



MAY 2020

GEOLOGY

K-4





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Welcome to the Geology STEM Learning Activity Pack

Thank you for purchasing the Geology STEM Learning Activity Pack. We hope that these specifically selected activities will provide an engaging, hands-on experience that helps your student discover more about rocks and minerals. The STEM Learning Activity Pack program invites children to explore science in engaging and fun activities while using critical thinking and problem solving skills.

STEM is more than the sum of Science, Technology, Engineering and Math; it is an approach to learning that focuses on real-world problem-solving using an inquiry-based methodology and all of the problem-solving tools you have at your disposal.

STEM problem-solving tools include multifaceted collaboration, creativity, coding, digital agility, media literacy, critical thinking, global citizenship, and dynamic communication. Whether you call it STEM, STEAM, STREAM or something else — this conversation is about the skills we need today (and for the future!) in order to function effectively and thrive as workers, family members and citizens.*

We hope you enjoy your adventure!

—The North Museum Education Team



*Courtesy of the Lancaster STEM Alliance

Science of Geology

Introduction to the theme

2020 Curriculum Outline Overview

The Geology STEM Learning lesson provides resources, information and activities about the topic. The content invites children to explore this big idea:

What are rocks, how are they formed, and why are they important to Earth?

While exploring this idea, students will:

- **Explore ...** different types of rock and how it is formed.
- **Discover....** the forces that break down, change and form different types of rock.
- **Learn about ...** the Rock Cycle, quicksand and more!



In this STEM GEOLOGY LEARNING ACTIVITY PACK you'll find activities that dive into the rock cycle, learn about Geological terms and the difference between a rock and mineral.

Each activity is designed for engaging learning. Feel free to extend the activities your students are enjoying most and condense others.

Most importantly...have fun!

Activity 1

Create Your Own Crayon Rocks

Materials Needed:

- Box of crayons
- Tin Foil
- Cheese grater or Pencil Sharpener
- Boiling Water (use caution and a Grown Up to help)
- Coffee Mug
- Notebook
- Pencil

About This Activity

For this activity we will be recreating different forms of rock, representing layers and understanding the 3 types of rocks that make up the rock cycle. How are rocks formed? What do they look and feel like during this process? Gather the following supplies to get started.



Create Your Own Crayon Rocks

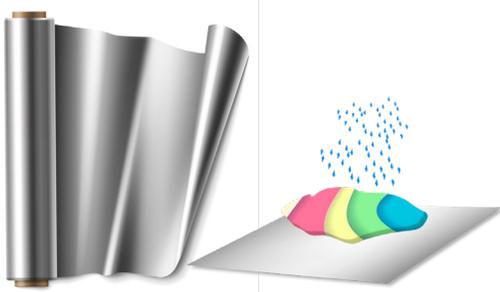


SET-UP – Select about 8 crayon colors to create your rocks. Carefully peel the labels off each crayon.

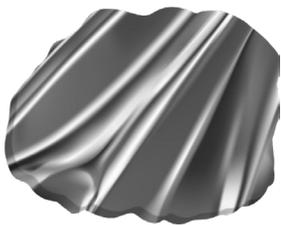
Use a cheese grater or pencil sharpener to begin to create crayon filings from each. Make sure you keep the filings separate. Keep each color in piles or in a small container.

Creating a Sedimentary Rock

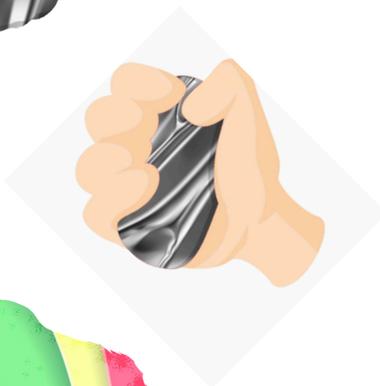
Sedimentary rocks are formed from sediments (tiny rock particles that are a result of weathering or erosion) that were layered and then compressed.



STEP 1 – Take a small square of the aluminum foil and sprinkle each of the colors of shavings into the middle of the square, one at a time so they will form the layers.



STEP 2 – Once your shavings are on the foil, fold the aluminum foil up tightly around them.



STEP 3 – Now we need to compress the sediments. Be creative! You can squeeze the foil in your hands, stand on it using all of your weight, place it under heavy books or weights, or create your own way. *HINT:* It may take some time, and your body heat can help the process.

