

## ROCK DETECTIVES METAMORPHIC MYSTERY

[www.MiniMeGeology.com](http://www.MiniMeGeology.com)

### Hey there Mini Me Geologists!

Today we are on a Metamorphic Mystery. To solve your mystery, you must follow the clues and complete the activities on this printable disk.

**First**, read about each of the samples in your kit in our Metamorphic 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 Metamorphic Mystery geologist's certificate to show everyone what a smart geologist you have become!



Experiments & Fun



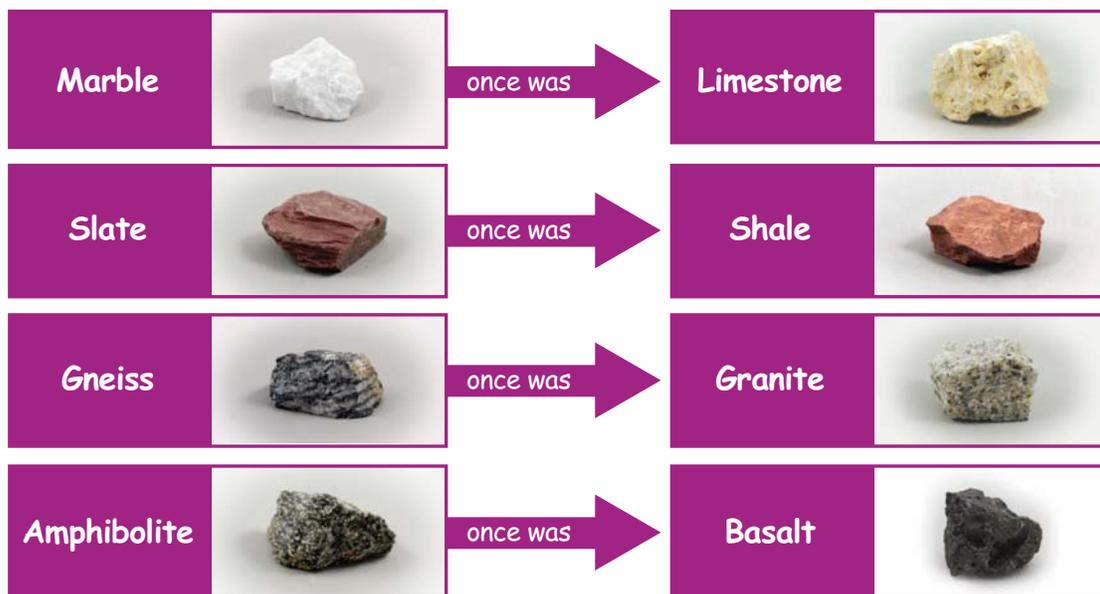
Games and Puzzles

**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](http://www.adobe.com).



## All About Metamorphic Rocks

There are three types of rocks that form our Earth. These rock types are Sedimentary, Igneous and Metamorphic. The word "metamorphic" means "to change." Metamorphic rocks are rocks that once were sedimentary or igneous rocks but have been changed because they were heated and/or squeezed. The rocks get exposed to either high temperature or high pressure or both as they are buried or moved and become deeper below the Earth's crust. Some examples of metamorphic rocks are:



Usually, a rock is metamorphosed (changed) when the temperature of the rock is between 300°F and 2000°F or when it is deeper than 12 miles below the surface of the Earth. The changing of sedimentary and igneous rocks into metamorphic rocks is part of The Rock Cycle.

Metamorphic rocks have many uses such as construction materials for road, buildings and roofs, jewelry and statues, to name a few.

### INTERESTING FACT

When a sedimentary rock is changed into a metamorphic rock, any fossils in the rock are almost always destroyed.

## Identify My Metamorphic Rocks



To identify your new metamorphic rock samples, follow the clues on this page to find the name of each one!

**CLUE #1** **TEXTURE** — Metamorphic rocks are known for a wide variety of textures. Place your samples in the correct circles. There are two samples for each circle.

**Fine-Grained**

May have large crystals of a single mineral included.

**Fine to Medium-Grained**

**Medium to Coarse-Grained**

**CLUE #2** **UNIQUE PROPERTIES** — Each rock type has special properties that make it different from every other rock in the world! Use these unique properties to tell the difference in the rock in each circle above. Place your sample in the correct circle to identify their name.

**Slate**

Has a layered, earthy appearance."

**Marble**

White color.  
Will fizz when acid is applied to the sample.

**Amphibolite**

Mostly dark minerals with speckles of white.

**Tourmaline Schist**

Shiny from mica in layers. Has black tourmaline crystals included.

**Quartzite**

Pinkish color.  
Rock will not fizz in acid.

**Granitoid Gneiss**

Mostly white with stripes of black minerals. May look like granite.



## Clay Metamorphism Experiment

Metamorphic rocks are interesting to observe. Sometimes you can easily tell what rock it used to be and sometimes it is very difficult to know. The temperature and pressure can change the rock slightly or completely. To see what can happen, try this neat experiment.

