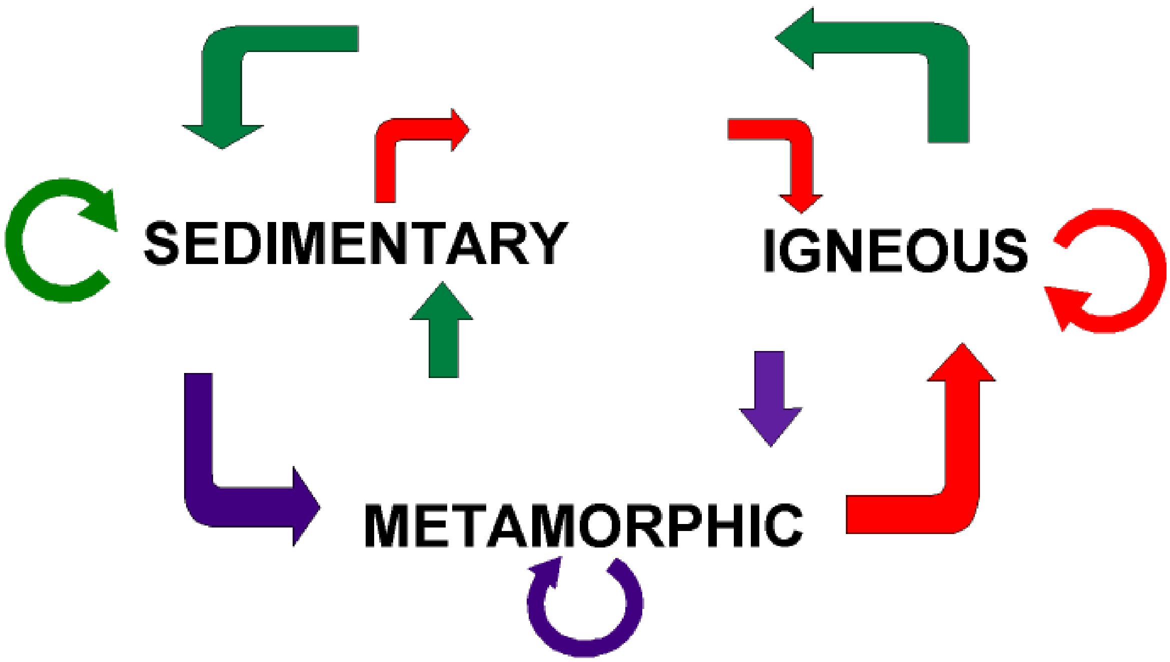
H. Which book has the prettiest pictures?

3. Go over the rock cycle as illustrated below. You may want to use the worksheet for students to follow along with your cycle. You may want the students to try and figure out the “blanks” before you give them the answer.



ROCK CYCLE - ROCKS (4A) PRE LAB

Can you write in the missing portions of the Rock Cycle in the diagram below?



Describe the rock cycle in a paragraph.

ROCK CYCLE - ROCKS (4A)

LAB

Students determine the different type of Rocks

OBJECTIVES:

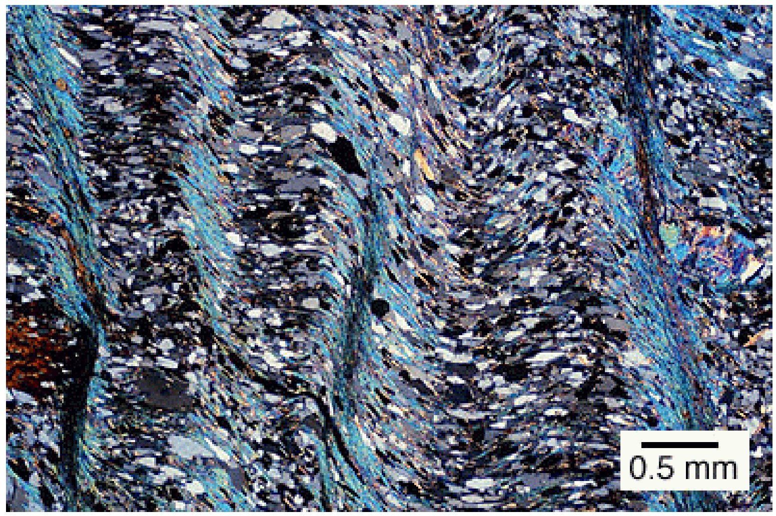
1. Analyzing how different types of rocks are formed.
2. Interpreting the characteristics of the three types of rocks.