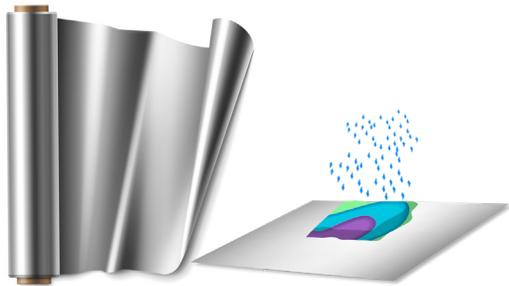


Once you feel your rock has formed, carefully unfold the foil and remove the sedimentary rock with care as this is the most brittle of the rocks that you are making.

Create Your Own Crayon Rocks

Creating a Metamorphic Rock

A metamorphic rock is a rock transformed from an existing rock when it is exposed to heat and/or pressure. This time we will need to add a heating element to the process, so carefully follow these directions with the help of a grown up.

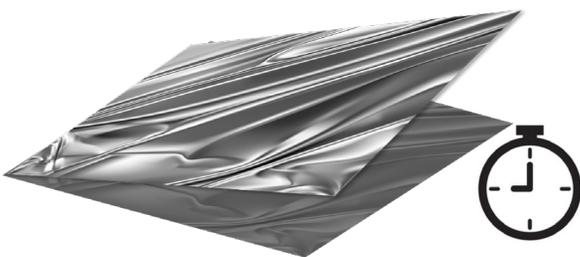


STEP 1 – Begin the same way you did for Sedimentary Rocks, add several layers of shavings to the center of a foil square.

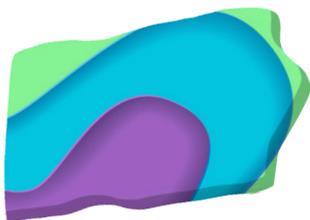


STEP 2 – This time, fold the foil the best you can into the shape of a boat.

Add some heated up water from a tea kettle into a coffee mug. Float the boat on top of the hot water for about 15 to 20 seconds, or until you notice them begin to melt.



STEP 3 – Quickly remove the boat and fold the foil in half so that the shavings are compressed. Let the foil and shavings cool before opening to reveal your Metamorphic rock.

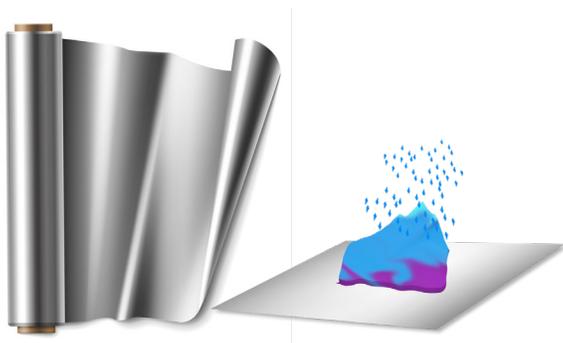


What differences do you notice in its appearance, texture and form? How do you think it's creation affected these characteristics?

Create Your Own Crayon Rocks

Creating an Igneous Rock

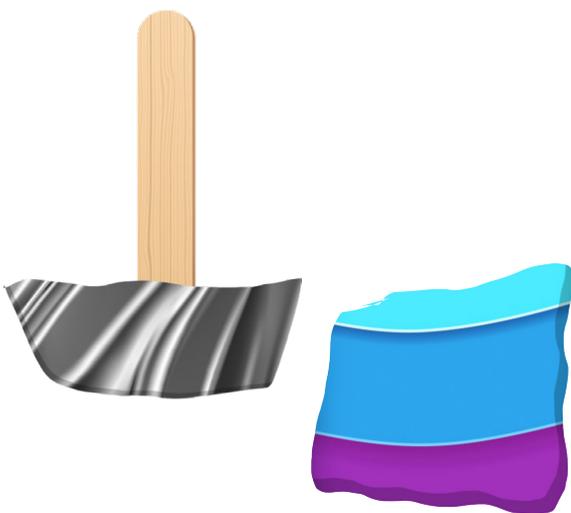
Igneous rocks are formed when magma (molten rock) cools and solidifies. Creating this type of rock will begin the same as the first two have, but we'll need to focus on the HEAT aspect and turn our crayon shavings into MOLTEN ROCK



STEP 1 – Add your shavings to a tin foil square, form the foil into a boat and again use hot kettle water in a mug as a heat source.



STEP 2 – This time, leave the boat and crayon sediments floating for a full minute (times will vary) until all of your crayon shavings have melted.



STEP 3 – Take your popsicle stick and stir the melted shavings around until they are well mixed.

Remove the boat and let your molten crayon rock cool.
**Remember, you don't have to apply pressure to this one.*

After formed, examine this rock in comparison to the other two you have created. How do they differ? How are they similar?

