Home School Series: K - 2 April: Rocks

Start Up: (5-10 min)
Rocks & fossils to look at and touch, magnifying glasses, related posters
Sedimentation experiment jar

Welcome/ Introduction: 1 min.
Staff/Volunteer Names
Today's Topic-Rocks
Question: Where do rocks come from and how do they change?

Opener: 10 min.
Daily Geology (Blobaum)-Use the geology bingo sheet (*3-5 Rocks & Fossils*) to ask the students about their activities in the last day. Have them raise their hands, then say their names if they've done the activity. Repeat for each question.
Make sure all students get a chance to introduce themselves.

Background/ Exploration: 50 min.
Ask the students what geology means. It is the study of the earth.
Help the students understand the meaning of rocks and minerals:
Rock-A substance made up of crystals and particles of minerals.
Most rocks are made up of combinations of the same 20 minerals.
Examples of rocks include granite, limestone, sandstone, & quartzite (show them).

Mineral-A naturally occurring non-living solid substance with a consistent chemical make-up and a special crystal shape. May include one or more elements.
There are more than 2500 kinds of minerals.
Examples of minerals include gypsum, calcite, galena, & quartz (show some).

Activity: 10-15 min.
A Mineral Recipe…for You! (Blobaum) and/or **Geoscavenge** (*Ranger Rick*)
Activities show students what familiar substances are minerals and what minerals are found in the human body. E.g.
Chalk-calcium
Pencil lead-carbon
Matches-sulfur, phosphorus
Salt-sodium, chlorine
Fluoride-toothpaste
Paper Clips-iron
Banana-potassium
Antacid-magnesium
Share a few human uses of rocks as tools-hammers, arrowheads, etc.

How do rocks form?
Types of Rock and their formation (show examples of each):
Igneous-Formed from molten rock-magma in the earth, or lava from volcanoes.
Sedimentary-Formed from sediment/particles cementing together under water.
Metamorphic-Igneous or sedimentary rock changed by extreme heat & pressure.
It takes a VERY long time for most rocks to form and/or change.

Which kind of rock do we find a lot of in Iowa?
Sedimentary-limestone-this area used to be covered by shallow seas.

Activity: **Sedimentation experiment** (Blobaum)-A model of sedimentary rock formation.
1 min. Show the students a clear container filled with pebbles, sand, twigs, leaves, and water.
(Students could help make the mixture.)
Shake the container to suspend the sediment.
Set it somewhere to settle so it can be observed later.

Volcanoes are one force for rock formation. They:

- Add gases to the atmosphere
- Add water to oceans
- Build mountains & islands by oozing lava
- Form rocks with cooled lava

Soil is later formed from erosion of volcanic rock

Activity: **Eruption demonstration** (Blobaum-see below)-
10 min. Put the baking soda & dish soap into the volcano bottle.
Add the colored vinegar quickly and enjoy the eruption.

Look at a diagram of the **rock cycle.** Compare it to the water cycle if you wish.
Explain the formation and erosion of rock as a continuous process.

Earth's Geologic Features-Show and explain a poster of the layers of the Earth.

Activity: **Earth Layer Model** (*Ranger Rick*)-Build a model of the Earth's layers with the students.
15 min. Divide the group of students into segments corresponding to the layers of the ESarth.
Give each set of students a layer and an action to go with it.
Ask the whole group to do their actions and sounds to model the Earth.
This works best with a larger group (20-40 students).

The **Earth's crust** is made of large pieces, or plates, which slowly move along on the molten magma underneath.
Where plates press together, land uplifts, eventually forming mountains.
Where plates separate, magma oozes up and cools into more land.
Sometimes, one plate goes under another, and the edge is melted again.
When plates rub against each other sideways, that makes earthquakes.
Everything on the Earth's surface is always changing, very slowly or sometimes faster.

Activity: **Plate Movement** (Blobaum)-Use a piece of waxed paper, a dollop of frosting,
5 min. and two graham cracker squares. Move the crackers on the frosting to model various plate movements-rift (ocean floor crack), uplift (mountains), sideways (earthquakes), subduction (one edge under the other-volcano).
This can also be done by the students and eaten as a snack when finished.

Fossils-Preserved remains, impressions, or traces of plants/animals that lived long ago.
Hard parts preserve best-bone, shell, tooth.
Rapid burial also helps preservation.
Show the students some fossils they can touch.
Mold-Shape/impression of an ancient animal or plant.
Cast-Material that later filled in the mold. Has the shape of the original creature.
Older fossils are usually found underneath younger ones.

Look for fossils where there is sedimentary rock-Stream/river banks, shorelines.
Especially helps to find rock that is being excavated because new un-weathered fossils can be exposed-road building, quarries.

Prepare to go Outside: 10 min.
Restroom break.
Apply: Sunscreen, Bug Repellant (if necessary)
Bring: Water bottles, hats, jackets (if necessary)
Trail Rules (see The First Program).
What we will do/What to look for-Rocks, fossils
Predictions-What rocks will we find? Will we find any fossils?

OUTDOOR EXPLORATION: 60-80 min.
Hike to see nearby landforms and places to find fossils.
Go to the mouth of a creek or sandbar to look for rocks.

Activity: 10-20 min.
Look for fossils in river rock or limestone landscaping.
Check the riverside rocks for different types and fossils.