VOCABULARY:

igneous
metamorphic
mineral
rock
sedimentary

MATERIALS:

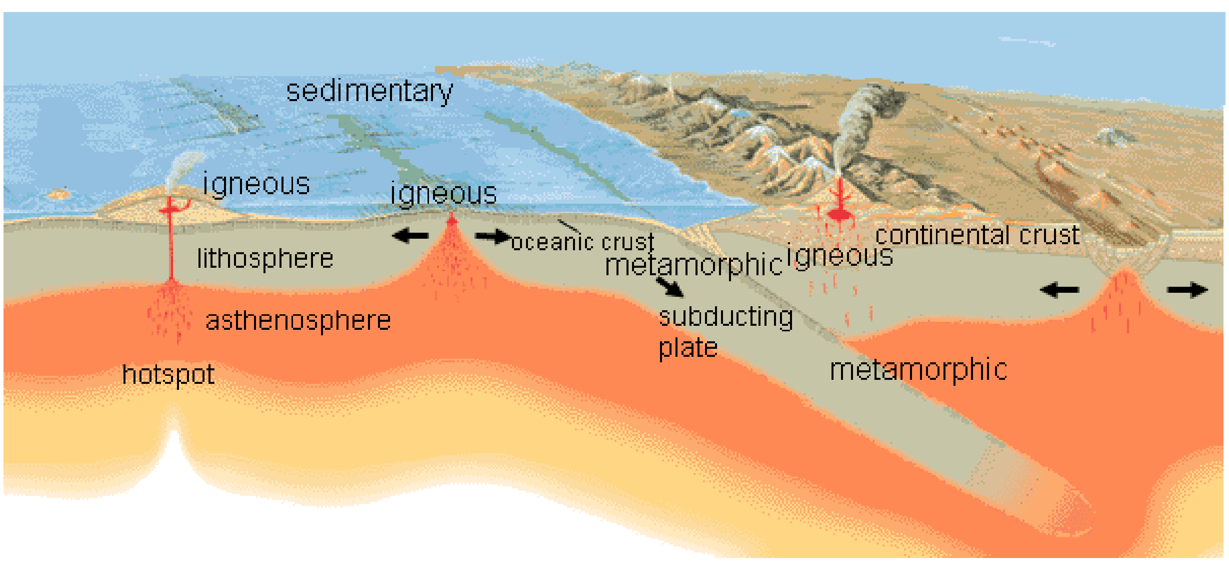
Rock Cycle - Rocks (4A)
Swift-GH microscopes or hand lens



Metamorphic texture

BACKGROUND:

Studying the environments where rocks form is a more creative way of teaching rocks than simply identifying rocks. Students should be able to visualize the different environments of rock formation. For example, if a child picks up granite, they should think



that this rock cooled slowly inside the crust of the Earth. The pictures below can help you illustrate the different environments. Igneous is melted and hot; sedimentary is wet and cool; and metamorphic is full of pressure and heat.

The distinct characteristics that separate igneous, sedimentary, and metamorphic rocks are not easily observed. The objective of this exercise is for the students to recognize common characteristics shared by rocks belonging to the same group. Some general characteristics that your students may observe include:

1) igneous rocks are often composed of minerals that are visible, especially rocks that have cooled slowly;

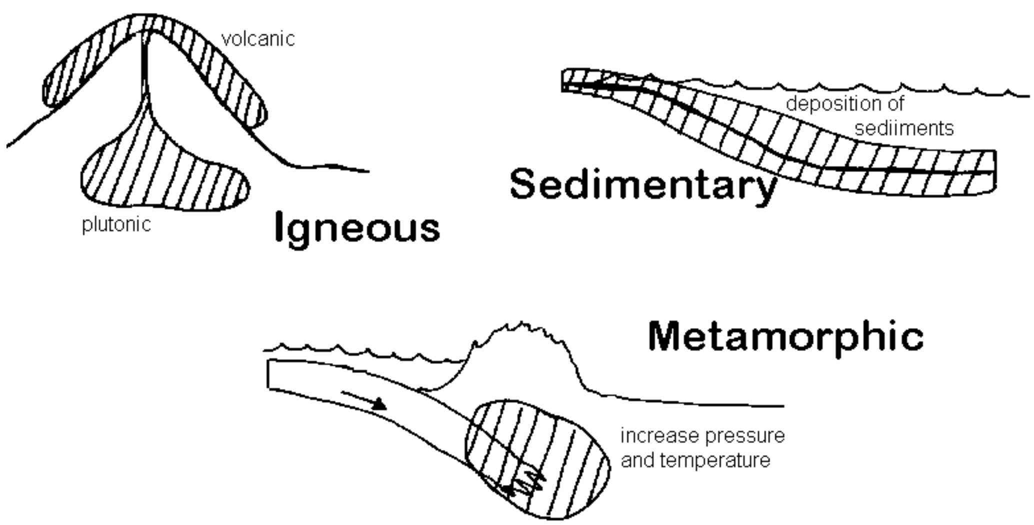
2) metamorphic rocks look squished, are very dense and sometimes shiny; and

3) sedimentary rocks usually are made up of pieces of rocks cemented together, resulting in a grainy texture.

PROCEDURE:

1. Explain the three ways that rocks form.

2. Draw the three types of rock-forming environments on the board. Label each diagram with the appropriate name (igneous, metamorphic or sedimentary).



