



Lesson Plan: Rocks

Grade Level: 6

Subject: Earth Science

Duration: 45–60 min

NGSS MS-ESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

Learning Objectives

By the end of this lesson, students will be able to:

- **Classify** rocks into the three main types — igneous, sedimentary, and metamorphic — based on how they are formed.
- **Explain** the formation processes of igneous, sedimentary, and metamorphic rocks, including



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or organic material — are pressed and cemented together over millions of years. Examples include sandstone, limestone, and shale.

- **Metamorphic Rock:** Rock that has been changed from an existing rock by intense heat and pressure deep in Earth's crust, causing its minerals to recrystallize into a new form. Examples include marble, slate, and quartzite.
- **Magma:** Melted rock material found beneath Earth's surface. When magma reaches the surface and flows out, it is called lava.



- **Rock Cycle:** The continuous process by which rocks of one type are broken down or transformed and reformed into rocks of another type through weathering, erosion, heat, pressure, melting, and cooling.
- **Foliated:** A texture of metamorphic rock in which mineral grains are arranged in visible parallel layers. Examples include slate, schist, and gneiss.
- **Texture:** The size, shape, and arrangement of the mineral grains or crystals in a rock. Texture helps geologists identify how and where a rock formed — for example, slow-cooling igneous rocks have large visible crystals, while fast-cooling ones have tiny or no visible crystals.

 **Materials Needed:** (all links are included in this PDF)

- Printed copies of the Study Guide (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-rocks-1.pdf>)



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Step 1: Introduction (/ minutes)

- Ask students: 'If you picked up a rock outside, how would you figure out what kind of rock it is and how it formed?' Allow 2–3 responses to surface prior knowledge.
- Display three rock samples or photographs — one igneous (granite), one sedimentary (sandstone), one metamorphic (slate) — and ask students to observe differences in texture, color, and grain size before any instruction.
- Briefly preview the Study Guide cover page to orient students to the three rock categories they will explore. (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-rocks-1.pdf>)



Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to walk through igneous, sedimentary, and metamorphic rock formation, emphasizing key distinctions: magma vs. lava, intrusive vs. extrusive, foliated vs. nonfoliated. (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-rocks-1.pdf>)
- Demonstrate texture differences using physical samples: hold up granite (slow-cooled, large visible crystals) next to obsidian (fast-cooled, glassy, no crystals) so students can see how cooling rate controls grain size — a direct, observable test of the intrusive vs. extrusive concept.
- Introduce the rock cycle using the diagram in the Study Guide, tracing how any rock type can be weathered into sediment, compacted into sedimentary rock, subjected to heat and pressure to become metamorphic, or melted and re-cooled to become igneous. (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-rocks-1.pdf>)

Step 3: Guided Practice (12 minutes)



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metamorphic rock classification (foliated vs. nonfoliated).

(<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-rocks-1-1.pdf>)

- Students complete the 'Make a chart' activity from the Activity Lesson: they find or draw one example of each rock type, name it, and describe two observable characteristics. (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-rocks-1-4.pdf>)

Step 5: Assessment (8 minutes)



- Students complete Practice Worksheet 0 (multiple-choice quiz covering igneous rock texture, magma vs. lava, intrusive vs. extrusive bodies, and rock composition).
(<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-rocks-1-0.pdf>)
- Ask students to classify three everyday objects by analogy: 'Concrete sidewalk (made of compressed materials) — which rock type does it most resemble and why? A glass bottle (cooled quickly from liquid) — which igneous rock does it remind you of? Marble countertop — what rock type is it and how did it form?' Discuss answers as a class.

