MiniMe Geology™

ROCK DETECTIVES
IGNEOUS INVESTIGATION

www.MiniMeGeology.com

Hey there Mini Me Geologists!

Today we are on an Igneous Investigation. To complete your investigation, you must follow the clues and complete the activities on this printable disk.

First, read about each of the samples in your kit in the Igneous Rock Information section.

Then, print out and follow each of the Identification "ID" Activities.

Rock Information

Identification Activities

Once you know what your samples are, move on to games, puzzles and experiments in any order you wish. Don't forget to take the "What I Learned" quiz at the end and print your Igneous Investigation geologist's certificate to show everyone what a smart geologist you have become!

Experiments & Fun

Games and Puzzles

Parents Note: The information on this disk is designed to be read on-screen and/or printed using adobe Adobe® Acrobat Reader 9.0 which is a free program available at www.adobe.com.

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Igneous Investigation Rock Samples

info

GRANITE

Color: White and light gray, also pink, red, yellowish
Type: Intrusive
Minerals: MAJORS: Feldspar, Quartz, Mica MINORS: Hornblende, Magnetite, Garnet, Pyroxene
Texture: Medium-grained. Crystals are all similar in size.
Locations: Most common rock on Earth's surface — can be found in most countries.
Uses: Building materials and monuments
Features: Hard and tough rock. Granite color varies based on minerals present.

SNOWFLAKE OBSIDIAN

Color: Black with white "snowflakes"
Type: Extrusive
Minerals: MAJORS: Feldspar, Quartz, Mica MINORS: Hornblende, Magnetite, Garnet, Pyroxene
Texture: Glassy - No Crystals
Locations: Yellowstone National Park (United States), Hungary, Japan and Italy.
Uses: Used in industry to make rock wool.
Features: Obsidian is formed when the lava cools very, very quickly and becomes glass-like. The snowflakes are actually small white crystals that are shaped like needles and form in a circle as the rocks breaks down over time.

ANDESITE

Color: Light to dark gray, brown to black, reddish-pink, green
Type: Extrusive or Intrusive
Minerals: MAJORS: Feldspar, Biotite MINORS: amphibolite, pyroxenes
Texture: Porphyritic
Locations: Japan, South America, Caribbean, Mexico
Uses: Building materials
Features: Found with volcanic ash or tuff (also from volcanoes)

SCORIA

Color: Red, brown, or black
Type: Extrusive
Minerals: Can vary (mostly feldspar, pyroxene, and biotite)
Texture: Vesicular
Locations: United States, Canada, Easter Island, New Zealand
Uses: Often used in road beds and landscaping beds and is called "lava rock."
Features: Forms during a volcanic eruption. Air escaping from the lava causes the holes in the rock.

PEGMATITE

Color: Light color, varies with crystal content.
Type: Intrusive
Minerals: MAJORS: Quartz, Mica, and Feldspar / MINORS: Garnet, Topaz, Beryl, Ruby, Pyrite, Fluorite, Emerald, and many more
Texture: Coarse-grained
Locations: United States, Brazil, Russia
Uses: Mined for its mineral content.
Features: Large crystals are characteristic of this rock. The large crystals are formed when the rock cools very, very slowly.

VOLCANIC BRECCIA

Color: Grayish, Greenish
Type: Extrusive
Minerals: Various
Texture: Porphyritic
Locations: Limited to areas near volcanoes
Uses: Limited use, possible as building materials
Features: Volcanic breccia is typically formed during an eruption when rock fragments are plucked off of the inside of a volcano and are stuck in the lava or when fragments are picked up by lava flowing over land.

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What I Learned

You have almost completed your Igneous Investigation! Try these questions to see what a great Mini Me Geologist you have become!

My Favorite Igneous Rock

(Draw and color a picture of your favorite rock)

I love it because: _____

_____

_____

_____

_____

1. _____ rocks can be made by volcanoes.
   A. Mineral B. Igneous C. Metamorphic D. Sedimentary
2. _____ rocks are formed when lava is thrown out of the volcano during an eruption.
   A. Internal B. Intrusive C. Extrusive D. Flying
3. _____ rocks are formed underground when magma cools very slowly.
   A. Internal B. Intrusive C. Extrusive D. Flying
4. _____ is a common igneous rock that is often used as a building material.
   A. Gabbro B. Diorite C. Pumice D. Granite
5. Granite has mineral crystals that you can easily see because the rock cooled very _____ .
   A. Quickly B. Evenly C. Slowly D. Instantly
6. Obsidian looks like black glass because the rock cooled _____ .
   A. Quickly B. Slowly C. At Night D. On a Glacier
7. All igneous rocks are made from the same minerals. TRUE FALSE
8. Volcanoes can only form one shape. TRUE FALSE
9. All igneous rocks have the same crystal sizes. TRUE FALSE
10. Igneous rocks can look very different depending on the minerals present and the way they formed. TRUE FALSE

Answers: 1. B, 2. C, 3. B, 4. D, 5. C, 6. A, 7. False, 8. False, 9.False, 10. True

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Growing Edible Glass Rocks

Hey Kids! Try this fun experiment to learn more about how extrusive igneous rocks form. Making a sugar glass rock will show you how extrusive igneous rocks form quickly when hot lava is instantly cooled when it is erupted from a volcano. Best of all, you can eat it too!