3. Instruct students to use the microscope or hand lens to look for details of each of different types of rocks. The following are suggested answers, but remember students can be more creative in their descriptions

IGNEOUS ROCKS (obsidian, granite, scoria, basalt) - all samples seem to be hard and not breakable.

GRANITE: Granite is an igneous rock that cooled very slowly. We know this because the minerals in granite are very large. It takes a long time (hundreds of thousands of years) for rocks to grow to visible size.

BASALT: Basalt cooled more quickly than granite. Geologists know this because the minerals are not visible with the naked eye, but are visible with a specialized microscope. The quicker an igneous rock cools the smaller the crystals.

OBSIDIAN: Obsidian, or volcanic glass, cooled very quickly giving minerals no time to form. Obsidian cooled faster than granite or basalt. The chemical composition is silicon dioxide (the same as quartz and glass).

SCORIA: Scoria is partly composed of pre-existing rock and new lava being cooled. It usually is reddish brown, with many gas pockets throughout the rock. Scoria is denser than pumice, but still relatively light in weight.

SEDIMENTARY ROCKS (shale, sandstone, conglomerate, mudstone with fossils). These samples are soft and more breakable than igneous or metamorphic rocks. These also seem to be less dense than the other types.

CONGLOMERATE: conglomerate is composed of fairly large rock fragments and minerals. Students will identify these as “pebbles” or “rocks”. The composition of these particles varies quite a lot between samples.

SANDSTONE: The gritty feel of the surface of sandstone hints that this rock was once sand that has been cemented together. Depending on the specimen, individual sand grains may be visible. Sandstones have quite varied compositions; some are composed entirely of quartz, and others are mixtures of rocks, crystals and fossils. Almost any combination is possible. Sandstones thus come in a wide array of colors.

SHALE: shale is composed of very small particles of mud, which have been compacted and cemented together. Individual mud grains are very small; they will rarely be visible. Shales are quite variable in color.

MUDSTONE WITH FOSSIL SHELLS - Mudstone is a variety of shale. The samples in the kit contain marine fossils, indicating that these rocks formed in the ocean.

METAMORPHIC ROCKS (marble, schist, serpentinite) these samples are dense, but all of them seem to have different characteristics

SCHIST - Schist is composed of visible minerals, mostly micas. Schists form under moderately high pressure conditions; this causes the naturally platy mica crystals to line up, giving the rock a platy look. This is a good example for illustrating the characteristic "squished" look of metamorphic rocks to your students. This is called a *foliated* texture. This It is a new word for most students, so it is important that you have a good sample when illustrating schist.

MARBLE: marble is composed exclusively of large commonly visible crystals of calcite. The gray/white bands in some of the samples are due to impurities within the calcite. Marble actually comes in a variety of colors, including black, gray, white, and pink.

Marble, like all rocks that have calcite in them, fizz if you put a weak acid on it (usually 10% solution of hydrochloric acid). Marble forms when a rock containing calcite in it (such as limestone) was put under high temperature and pressure conditions.

SERPENTINITE: Serpentinite has a smooth, soapy feel, a green mottled color, and a somewhat flaky texture. It is composed mainly of the mineral serpentine. Serpentinite is so named because of its mottled color, which resembles the back of a sea-serpent. The geologic origin of serpentinite is still debated, but many scientists agree that it formed from a rock like basalt that was put under high temperature and pressure. Serpentinite is the state rock of California.

ROCK CYCLE - ROCKS (4A) LAB

PROBLEM: What characteristics are useful in identifying the major types of rocks?
PREDICTION:____
EXERCISE: Using your rock kit and the code described by your instructor, arrange the rocks into 3 groups. Try to determine which characteristics are common to each group. List these characteristics [Hint: hard, soft, breakable, flat, sandy, heavy, crystals, color, etc.].

IGNEOUS	CHARACTERISTICS
GRANITE	
OBSIDIAN	
BASALT	
SCORIA	

METAMORPHIC	CHARACTERISTICS
MARBLE	
SCHIST	
SERPENTINITE	

SEDIMENTARY	CHARACTERISTICS
SHALE	
SANDSTONE	
CONGLOMERATE	
MUDSTONE (FOSSILS)	

CONCLUSION: What are some identifying characteristics of igneous rocks? Of metamorphic rocks? Of sedimentary rocks?

____

ROCK CYCLE - ROCKS (4A)

POST LAB

Students study rocks in Native American culture.

OBJECTIVE:

1. Exploring the uses of rocks in the Native American culture
2. Discovering why rocks were important in everyday life.

VOCABULARY:

flint
mortar
pestle
tools

MATERIALS:

Display - Indian Rocks
arrowheads

BACKGROUND:

Early humans did not have many materials available to fashion tools. Steel, iron, plastic, and many other materials were not invented or discovered until modern times. The only materials available were trees, rocks, plants, minerals, and animal remains. Rocks and minerals were important because many types are naturally hard.

Some minerals were ground up and mixed with animal fat for use as face paint or to create colors on cave walls. The red in many cave paintings used hematite (an iron oxide mineral.) Minerals were also used as jewelry, much as they are today.