### You will need:

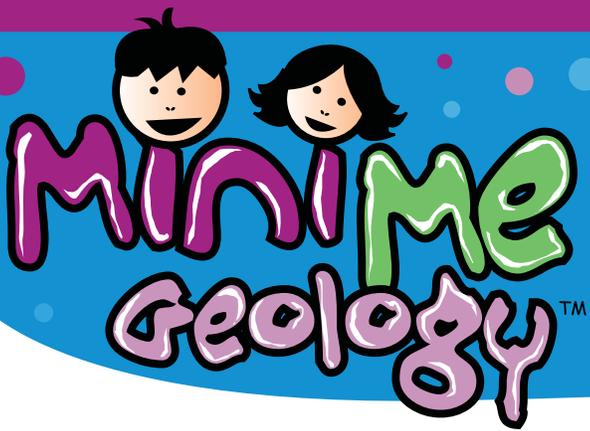
- Modeling clay in several colors, softened
- A sunny window
- Rolling pin or full soda can
- Notebook
- Pencil



### To Do the Experiment:

1. Choose one clay color to be the main "rock." Form the "rock" into a ball, cube or cylinder. It does not have to be a perfect shape. You just want a shape that is thick in each direction.
2. Form "minerals" or "fossils" out of the other colors of modeling clay. These shapes can be large and small.
3. Press the "minerals" and "fossils" into the main rock.
4. Place the "rock" in a sunny window for several minutes until warm.  
**Observe:** What happened to the "rock" when it was heated by the sun? Did it change shape? Was it softer and easier to work with? How do you think heat changes rocks?
5. Flatten the "rock" with the rolling pin or can.  
**Observe:** What happened to the rock? What happened to the minerals and fossils in the rock when it was pressed and squeezed? How do you think pressure changes rocks?

Remember to document your experiment in your field notebook!



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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.

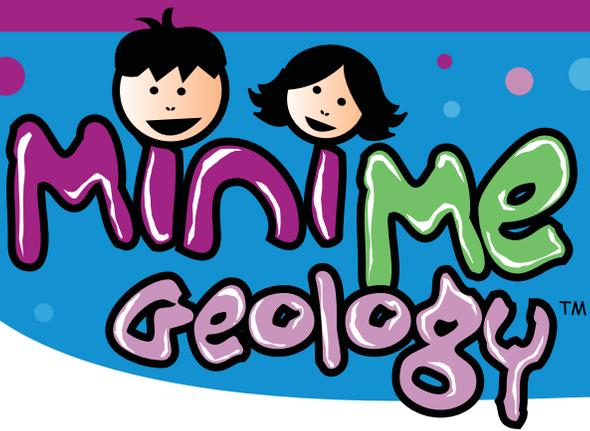
#### To Use Your Geologist Field Notebook:

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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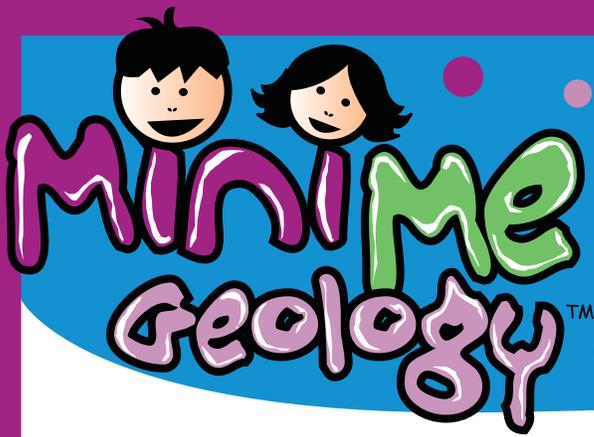
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### Metamorphic Mystery Word Scramble



Use the clues to help you unscramble these mineral names and geology words.

- |                    |   |       |
|--------------------|---|-------|
| <b>MMETACIHORP</b> | Type of rock that has been changed because of high heat and/or high pressure.       | _____ |
| <b>ETALS</b>       | Metamorphic rock that can break into sheets.  | _____ |
| <b>CAIM</b>        | Mineral common in metamorphic rocks like schist.                                    | _____ |
| <b>BRLAEM</b>      | Metamorphic rock that bubbles when acid is dropped on the sample.                   | _____ |
| <b>EISSNG</b>      | Metamorphic rock pronounced "nice."   | _____ |
| <b>DEXIN</b>       | Name for special minerals that tell you the rock's temperature during metamorphism. | _____ |
| <b>ANITEGR</b>     | Igneous rock that changes to gneiss during metamorphism.                            | _____ |
| <b>LRYEEJW</b>     | Common use for many metamorphic rocks and minerals.                                 | _____ |
| <b>SSEURREP</b>    | Force that squeezes a rock.   | _____ |
| <b>THAE</b>        | Measured by temperature.  | _____ |



**Official Mini Me Geologist**

Presented to

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**In Recognition of Your Outstanding Work  
and Completion of your Metamorphic Mystery**

**Rock On!**

**Mini Me Geology**

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