Differentiation Strategies

For advanced learners:

- Challenge students to trace a specific rock — for example, limestone — through every possible pathway in the rock cycle, writing a narrative explanation of each transformation step (limestone → marble via metamorphism; limestone → sediment via weathering → new



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- Collect 5–10 rocks from the schoolyard or neighborhood; use the Study Guide classification criteria (color, grain size, layering, crystal visibility) to identify each rock's type and record findings in a data table.
- Build a physical model of the rock cycle using craft materials: use clay of three colors to represent the three rock types, then physically reshape and re-form the clay to demonstrate weathering, compaction, heat and pressure, and melting — explaining each step aloud.
- Research how pumice (the only rock that floats on water) forms and design a simple experiment to test its buoyancy compared to granite and sandstone samples, then explain the result using what you know about igneous rock formation.



Complete List of Available Resources:

- NewPathWorksheets: Rocks (Grade 6) (<https://newpathworksheets.com/science/grade-6/rocks-1>)
- Study Guide — Rocks (Grade 6) (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-rocks-1.pdf>)
- Activity Lesson — Rocks (Grade 6) (<https://newpathworksheets.com/api/activity-lesson/activity-lesson-science-grade-6-rocks-1-4.pdf>)
- Practice Worksheet 0 — Rocks (Grade 6) (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-rocks-1-0.pdf>)
- Practice Worksheet 1 — Rocks (Grade 6) (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-rocks-1-1.pdf>)
- Practice Worksheet 2 — Rocks (Grade 6) (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-rocks-1-2.pdf>)



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ROCKS

If you know how to read them, rocks can tell a story. They can reveal where they came from, how fast they cooled, how far they traveled, how much pressure and heat they endured. Knowing some basic facts about rocks makes it possible to know a great deal about the rocks and the geologic history of a given area.

How Are Rocks Classified?

There are three major groupings of rocks: igneous, metamorphic, and sedimentary.

Igneous rocks are formed when liquid rock (magma in the Earth and lava when it pours onto the surface) cools. Igneous rocks are classified based on their color (which tells something of their chemical composition) and the size of the grains or crystals in the rock. Darker igneous rocks are high in iron and magnesium and come from the Earth's mantle (like basalt). Lighter igneous rocks are higher in silica



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Igneous Rocks

Formation

Igneous rocks form when liquid rock cools and hardens. Liquid rock that is under the crust is called magma. When it pours out onto the Earth's surface, it is then called lava.



Dark igneous rocks come from the Earth's mantle. They are dark because they contain high concentrations of iron and magnesium. As



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pumice. Pumice is the only rock that can float on water. Light colored igneous rock that does not have visible crystals is called syenite. Light colored igneous rock that has visible crystals is called granite.

There is a special circumstance in which the magma cooled so slowly that the crystals grew to be so large that they weigh tons. This special igneous deposit is called a pegmatite.

Crystal size in igneous rocks seems to be connected to the length of time the crystal had to grow. Obsidian (volcanic glass) has no visible crystals because it cooled immediately. Granite has larger, visible crystals because it cooled more slowly. Pegmatite crystals are enormous because they cooled, literally, over many thousands of years.

Uses

Igneous rocks are used primarily in the building industry for making and decorating business buildings and homes. Some igneous rocks, like pumice, are used as an abrasive. The feldspar from granites and pegmatites is used to make porcelain and glass.

Lesson Checkpoint:

Which is the only rock that can float on water?



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- **Chemical sedimentary rocks** are sedimentary rocks that formed through chemical precipitation. When the situation is just right, dissolved lime in ocean water can precipitate out of the water and settle on the ocean floor. It accumulates and, in time, solidifies into limestone. Chemical sedimentary rock is very fine grained and shows no signs of life, such as fossilized remains.

- **Biochemical or organic sedimentary rocks** form when the shell remains of organisms collect on the ocean floor. There they solidify, becoming fossils and a layer of limestone. A special type of organic sedimentary rock called coquina is formed by the accumulation of shell fragments. In this case, the shell fragments have not fossilized, but are the original shell material.

Uses

Sedimentary rock is occasionally used in construction. Most limestone is crushed and used to make concrete. It is also crushed and used in road construction.

Lesson Checkpoint:

Which type of sedimentary rock is formed from other rocks?