Rocks were converted into useable tools. For example, large flat rocks were used as grinding stones (mortar and pestle). Wild grains were crushed on them to produce flour. Many of these rocks were well-cemented sandstone or igneous rocks (basalt in particular). Long round rocks were then used to roll the grain mixture into flattened dough, which could be easily cooked over a fire. Rocks, like obsidian or chert (composed of quartz), could be also fashioned into weapons. Arrowheads were traditionally made from rocks like obsidian, which could be sharpened enough to pierce the skin of an enemy or prey. Heavier rocks were used as blunt instruments.

Even pottery requires clay from a pure mudstone. Fine grained feldspar (a mineral) is also used in making some pottery better than others.

PROCEDURE:

1. Discuss some of the uses of the rocks in the Indian Rocks display. Quartz and flint were used to make fire. Flint, agate, and obsidian were used for knives. Sandstone, basalt, and granite were used for mortars and pestles. Sulfur was used as a medicine. Early humans also used ground minerals as pigment in rock paintings.

2. Instruct the students to imagine that they are early Native Americans living in this country. You may want to list some of the Indian tribes such as the Navajo, Hopi, Ohlone, Cherokee, Cheyenne, or Apache. Have the students try to imagine what mineral and rock resources they would have available, and how they would use them.

3. If you have information on the Native Americans in your area, we suggest you find out how they used rocks and minerals in their culture. A local museum or college can provide information.

ROCK CYCLE - ROCKS (4B)

PRE LAB

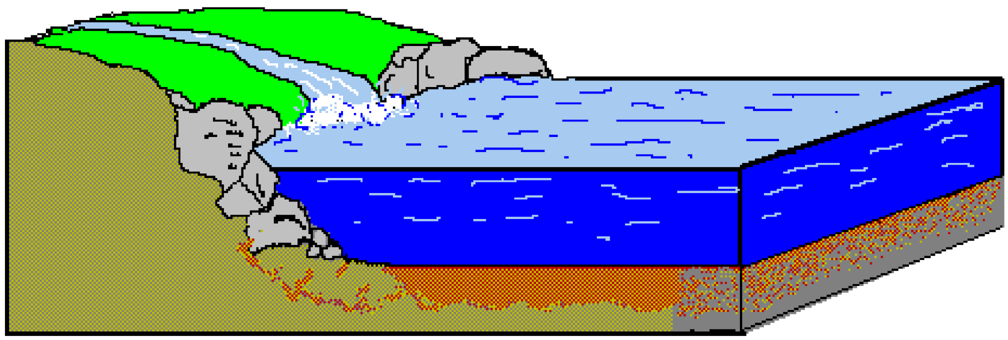
Students discover how sand is created.

OBJECTIVE:

1. Exploring parts of the rock cycle.
2. Comparing different sands.

VOCABULARY:

angular
change
erode
melt
particle
round
sand grain



MATERIALS:

Sand Display kit

BACKGROUND:

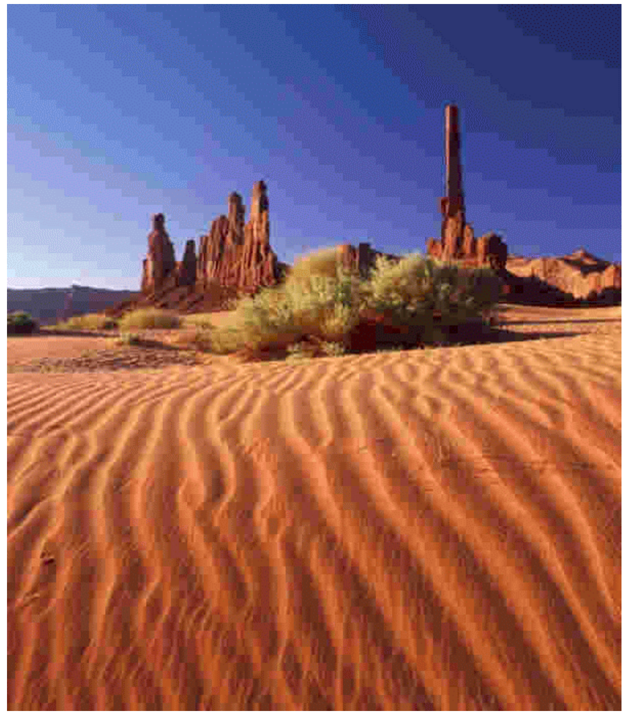
Sand has been used to describe many human attributes. A vagabond has been referred to as "driftless like ...sand"; endless time is called "sand that drifts forever"; we are all but a "grain of sand on the beach." Children can spend endless hours on the beach, creating sand castles, or digging to reach the other side of the world. Sand is clean to play with; it can cover you up, but not make you dirty. Sand is loved so much by children that adults have created sand boxes, so their children can play with it.