Rock Facts



Sedimentary Rock

Sedimentary rocks are formed by sediment that is deposited over time, usually as layers at the bottom of lakes and oceans. This sediment can include minerals, small pieces of plants and other organic matter.

Examples of sedimentary rocks include limestone, sandstone, mudstone, greywacke, chalk, coal, claystone and flint.

Igneous Rock

Igneous rock is formed when magma cools and solidifies, it may do this above or below the Earth's surface. Magma can be forced into rocks, blown out in volcanic explosions or forced to the surface as lava.

There are over 700 different types of igneous rocks.

Examples of igneous rocks include basalt, granite, pumice, obsidian, tuff, diorite, gabbro and andesite.



Metamorphic Rock

Metamorphic rocks can be formed by pressure deep under the Earth's surface, from the extreme heat caused by magma or by the intense collisions and friction of tectonic plates. Uplift and erosion help bring metamorphic rock to the Earth's surface. Marble is a metamorphic rock that is formed from the sedimentary rock limestone.

Slate is a metamorphic rock that is formed from the sedimentary rock mudstone.

Activity 2

The Science of Quicksand

Quicksand is an interesting natural phenomenon -- it is actually solid ground that has been liquefied by a saturation of water. The "quick" refers to how easily the sand shifts when in this semiliquid state.

What's Happening?

Your mixture is mimicking real water saturated sand that can create quicksand.

When loose sand becomes saturated with water, it creates a form of liquefied soil that begins to loosen the grains of sand and essentially weakening their structure. This creates a base of soil that cannot hold weight like it typically would and thus heavy objects would begin to sink!

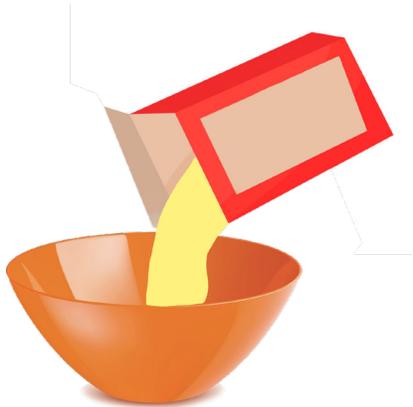
There are two different ways water can agitate sand enough to create quicksand... Flowing water underground and earthquakes.

Materials Needed:

- 1-1/4 cup cornstarch
- 3/4 cup water
- 1/2 cup sand
- Small plastic toys



The Science of Quicksand



STEP 1 – Add Cornstarch to a large mixing bowl



STEP 2 – Slowly add water and stir, it will be hard at first but should soften as you stir



