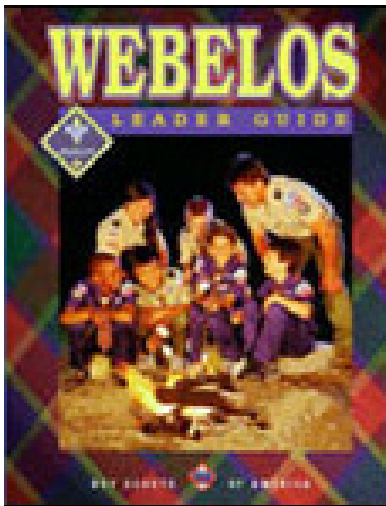


Webelos Activity Badge

Geologist



Prepared By:

Rich Smith

Cubmaster Pack 133

September, 2003



Geologist

Do five of these:

1. Collect five geologic specimens that have important uses.
2. Rocks and minerals are used in metals, glass, jewelry, road-building products, and fertilizer. Give examples of minerals used in these products.
3. Make a scale of mineral hardness for objects found at home. Show how to use the scale by finding the relative hardness of three samples.
4. List some of the geologic materials used in building your home.
5. Make a drawing that shows the cause of a volcano, a geyser, or an earthquake.
6. Explain one way in which mountains are formed.
7. Describe what a fossil is. How is it used to tell how old a formation is? Find two examples of fossils in your area.
8. Take a field trip to a geological site, geological laboratory, or rock show. Discuss what you learned at your next Webelos Den Meeting.
9. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for [Geology](#).

Geologist Signoff

Requirements							
Do five of these requirements:							
1. Collect five geologic specimens that have important uses.							
2. Give examples of rocks and minerals used in metals, glass, jewelry, road-building products, and fertilizer.							
3. Make a scale of mineral hardness for objects found at home.							
4. List some of the geologic materials used in building your home.							
5. Make a drawing that shows the cause of a volcano, a geyser, or an earthquake.							
6. Explain one way in which mountains are formed.							
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8. Take a field trip to a geological site, geological laboratory, or rock show. Discuss what you learned at your next Webelos Den Meeting.							
9. Earn the Cub Scout Academics belt loop for Geology .							

Geologist Activity Badge

1. Premeeting – Geologist Word Search *(Handout)*
2. Introduction
 - a. Background Information
 - b. Geologist Flash Card Definition
3. Examples of minerals used in metals, glass, jewelry, road building products and fertilizer p 358 *(Requirement 2)*
4. Geological Materials in Homebuilding p 358 *(Requirement 4)*
 - a. Types of Materials Used for Building *(Display Pieces)*
5. Make a drawing that shows the cause of a: *(Requirement 5)*
 - a. Volcano p 359 *(Handout)*
 - b. Geyser p 361 *(Handout)*
 - c. Earthquake p 362 *(Handout)*
6. Explain one way a mountain is formed p 363 *(Requirement 6)*
 - a. Draw a Mountain Handout *(Handout)*
7. Hike
 - a. Collect Five Specimens *(Requirement 1)*
 - b. Identifying Rocks p 350
 - c. Collecting Rocks p 355-57
8. Mineral Hardness Scale *(Requirement 3)*
 - a. Activity – Hardness Scale (Identification) *(Handout)*
9. Describe what a fossil is p 364 *(Requirement 7)*
 - a. Discussion
10. Activity – Geologist Word Scramble *(Handout)*
Or Geologist Match *(Handout)*

Rich Smith
9/22/2003

Introduction to the Geologist Activity Badge

What is Geology?

Geology is the science of the earth. **(Use Geologist Flash Card Definition)** The name comes from two Greek words. Geo, meaning earth or land and logos, meaning speech or story.

Geology began to take its present form about 200 years ago. A Scot, James Hutton, published his *Theory of the Earth*, which held that, "the present is a key to the past". Hutton advocated that given sufficient time, processes that were now working could account for all of the geologic features we now see. Geologists call this principle the principle of uniformitarianism.

Geology includes the study of materials that make the earth, the processes that change it, and the history of how things happened. Human civilization depends on natural materials for its existence. Although much is known about these subjects, much more remains to be discovered, explained, and understood.