Sand is very important in manufacturing industries. Pure quartz sand is the raw material for making glass. Other sands are also used to make pottery, to line the hearth of acid steel furnaces, for molding metal casts, and as abrasives (garnet-rich sands). Sand is also important in the cement business; it is an important component of concrete. Imagine an industrialized country without concrete: no large buildings, no highways, no slab housing, no large pipelines (especially sewage), and so on.

Sandstone layers within the earth are important to the petroleum industries. The spaces between the sand grains in these layers may be filled with oil and gas. Sandstone thus acts like a holding tank for petroleum, just waiting for humans to tap them.

Sand, is defined as any loose, granular material between upper and lower size ranges (in the United States - 1/16mm - 2mm). Sand is created in a number of ways:

WEATHERING is the mechanical breakdown and chemical decay of rocks. An example of the former is frost wedging. In wet areas, water fills the cracks in rocks. When the temperature drops below freezing, the water in the cracks turns into ice. The ice expands, and forces the cracks apart. The ice then melts as the weather warms up. The rock thus becomes weaker and the cracks become wider with each successive freeze-thaw cycle. The rock eventually breaks apart into many pieces. Decomposition of a rock converts less resistant, chemically unstable minerals stable forms. For example, at the earth's surface, feldspar decomposes into clay. These two types of weathering work together to break down rocks. For example, the decomposition of the unstable minerals in a rock allows the remaining resistant minerals to fall out.



VOLCANIC EXPLOSIONS can create sand size particles of glass, crystal fragments, and lava particles. The particles will settle out onto land, or when an underwater volcanic eruption takes place, into the sea.

CRUSHING and **ABRASION** take place when rocks are physically broken up during transport. For example, as they move, glaciers often break larger rocks into sand size particles. Further abrasive action results in clay size particles. Small particles loosened and carried by wind can abrade or "sandblast" other rocks.

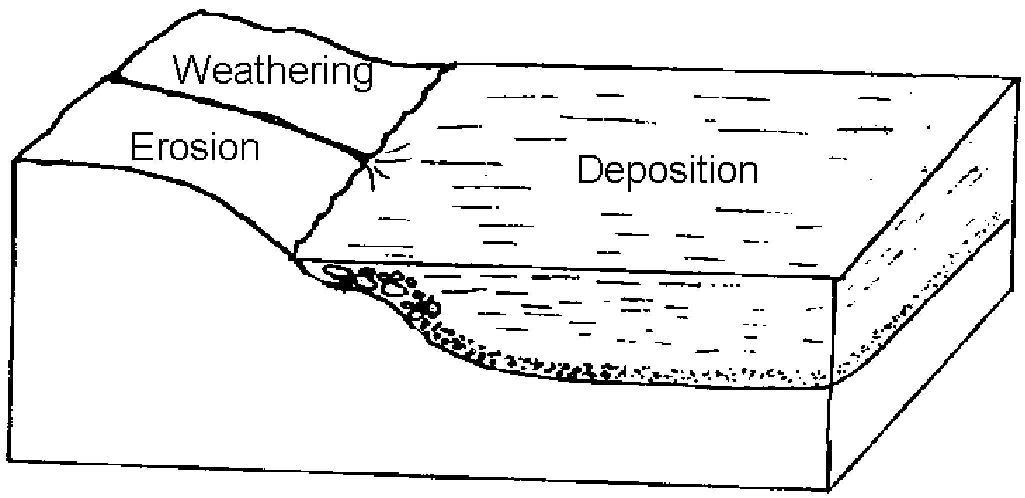
PELLETS created in the guts of little organisms also can form sand-sized particles. Many organisms on the bottom of the ocean are debris feeders, scooping up mud, digesting it for food and then excreting the remaining material in pellet form. Large portions of the ocean floor are covered with such pellets.

PRECIPITATION of minerals from water supersaturated with calcium carbonate can produce sand-sized grains called oolites. Oolites (which means egg shaped) form in warm shallow ocean water, along beaches in places like Florida and Australia. In addition, the skeletons of marine organisms, which are biologically precipitated, can break up after the organism's death to form sand-sized fragments.

PROCEDURE:

1. Discuss the rock cycle. Introduce sand as "miniature rocks" reflecting the parent rock that it eroded from. Use the sand kit to show students different types of sand that can be found at beaches. Different processes create different types of sand. Sand can be formed in deserts as well as rivers.

2. Use the diagram to show students where weathering, erosion, and deposition take place. Explain how this is a part of the Rock Cycle. Sediments travel from the land to the ocean by rivers, streams, and creeks. These sediments will settle out in the ocean or lake from heaviest to lightest.



ROCK CYCLE - ROCKS (4B)

LAB

Students analyze sand samples to discover parent rocks.

OBJECTIVES:

1. Analyzing and interpreting the shape of sand particles.
2. Comparing the roundness of various sands.

VOCABULARY:

angular
rounded
sand

MATERIALS:

Rock Cycle - Rocks (4B)
Swift-GH microscopes
sand charts

Ripples in sand

BACKGROUND:

Sedimentologists (geologists that work with sedimentary rocks), understand the significance of sand grains in rocks. The size, shape, and roundness help to explain the sandstone's "life history."