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can be metamorphosed into a new metamorphic rock.

There are two categories of metamorphic rocks. Both are formed as the result of intense heat and pressure deep in the Earth's crust. The categories are foliated and non-foliated (or massive) metamorphic rocks. The difference is determined by the original rock that is being changed by the heat and pressure.

Formation

Foliated metamorphic rocks begin as clay and siltstone. As heat and pressure change the siltstone, the particles in the siltstone grow. As they grow larger, different metamorphic rocks are formed. The first to form is slate. As the grains continue to grow, the rock becomes phyllite. As the grains grow even larger, the phyllite becomes schist, and then it becomes gneiss. If the heat and pressure becomes too great, the gneiss can actually melt down and become magma. All of these rocks show some form of layering which is called foliation; therefore, they are called foliated metamorphic rocks.

Non-foliated metamorphic rocks begin as either limestone or sandstone. When limestone is metamorphosed, its grains grow and become more dense and compact. The metamorphic rock that forms is called marble. The same happens with sandstone which becomes the metamorphic rock called quartzite.

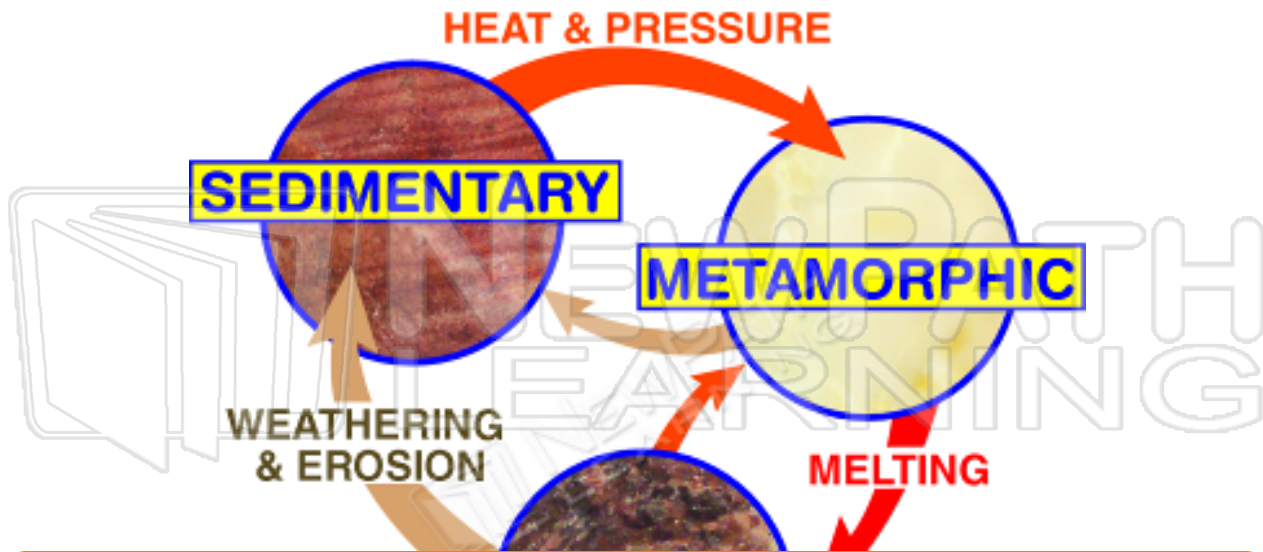


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The Rock Cycle