SAFETY FIRST! Please get an adult to help melt the handle the hot sugar. Do not spill sugar on the burner as it can cause a flame. Adult supervision required.

You will need:

- Cookie sheet
- Non-stick cooking spray
- 1-2 Cups white sugar
- Food coloring
- Sauce pan
- Stirring spoon
- Notebook
- Camera (optional)

Step 1: Lightly spray the cookie sheet with non-stick cooking spray and place the sheet in the freezer while you complete Step 2.

Step 2: Place the sugar in a sauce pan and heat over medium. When the sugar starts to dissolve add a few drops of food coloring. Keep stirring until the sugar is fully melted and the food coloring is dissolved and mixed completely with the sugar.

Step 3: Remove the cookie sheet from the freezer. Quickly pour the sugar mixture onto the cookie sheet and return to the freezer.

Step 4: Leave the sugar mixture in the freezer for approximately five (5) minutes.

Observe: What does the sugar look like? Are there any crystals present? How does this sugar compare to the rock candy sugar you grew in the other experiment?

Also try: When you pour the melted sugar mixture onto the cookie sheet, make several "rocks" in different sizes. Time how long it takes the rocks to freeze. Do small rocks freeze faster, slower or a the same speed as larger rocks? Why do you think so?

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Make a Geologists Field Notebook

Geologists use a field notebook to record information about their rocks, minerals, and maps. Create your own notebook with our Field Notebook Pages.

You will need:

- 1 copy of the Notebook Cover
- Several copies of the Notebook Inside Pages
- Hole punch (have an adult help you)
- String
- Markers, crayons or colored pencils

Optional:

- Construction paper and glue
- 3-ring binder

To Make Your Geologists Field Notebook:

- Decorate the cover of your Field Notebook with colors or pictures.
- Write your name on the bottom of the cover (where it says "Property of") so everyone knows that the field notebook belongs to you.
- Stack your cover and inside pages together.
- With an adults help, punch 2 or 3 holes along the left edge of the pages.
- Tie string through the holes to hold your field notebook together.

Other ideas:

To make your notebook stronger, glue your cover page to a piece of construction paper and put a second piece of construction paper at the back of the notebook.

OR Instead of using string to tie your notebook, you can place the pages in a 3-ring binder.

To Use Your Geologists Field Notebook:

Each time you use your notebook, write the date, page number, and weather on the lines at the top. Give each page a title such as "Salt Growing Experiment" or "Nature Walk." Use the lined area to write notes about your nature walks, samples, or experiments. Use the space at the bottom of each page to draw pictures of your samples, locations and activities.

For safety, always take an adult with you on a nature walk or if you are rock hunting outdoors.

Have fun! The information you record in your book is up to you because you are the geologist!

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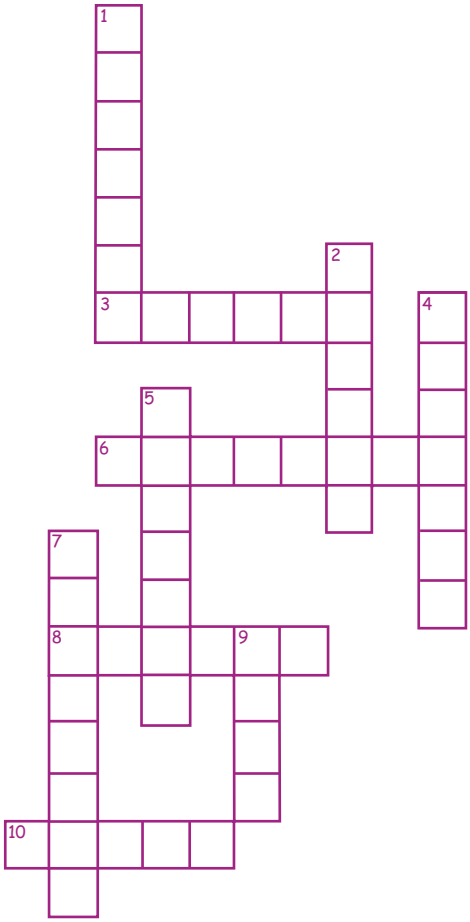
Volcanoes and Rocks Crossword Puzzle



ACROSS

3. Igneous rock with many holes often used for landscaping.
6. A time when lava, steam and ash are thrown out of a volcano.
8. Type of volcano that forms wide, gentle cone.
10. Melted rock inside a volcano.

DOWN

1. The type of rock formed by volcanoes.
2. State in the USA made of volcanic islands.
4. Volcanic rock often used for building materials.
5. Volcanic rock with larger, angular pieces trapped within a fine-grained rock.
7. Volcanic rock often called 'black glass' because you can not see any crystals.
9. The name for the melted rock once it has been erupted from the volcano.

Choose from: Shield, Eruption, Granite, Scoria, Magma, Igneous, Lava, Breccia, Hawaii, Obsidian

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Create a Story

Imagine that you and your friends are geologists about to study a volcano. Write your own geology adventure story using as many of the words below as possible. Illustrate your story with a drawing too.

Igneous	Volcanic Breccia	Hand Lens	Field Notebook	Granite
Pegmatite	Compass	Safety Goggles	Obsidian	Volcano
Rock	Lava	Andesite	Geologist	Mineral
Cone	Scoria	Geology	Magma	Erupt