Game: 15 min.
Play **Asteroid Belt** (Sanborn)-Set up a rectangular playing field.
Ask students to stand randomly within the area. They are the asteroids.
- ♣A blindfolded student is the spaceship trying to guide itself through the field of asteroids.
- ♣The nearby asteroids must "beep" as the ship's radar detects them (student gets close).
- ♣If the student successfully navigates the asteroids, a new pilot is chosen.
- ♣If an asteroid is hit, that student becomes the new pilot.
- ♣Several pilots can fly simultaneously in a larger group.

Closing: 1 min.
Sediment Experiment-Check on the settling sediment jar.
Which materials have settled on the top? The bottom?
Briefly discuss the difference in settling rates of various materials.

Send Off: 1 min.
Goodbye!
Next Month-Water Birds

Take Home:
Parent Outline
At-Home Activities
Rock or fossil

Vocabulary

Geology, mineral, rock, fossil, cast, mold, igneous, sedimentary, metamorphic, volcano, magma, tectonic plates, earthquake

Background and Activity References for Naturalists and Parents

www.rahul.net/infodyn/rockhounds/rockhounds.html	Rockhounds Information Page
http://www.angelfire.com/ia3/cvrms/	Cedar Valley Rocks and Minerals Society
http://midamericapaleo.tripod.com/	Mid-America Paleontology Society

Blobaum, Cindy. 1999. *Geology Rocks! 50 Hands-on Activities To Explore the Earth.* Williamson Publishing, Charlotte, VT. P. 5 Earth's Treasure Che st; p. 24 Sediment experiment; p. 29 Marble-metamorphic candy experiment; pp. 38-41 Mineral Testing; p. 50-51 Push those Plates; p. 58 Thar She Blows!; p. 72 Fossils; p. 86 Cave formation experiment.

Land for Life, The Story. National Association of Conservation Districts, League City, TX. Coloring pages and puzzles on a poster. What is Soil?

Millie and Sam's Fossil Hunt. 2004. University of Iowa Paleontology Repository, Mid-America Paleontology Society. Good photos. Background and field guide for beginning fossil hunters.

Ojakangas, Richard W. 1997. *Earth Science.* Walch Science Literary Series. J. Weston Walch, Portland, Maine. P. 8 Rock Cycle diagram

Ranger Rick's Naturescope: Geology: The Active Earth. 1987. National Wildlife Federation, Washington, D.C. Background and many geology related activities; P. 9 Earth's Layers activity; p. 13 Famous volcanic eruptions; pp. 25-26 Mineral testing; pp. 27-28 Crystals; pp. 42-44 Fossil formation; pp. 61-62 Geoscavenge/Mineral Hunt

Sanborn, Jane. 1984. *Bag of Tricks: 180 Great Games*. Search Publications, Florissant, CO. P. 27 Asteroid Belt

Wherever You Are on Earth…You're on Rock! An Activity Book for Junior Geologists, Mining Engineers, and Earth Scientists. Martin Marietta Aggregates. Geology puzzles and information. P. 10 Rock & mineral uses matching activity

Places in Iowa to visit to see rocks

-Rock & Mineral Show (Cedar Rapids in March)
-Bluestone Rock Shop (Cedar Rapids-Mt. Vernon Rd.)
-Devonian Fossil Gorge (Coralville, Corps of Engineers)
-Museum of Natural History, McBride Hall, U of I
-Rockford Quarry

Extensions/Alternate Activities/Rainy Day

Mineral Matching (Martin Marietta, see *3-5 Rocks & Fossils*)-Ask the students to match up the rock & mineral shapes. Discuss the use revealed by each match.

Discuss **Elements**-Pure substances made up of one kind of atom.
Examples of elements: gold, carbon, copper, iron, neon, & oxygen (show some).

Compare the size, shape, color, and texture of different minerals and rocks.

Show students how to test minerals for color, hardness, streak, and luster.

Obtain limestone gravel or river rock containing fossils (Rockford Quarry). Set up a table and tubs ½ full of warm water for students to clean the rocks with toothbrushes. Let them take home a couple fossils.

Play the **Rock Cycle Game** (see *3-5 Rocks & Fossils*).

Supplies:

Rock examples	Graham crackers	Fossil mold	
Minerals	Frosting	Fossil cast	
Fossils			
Magnifying glasses	**Daily Geology** sheet	**Volcano Model**	-baking soda
Geology posters			-vinegar
Rock cycle diagram	Blindfolds for **Asteroid Belt**		-red food coloring
			-20 oz. Plastic bottle
			-funnel

Geoscavenge hunt-
Objects made from minerals & rocks (*Ranger Rick*)
Aluminum can, aluminum foil, metal utensil, pencil, toy car, mirror, glass/jar, scissors, (wooden spoon, book, paper, plant)

Mineral Recipe-Familiar substances containing the same minerals as the human body (Blobaum)

Advance Preparation:

Eruption demonstration-Cover a plastic soda or water bottle with clay or play dough until it looks like volcano. Place somewhere the students can all see it. A plastic sheet or tarp on the table and/or floor is a good idea! Add red food coloring to the vinegar for easier use later.

Sediment jar-Place pebbles, sand, silt, small twigs, and leaves in a clear container. Fill the container up to 2" from the top. (Epsom salts can be added to set the "sedimentary rock".)

Copy the **Daily Geology** sheet from *3-5: Rocks & Fossils.*

Copy and enlarge the Earth layer diagram from Ranger Rick

*Be sensitive to families' religious views.
Extinction is a natural process.
When talking about fossils, use terms like "long ago", rather than "millions of years", etc.