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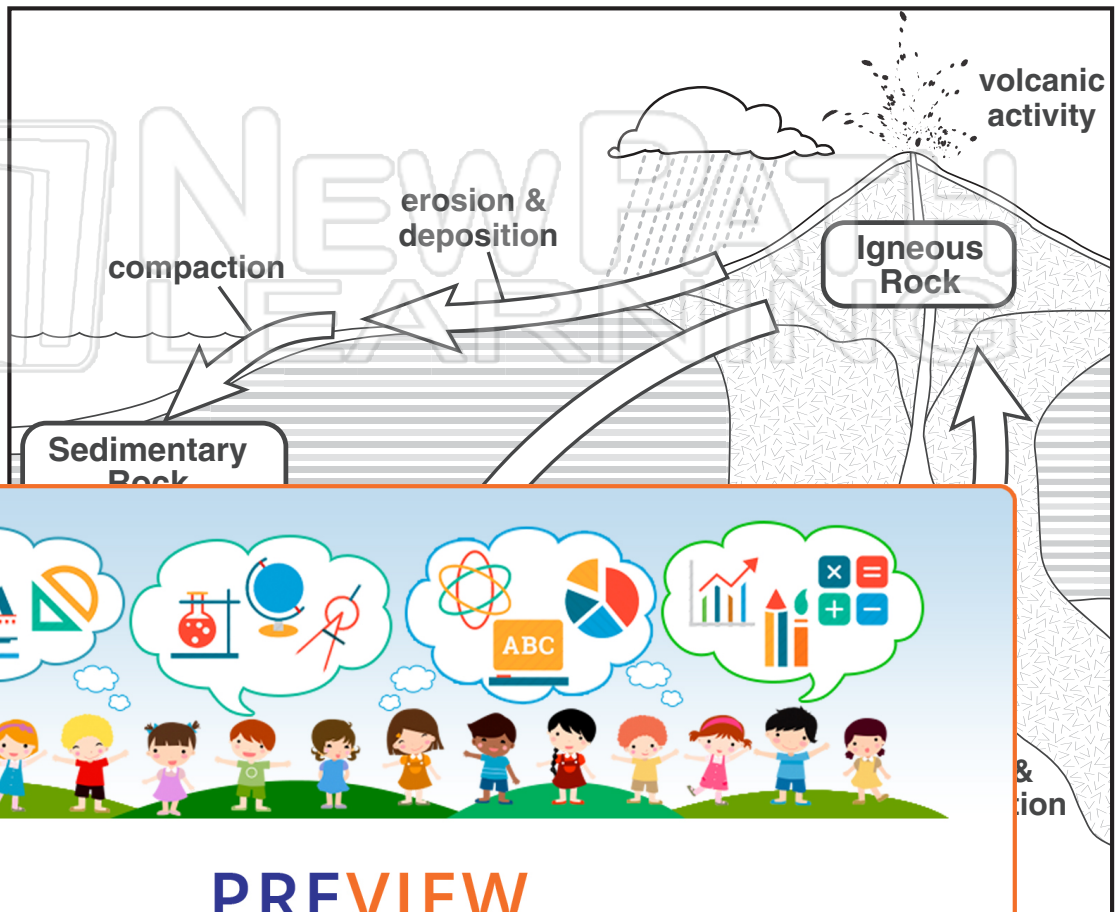


Rocks

Name _____ Class _____ Date _____

Rocks are solid materials found in nature made up of minerals. A **mineral** is a natural material usually found in the ground. Rocks can be classified into **three main groups** according to how they were formed.

Sedimentary rocks are formed when **sediment** piled up at the bottom of a body of water is



pressed over
of years
Sedimentary
rocks are
in layers

**Metamorphic
rocks** are
that have
changed
applied

**Igneous
rocks** are
below



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As the magma underground **cools**, igneous rocks are formed. igneous rocks are also formed above ground when **lava** erupts from a **volcano** and then cools forming igneous rocks above the Earth's surface.

Sedimentary Rocks		Metamorphic Rocks		Igneous Rocks	
sandstone	limestone	gneiss	quartz	pumice	



Rocks

Name _____ Class _____ Date _____

Igneous rocks are classified by their origin, texture and composition.

Intrusive igneous rocks originate from cooling **magma**, while **extrusive rocks** are made from cooling **lava**.

Texture is related to how long it takes a rock to cool. **Slow-cooling** rocks form **visible crystals**, while **fast-cooling** rocks have small crystals that are not always visible.