This lab emphasizes two points. First, sand composition reflects the sand's source. Second, the roundness of individual sand particles reflects how far the sand traveled and for how long. Sand is usually created when water and/or wind break off small pieces of pre-existing rock. If the particle is "newly" broken off, it tends to have an angular look, but if the particle has traveled by water or wind for a long time it becomes rounded.

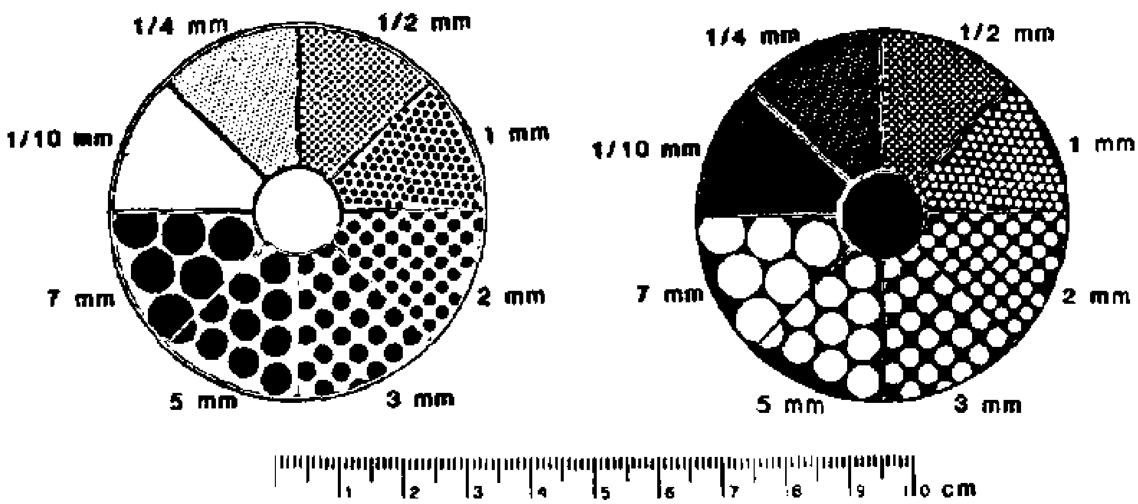
The river's water carries the rocks along the bottom of the river bed. The pebbles are eroded by abrasion. The longer a pebble stays in the river bed, the more rounded it will become. The more angular a pebble the shorter the period of time it has been moving.

Since sand comes from a "Mother" or source rock, it is possible to determine what type of rock produced the "baby rocks." The composition and general color of both the "baby" and "mother" rock are often very similar. There are five possible source materials for the sand in this lab. Granite is a plutonic igneous rock. It occurs in varying shades of light and dark colors depending on the specimen's mineral composition. Serpentinite is a metamorphic rock that is smooth, green, and scaly. It is the state rock of California. Chert is a sedimentary rock that forms from the shells of microscopic marine life in deep ocean environments. It is very hard, and comes in many colors. Quartz is found in many rocks including granite and chert, and is the main constituent of most sand. Most quartz crystals are clear or white in color. Basalt is a dark, fine -grained igneous rock.

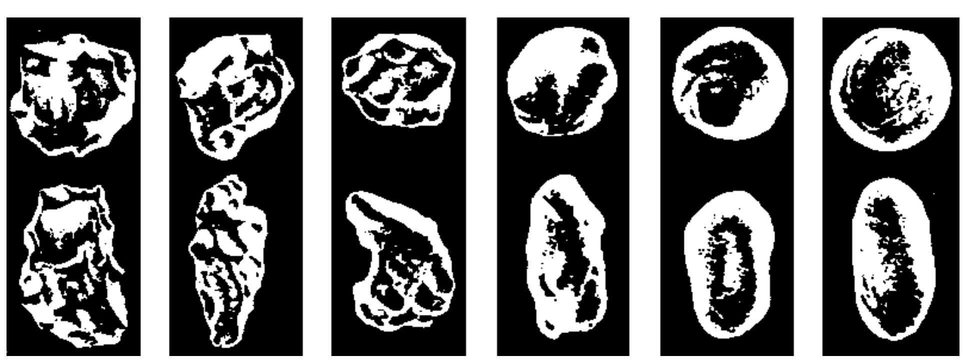
PROCEDURE:

1. Before lab, prepare sand samples for each student group, using the Rock Cycle - Rocks (4B) kit. Set up microscopes for each group. If you are not familiar with the sand identification charts, you may wish to experiment before the lab.

2. Instruct the students to use the size component of the Sand Chart (shown below) to determine the shape of the sand particles. If you have microscopes, use tape to hold a few particles in place under the objective. If you have the Swift GH microscope, you can keep the sand in the bag and have the students observe the sand through the bags. Have the students illustrate their observations. In most cases, the students will see a range of sizes. Size generally indicates how long a particle has been eroding and moving. The longer time, the smaller the particle will be.