STEP 3 – Next, add sand to mixture and stir

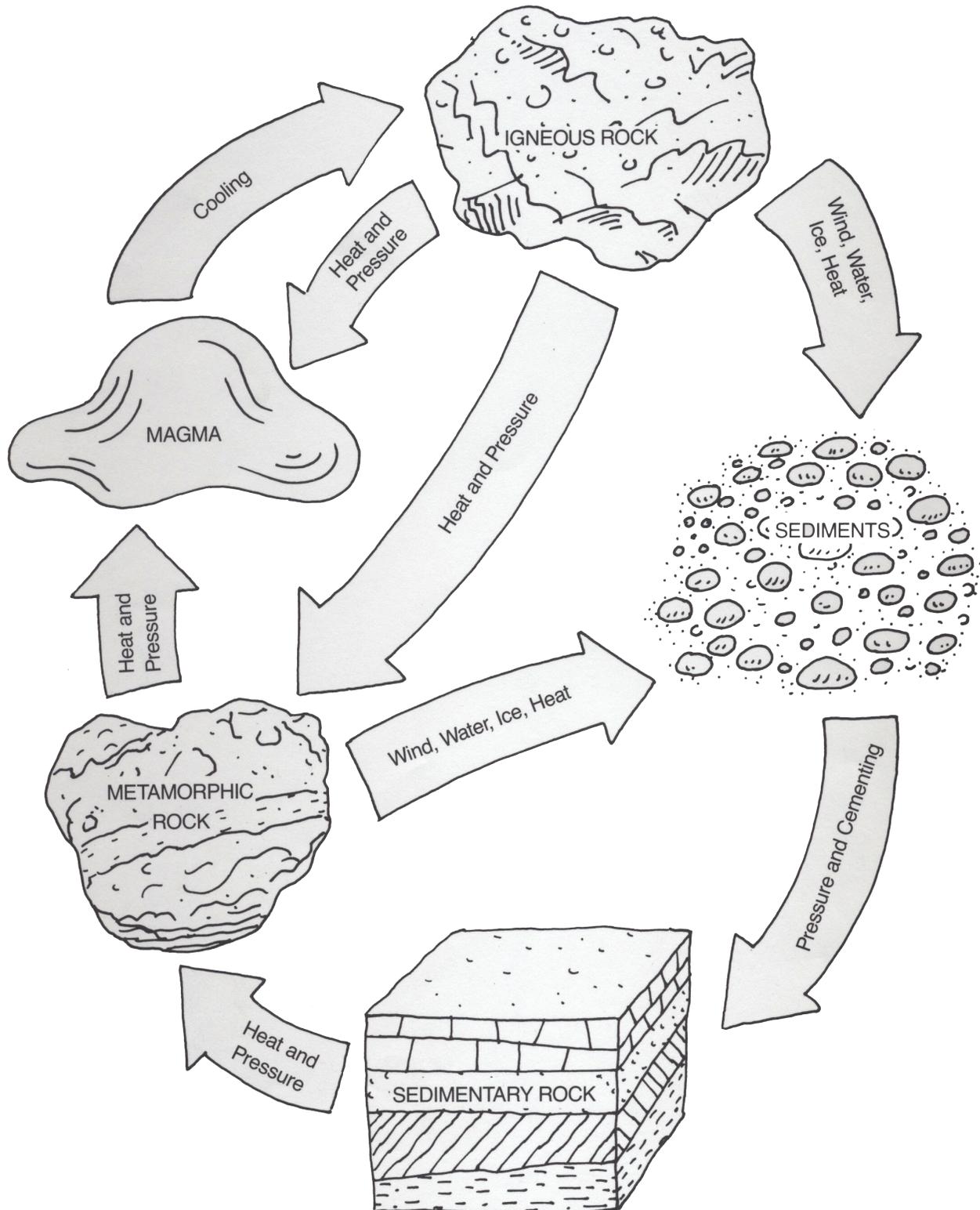


STEP 4 – Now you're ready to test your quicksand mixture.

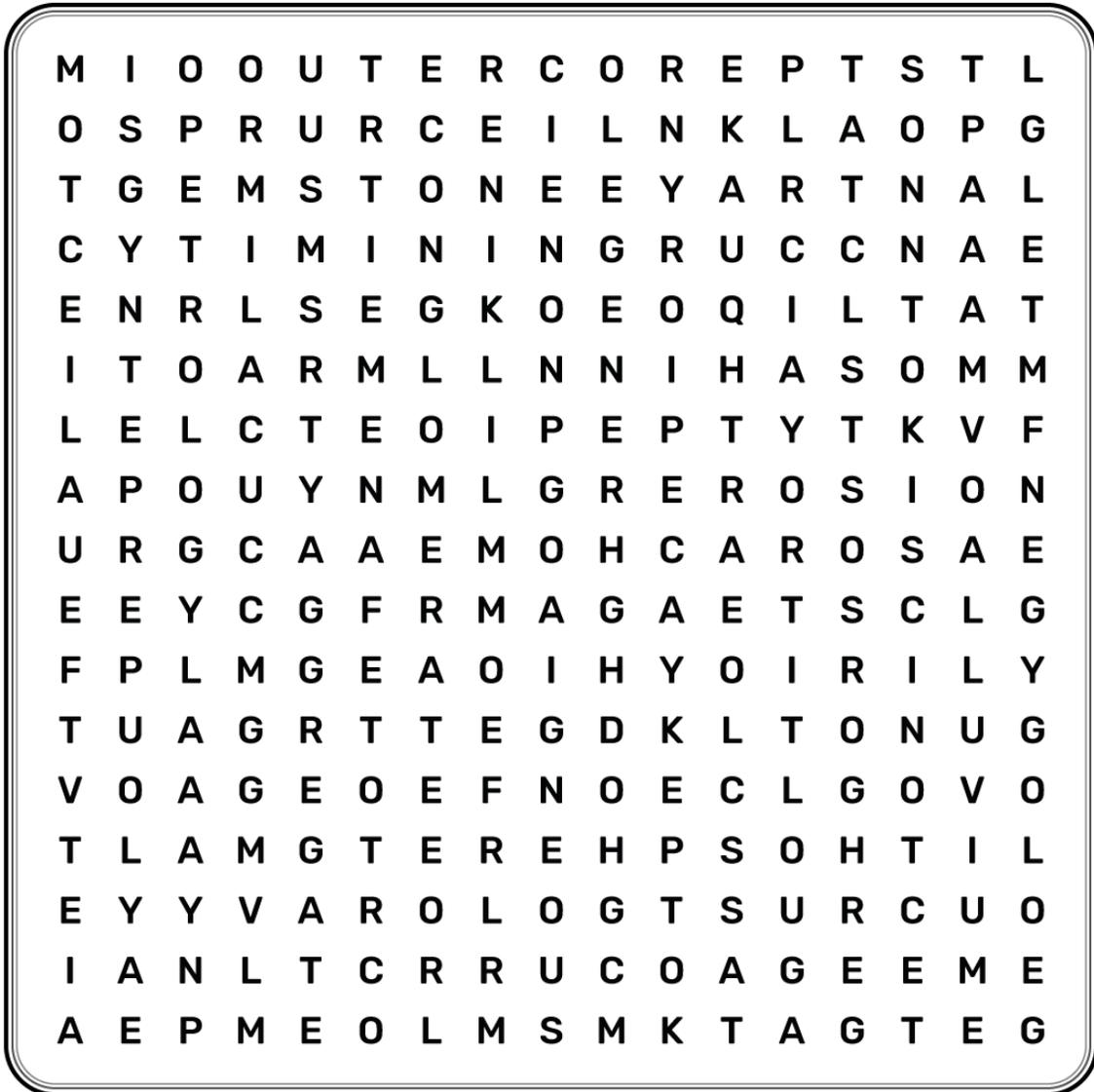
Add your plastic toys to the top and watch as they slowly sink into the mixture.