Dark igneous rocks, described as **mafic**, have a different composition than **light igneous rocks**, described as **felsic**.

Pumice is a lightweight rock made from frothing **lava** and gases. It is the only rock that can float on water.

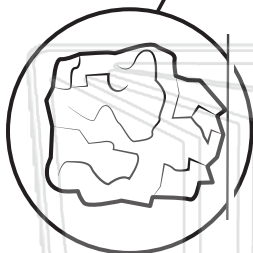
Obsidian is a

eous



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granite

Granite is a light-colored intrusive rock with visible crystals.



basalt

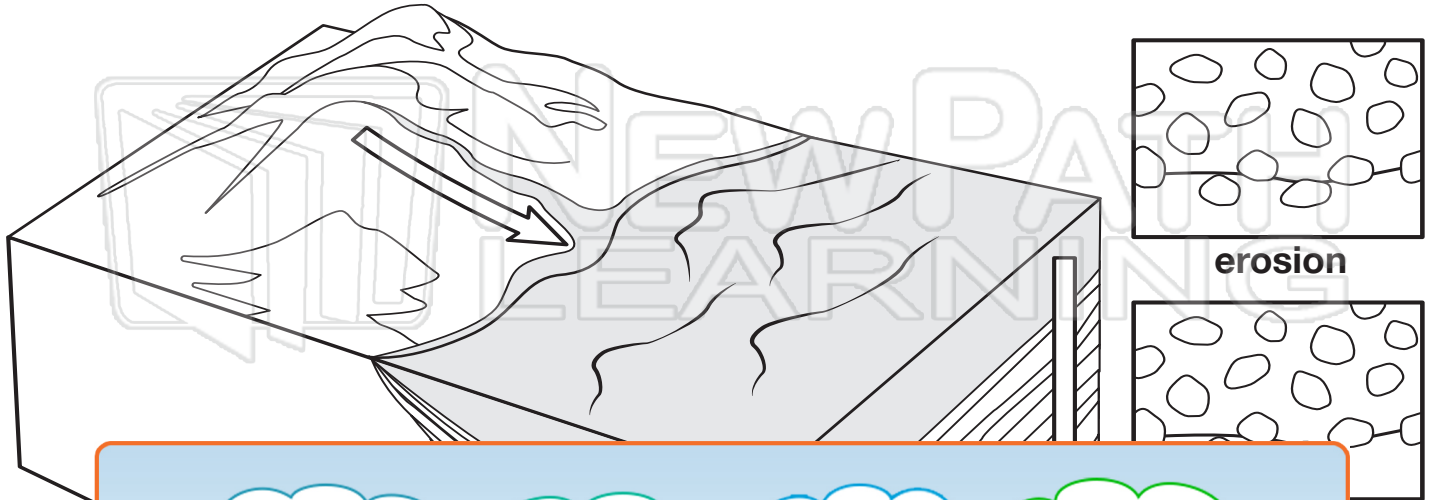
Basalt forms much of the ocean's crust.



Rocks

Name _____ Class _____ Date _____

Sedimentary rocks are rocks that have been placed in layers by **weathering** or **erosion**. Over millions of years, these layers are **compressed** and **cemented** together.



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sar



limestone



coquina

Chemical sedimentary rocks are sedimentary rocks that formed through **chemical precipitation**. Dissolved lime in ocean water precipitates out of the water and accumulates on the ocean floor which eventually lithifies into limestone.