3. Instruct the students to compare the particles in their sand samples with the diagram below. In the diagram below, the most rounded grains are on the right, the most angular are on the left. Students find this difficult because they have to make a decision based on their observation. Again, microscopes are helpful. The rounder a particle, the longer it has been moving.



4. Tell the students to try and identify the source rock for each sand sample. Emphasize that rocks contain many clues about their origins. Tell the students that they can interpret the history of rocks, using their powers of observation. Show examples of "mother" or source rocks to the students. Describe the origin of each source material to the students. Be sure to point out that quartz is a mineral and not a rock. Each sand sample will resemble the mother rock because the sand has the same mineral composition. Have samples of granite, chert, serpentinite, and basalt on display to aid the students in their description of the sand samples.

CLEONE, Mendocino County, California -.25-0.5mm; well sorted; subangular - subrounded. Contains quartz, feldspar, serpentinite, chert and basalt. The dark color is due to over abundance of basalt, serpentinite and chert. Also may contain pieces of shell material. Type of rock in area are basalt, serpentinite and chert.

MONTEREY, California - 025 - 7mm; very poorly sorted; subangular. Contains quartz, feldspar and pieces of granitic rock. The Mother rock is a granite, but unlike Montara Beach sand, Monterey has not been chemically weathered. Abrasion of large boulders of granite along the coast have mechanically broken this sand.


Monterey sand


Monterey granite

OAKWOOD HEIGHTS BEACH, Staten Island, New York -0.25 -1mm; well sorted; angular - rounded. Contains quartz, feldspar and magnetite. This sand is eroding from a sandstone that probably had a granitic origin, which has more pinkish/orange feldspars in it, then the California counterpart.

SAN FRANCISCO, California -0.1 -0.5mm; well sorted; subangular to subrounded and crystals. Contains quartz, mica, feldspar and magnetite (magnetic) Derived from sandstones exposed along cliffs south of Ocean Beach.

RODEO BEACH, Marin County, California -0.1 -7mm; poorly sorted; angular - rounded. Contains chert, serpentinite, quartz, basalt, magnetite. This beach is in a cove behind the Golden Gate Bridge, where very high energy waves erode the rocks exposed along this coast. The source rocks include chert, serpentinite, and basalt.

ROCK CYCLE - ROCKS (4B) LAB

PROBLEM: Can you determine the size, shape, and source rock of different sands?

PREDICTION: ____

PROCEDURE: You have sand samples from different locations. Try to determine which minerals, rocks, or other items are in the samples. Look at the display of rocks for clues. Use a microscope or magnifying glass to help you look at the samples.

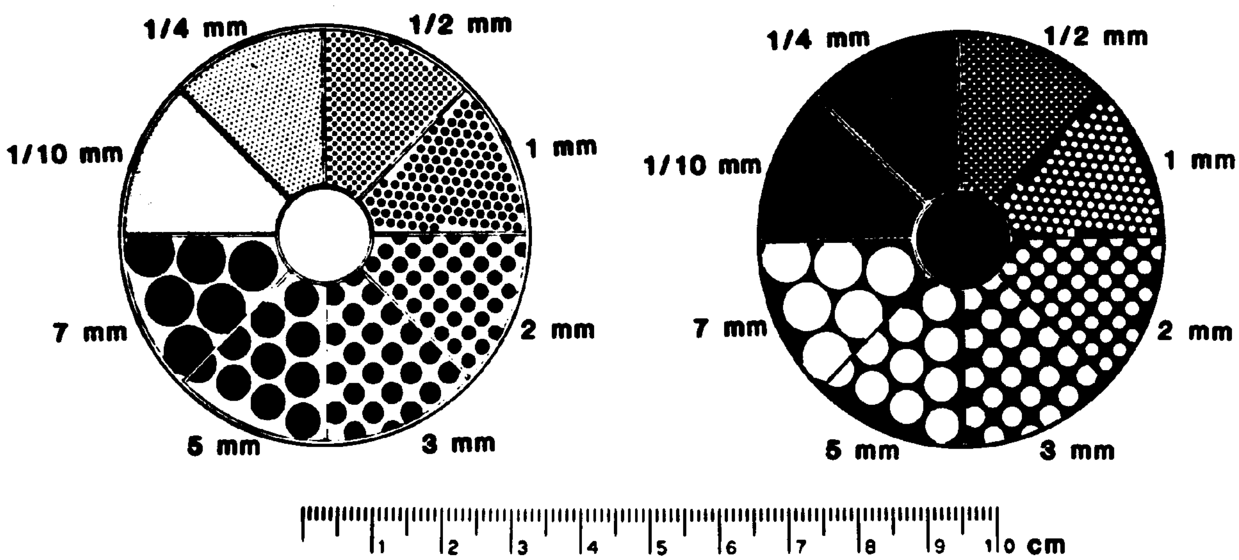
LOCATION	SIZE	ROUNDNESS	DRAW GRAINS
PALM SPRINGS, CA parent rock:			
RODEO BEACH, CA parent rock:			
CLEONE, CA parent rock:			
MONTEREY, CA parent rock:			
NEW YORK, NEW YORK parent rock:			
SAN FRANCISCO, CA parent rock:			

CONCLUSION: Which rocks can you identify?