A geologist is a person who studies the history of the earth and its life. The history books that the geologist uses are rocks! Geologists are interested in how the earth is made. Geologists study rock formations at the top of mountains and deep in the earth's crust. They investigate earthquakes, volcanoes and geysers. They know about the uses of rocks and minerals. Some geologist search for mineral deposits like gold, diamonds, coal and oil.

A geologist also studies fossils to learn what they can tell us about the earth millions of years ago.

Why Are Minerals Important?

The earth contains many useful minerals. Some, like silica (sand), are easy to see and collect. Others, like iron and zinc, are found in rocks. They must be removed from the rock by a process called *smelting* or *refining*.

There are three classes of useful minerals – metals (gold, silver, copper, iron, aluminum), non-metallic minerals (gypsum, potash, limestone, sand), and fuels (coal, natural gas, petroleum, uranium).

Did You Know These Facts About Minerals?

- Precious and semiprecious stones include diamond, garnet, ruby, sapphire, and topaz.

Geologist Word Search

Directions

Find the words in the puzzle that are listed below.

The words are horizontal, vertical, and diagonal, forwards and backwards.

All of the words are associated with the Geologist Activity Badge!

Put the unused letters in the boxes to find a hidden message!

S C M O G E O L O G I S T R S U T J
I S E N E R C V O L C A N O S G F E
M E T A M O R P H I C O R C E N E W
I D A E S C U I R S R O C K N E R E
N I L R K K S R E S Y E G H D M O L
E M S O T S T O S O S R R O R I C R
R E Q Y S H P N V F T O A U A C R Y
A N B N S M Q X C V A C N N H E E E
L T N I A T N U O M L R I D J P T L
M A N T L E A V A L K E T A L S U B
Q R I C G O L D W K L N E R I C O R
W Y Y T N O I S O R E N I C K E L A
Z A C H B F O R M A T I O N N E D M

H I D D E N M E S S A G E

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!

CRUST

CRYSTAL

EARTHQUAKE

EROSION

FORMATION

FOSSIL

GEMS

GEOLOGIST

GEYSER

GLASS

GOLD

GRANITE

HARDNESS

IGNEOUS

INNER CORE

IRON

JEWELRY

LAVA

MANTLE

MARBLE

METALS

METAMORPHIC

MINERAL

MOUNTAIN

NICKEL

ORE

OUTERCORE

ROCKHOUND

ROCKS

SEDIMENTARY

SLATE

SPECIMEN

VOLCANO

R. P. Smith

9/13/03

Geologist Word Search

Directions

Find the words in the puzzle that are listed below.

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S	C	M	O	G	E	O	L	O	G	I	S	T	R	S	U	T	J
I	S	E	N	E	R	C	V	O	L	C	A	N	O	S	G	F	E
M	E	T	A	M	O	R	P	H	I	C	O	R	C	E	N	E	W
I	D	A	E	S	C	U	I	R	S	R	O	C	K	N	E	R	E
N	I	L	R	K	K	S	R	E	S	Y	E	G	H	D	M	O	L
E	M	S	O	T	S	T	O	S	O	S	R	R	O	R	I	C	R
R	E		S	H		N		F	T	O	A	U	A	C	R	Y	
A	N		S		Q			A	C	N	N	H	E	E	E		
L	T	N	I	A	T	N	U	O	M	L	R	I	D		P	T	L
M	A	N	T	L	E	A	V	A	L		E	T	A	L	S	U	B
	R		G	O	L	D		K		N	E				O	R	
	Y		N	O	I	S	O	R	E	N	I	C	K	E	L	A	
				F	O	R	M	A	T	I	O	N					M

H I D D E N M E S S A G E

S C O U T I N G F O R R O C K S !

CRUST

CRYSTAL

EARTHQUAKE

EROSION

FORMATION

FOSSIL

GEMS

GEOLOGIST

GEYSER

GLASS

GOLD

GRANITE

HARDNESS

IGNEOUS

INNER CORE

IRON

JEWELRY

LAVA

MANTLE

MARBLE

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SEDIMENTARY

SLATE

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VOLCANO

R. P. Smith

9/13/03

Mineral Hardness Kit

Piedmont Council

The mineral hardness scale was developed more than 100 years ago by Friedrich Mohs, a German mineralogist. He arranged 10 minerals in a hardness scale with talc the softest as number 1 and diamond, the hardest as number 10. The complete hardness scale can be found in the Webelos Scout handbook.