Rock Cycle Coloring Page

Understand how the rocks you've created can change in nature.



Geology Word Search



Aggregate

Alluvium

Conglomerate

Crust

Crystal

Earthquake

Erosion

Fault

Fossil

Gemstone

Geology

Igneous

Inner Core

Lithosphere

Loupe

Magma

Mantle

Metamorphic

Mineral

Mining

Outer Core

Petrology

Plate

Rock

Rock Hammer

Sedimentary

Seismology

Tectonics

Volcano

Vulcanology

Activity 3

Is It a Rock or Mineral?

Vocabulary

Mineral – a naturally occurring substance having a definite chemical composition and repeating arrangement of atoms.

Physical Property – a characteristic of matter that can be measured; color, smell, texture, melting point, density, and so on.

Rock – a naturally occurring aggregate of one or more minerals

Materials Needed:

- Assorted Candy of Two Types:
 - Group A Candy
(Hershey Kisses, Gummy Bears, Chocolate Chips, Jelly Beans)
 - Group B Candy
(Snickers, Butterfinger, M+Ms, Reese's Cup)



Is It a Rock or Mineral?



STEP 1 – Take all of your 8 candies and lay them out on a plate.

Observe the physical properties on the outside of each candy piece. What do you notice about them?



STEP 2 - Bite or cut each piece of candy and observe the inside. Record your observations.

Review the vocabulary definitions for Rock and Mineral. Think about which of the candy you think may have characteristics of a mineral.

Think about which candy may have the characteristics of a rock.



STEP 3 - Now divide your candy into two groups... Minerals and Rocks. Explain your decision for classifying each candy.

Enjoy your snack while you answer the reflection questions on the next page!

Is It a Rock or Mineral?

Reflection Questions

1. How do scientists classify rocks and minerals?
2. Name three physical properties you observed during the experiment.
3. Which candy did you classify as a rock? Which candy did you classify as a mineral?
4. Define Rock and Mineral in your own words.

Rock-

Mineral-

Answer: Group A = Minerals, Group B = Rocks

Fun Facts

Geology

- Geology is the study of the Earth – how it works and its 4.5 billion-year history. Geologists study some of society’s most important problems, such as energy, water, and mineral resources; the environment; climate change; and natural hazards like landslides, volcanoes, earthquakes, and floods.



Geologist

- If you’re fascinated by rocks and spend hours digging for interesting samples in the backyard, you might be a budding geologist, a scientist who studies all things related to the Earth. A geologist is an expert in the field of geology, the study of what the Earth is made of and how it was formed.



Rock Cycle

- The rock cycle is a basic concept in geology that describes transitions through geologic time among the three main rock types: sedimentary, metamorphic, and igneous.
- Each rock cycle offers an environment for different types of rocks and minerals. We’ll review each rock cycle, its description and review the types of rocks found in that cycle.

Fun Facts

Sedimentary Rock

- Rock that has formed through the deposition and solidification of sediment, especially sediment transported by water (rivers, lakes, and oceans), ice (glaciers), and wind. Sedimentary rocks are often deposited in layers, and frequently contain fossils.



Metamorphic Rock

- Metamorphic rocks are formed under the surface of the earth from the metamorphosis (change) that occurs due to intense heat and pressure (squeezing). The rocks that result from these processes often have ribbon like layers and may have shiny crystals, formed by minerals growing slowly over time, on their surface.





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