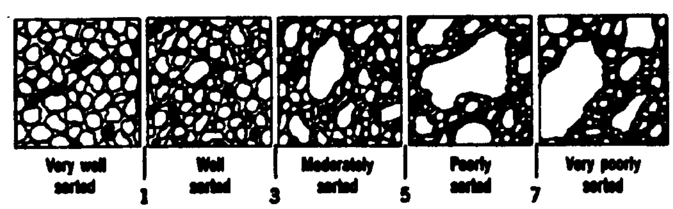
____

____

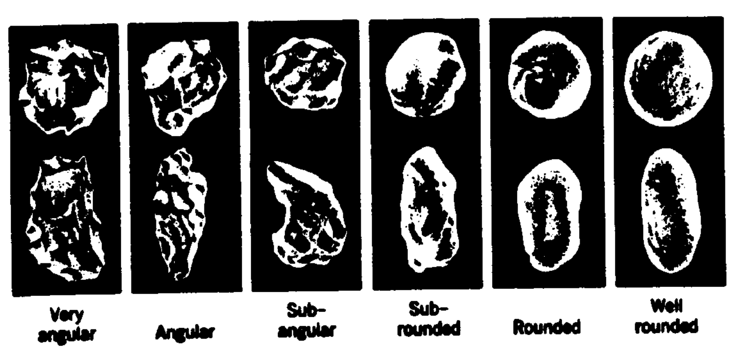
SAND CHARTROCK CYCLE - ROCKS (4B)



sorting



roundness

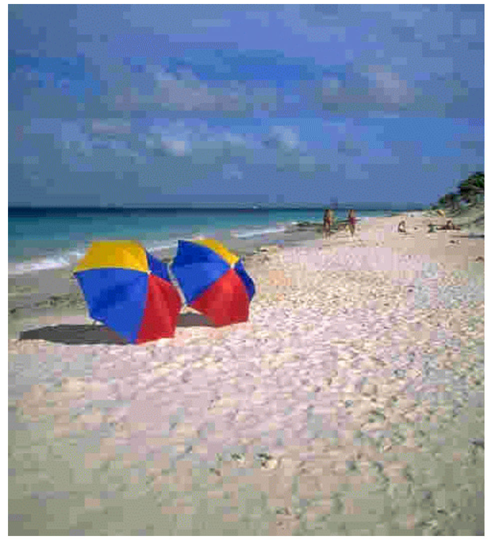


ROCK CYCLE - POST LAB (4B)

> Students develop language arts skills using sand as a story line.

OBJECTIVES:

1. Developing a story about how rocks become round.
2. Using information to construct a story on rocks.



VOCABULARY:

angular
eroded
movement
round
transport

MATERIALS:

Internet

BACKGROUND:

People, young and old, like to feel shiny, smooth rocks. Many do not even realize that these types of rocks have endured erosion, possibly as the rocks tossed and turned down a river's path. Abrasion by glaciers and wind also results in a smooth surface on a rock.

Throughout history, civilizations have used rocks and minerals in sacred ceremonies. People even have spent money to purchase “pet rocks.” Rocks and minerals have characteristics that lure people to them, including their strength, their smoothness, and their beauty.

Rocks and minerals can become the storyteller’s “liar stone.” The rock or mineral can neither confirm nor deny the tale. This is what makes just one rock, a perfect way for students to communicate.

PROCEDURE:

1. Instruct students to look on the Internet for information that show a “fun” way to present rocks. The following web sites on sand castles can help students realize that people around the world can enjoy sand without knowing all the science behind them. However, knowing the science makes it more interesting.

http://www.netaxs.com/~sparky/sand.html
Center for Sand site includes geology, biology, and art of sand.

www.sandcastlecentral.com/tips/index.html

Sand castles for beginners gives information on how to build an award winning sand castle.

2. Instruct the students to study the worksheet and use their imagination to decide how Billy can determine why the rocks became round. Some students may want to be more scientific, but others may want to develop a fictional story line. The story below is an example. Remind students that "Billy" could refer to a boy, girl, or even a goat.

Billy found pebbles that were along a river. The river's waters carried the rocks along the bottom of the river bed. The pebbles were eroded by abrasion. The longer a pebble stays in the river bed, the more rounded it will become. The more angular a pebble is, reflects that it has not been moving for very long. Billy found the two different types of rocks together (one very old, eroded and well rounded, the other very angular and new) because the river can erode new rock anywhere on its journey.

WHY ARE ROCKS ROUNDED?

Billy found these pebbles along a river. Some were very rounded and others were not. He put them in order from angular to rounded. Can you think of the reason why this can happen and why they can be found together?