You can make your own kit from materials you already have around the house or that you can buy at low cost. It will help you establish the hardness of a mineral sample within rough limits. You will need:

1. Talc. You can purchase this in the form of tailor's chalk.
2. Your fingernail. It has a hardness of 2 to 2 1/2.
3. A new copper coin. The edge has a hardness similar to calcite.
4. A 12-penny nail. To test materials with hardness of 4 to 4 1/2.
5. A knife. The steel of a good knife blade is rated at about 5 1/2.
6. Piece of window glass. It has a hardness of about 6.
7. A high-speed drill bit. Tip has hardness of about 6 1/2.
8. Metal file. Good quality capable of fine smoothing or cutting - 7 1/2.
9. High-speed masonry drill point. Hardness of about 8 1/2.
10. Carborundum sharpening stone will scratch minerals of hardness about 9.

It is a good idea to label each piece of your hardness kit. When you find a mineral that will barely scratch your knife blade (5 1/2) but will not mark glass (6) you may assume that the material's hardness lies between 5 and 6.

You will find it best to test the mineral specimen on a flat surface. After you have made a test scratch, try to run the mark away with your fingers. A true scratch will remain. It's best to use a magnifying glass to examine any doubtful mark. Sometimes the testing tool will leave scrapings or such marks. Your hardness kit will be of little use when testing pieces of granite, which may be composed, of a mix of quartz (7), Feldspar (6) and mica (2). The bits of individual minerals may be large enough to recognize but impossible to test with your kit. This is where your study of rock samples and guidebooks will serve you well. Not only will you be able to recognize the major types of rocks, but you will also learn something about the minerals you find connected to such rocks. Don't take more of a mineral than you need for a display sample. Thumb-sized lumps are fine. They display well, they are easy to carry, and your consideration will mean that another rockhound will have the fun of making the same discovery that you did.

Building Materials

Invite a housing contractor to come to your den meeting. Ask them to bring materials such as **slate, brick, block, stone, cement, limestone, marble, granite, ceramic tile, linoleum**, etc. Where do they purchase these supplies? Where do they come from originally?

What Geological Materials are used to Build your Home?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

How Does a Volcano Form?

Draw a picture that shows how a volcano is formed.

Include the following parts in your picture:

- | | | | |
|---------|----------|-------------|----------|
| 1. Ash | 3. Crust | 5. Mantle | 7. Smoke |
| 2. Cone | 4. Lava | 6. Mountain | 8. Vent |



Draw a picture of a volcano that shows how it is formed.

Volcanoes

By Barb Stephens

Read the definitions, then label the diagram below.

ash cloud - the cloud of ash that forms in the air after some volcanic eruptions

conduit - a passage through which magma (molten rock) flows in a volcano

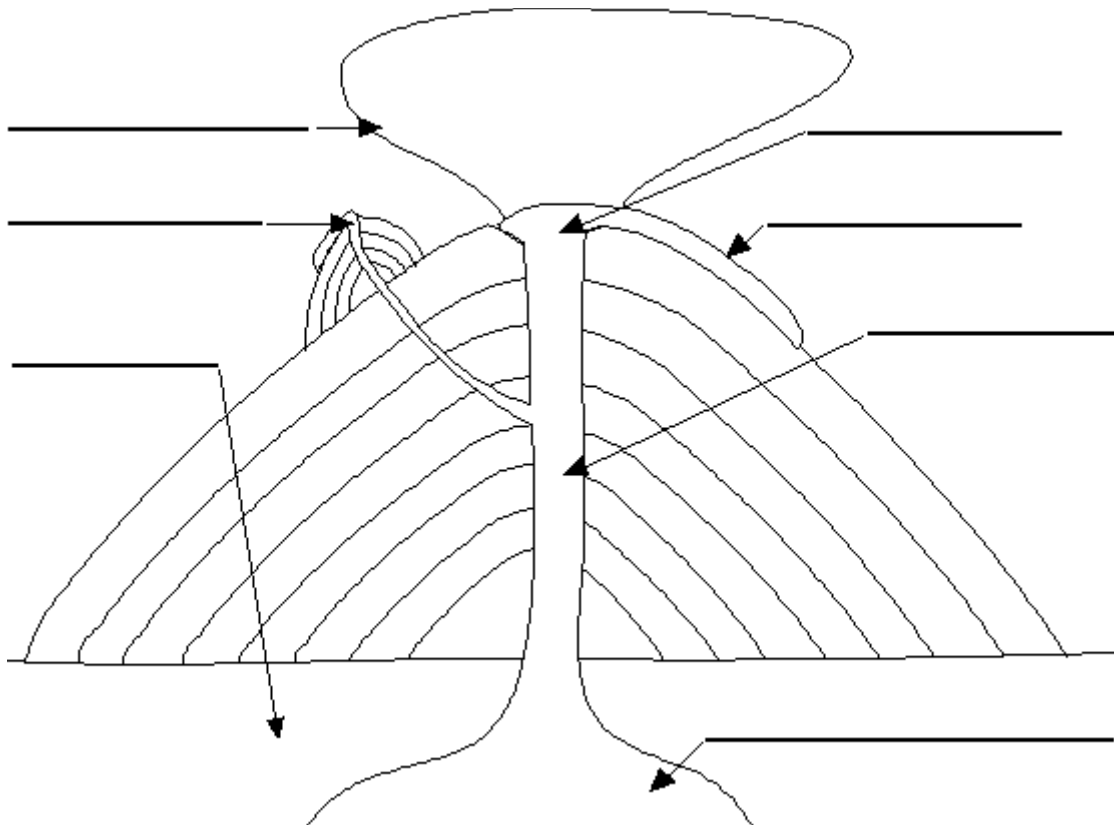
crust - the Earth's outermost, rocky layer

lava - molten rock; usually comes out of erupting volcanoes

magma chamber - contains magma (molten rock) deep within the Earth's crust

side vent - a vent in the side of a volcano

vent - an opening in the Earth's surface through which volcanic materials erupt



What Causes a Geyser?

Draw a picture that shows what causes a geyser.

Include the following parts in your picture:

- | | | |
|----------------|----------------|----------|
| 1. Crust | 3. Hot Gases | 5. Steam |
| 2. Geyser Tube | 4. Molten Rock | 6. Water |



Draw a picture that shows what causes a geyser.

What Causes an Earthquake?

Draw a picture that shows what causes an earthquake.

Include the following parts in your picture:

1. Crust

2. Fault

3. Plates

4. Rocks



Draw a picture that shows what causes an earthquake.

How Are Mountains Formed?

Draw a picture that shows how a mountain is formed.

Include the following parts of the process:

- | | | | |
|------------|----------|-----------|------------|
| 1. Crust | 3. Fault | 5. Plates | 7. Volcano |
| 2. Erosion | 4. Lava | 6. Uplift | 8. Wind |



Draw a picture that shows how a mountain is formed.

Identify Six Different Rocks

1. Rock # 1
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____
2. Rock # 2
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____
3. Rock # 3
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____
4. Rock # 4
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____
5. Rock # 5
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____
6. Rock # 6
 - a. Color _____
 - b. Luster _____
 - c. Cleavage _____
 - d. Hardness _____

Rocks, Shells and Fossil Prints

Mix: 1/2 cup cornstarch

1/2 cup salt

3/4 cup flour

Add: Warm water to make into a dough ball

The dough can be rolled, formed or used to press shells, rocks or other natural found objects into. Let the dough air dry, turning each day until dry or microwave one minute on each side. It may be necessary to adjust the microwave time according to the thickness of the dough and microwave temperature. Dry dough can be painted with tempera paint.

A Sour Trick

Material

Lemon juice, vinegar, medicine dropper, and two pieces each of limestone, calcite, chalk, and quartz

1. Put a few drops of lemon juice on four of the rock samples.
2. Put a few drops of vinegar on each of the four other rock samples.
3. LOOK and LISTEN carefully each time you add vinegar or lemon juice.

What To Think About

1. What happens when you put lemon juice on each rock?
2. What happens when you put vinegar on each rock?
3. Did the lemon juice and vinegar act the same way on each rock?
4. Why did some of the rocks react differently?
5. What does this experiment have to do with weathering?

What Should Have Happened

The lemon juice and vinegar both contain weak acids. The lemon juice contains citric acid and the vinegar contains acetic acid. These mild acids can dissolve rocks that contain calcium carbonate. The lemon juice and vinegar should have bubbled or fizzed on the limestone, calcite, and chalk, which all contain calcium carbonate.

There should not have been a reaction on the quartz, which does not contain calcium carbonate. Explain that water often contains weak acids that dissolve rocks containing calcium carbonate and other minerals. You may want to discuss ACID rain, too.