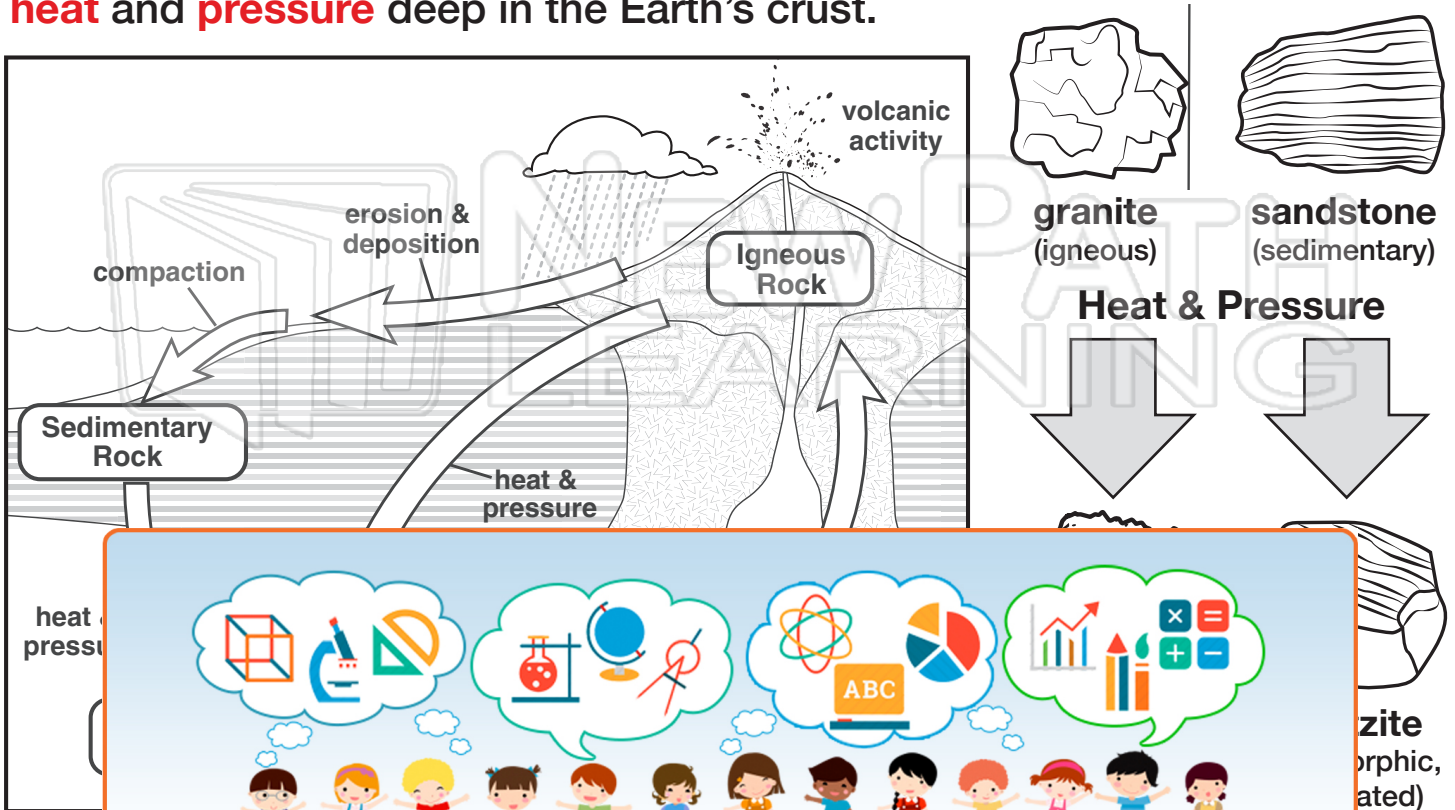
Biochemical or (**organic**) **sedimentary rocks** form when the **shell remains** of organisms collect on the ocean floor and lithify, becoming fossils and a layer of limestone.



Rocks

Name _____ Class _____ Date _____

Metamorphic rocks are rocks that have changed as the result of **intense heat** and **pressure** deep in the Earth's crust.



Meta

Foliated metamorphic rocks such as slate and gneiss have their mineral grains arranged in layers.

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gneiss

slate

Foliated metamorphic rock is arranged in layers.

Nonfoliated metamorphic rocks such as marble and quartzite have their mineral grains arranged **randomly**.



marble

quartzite

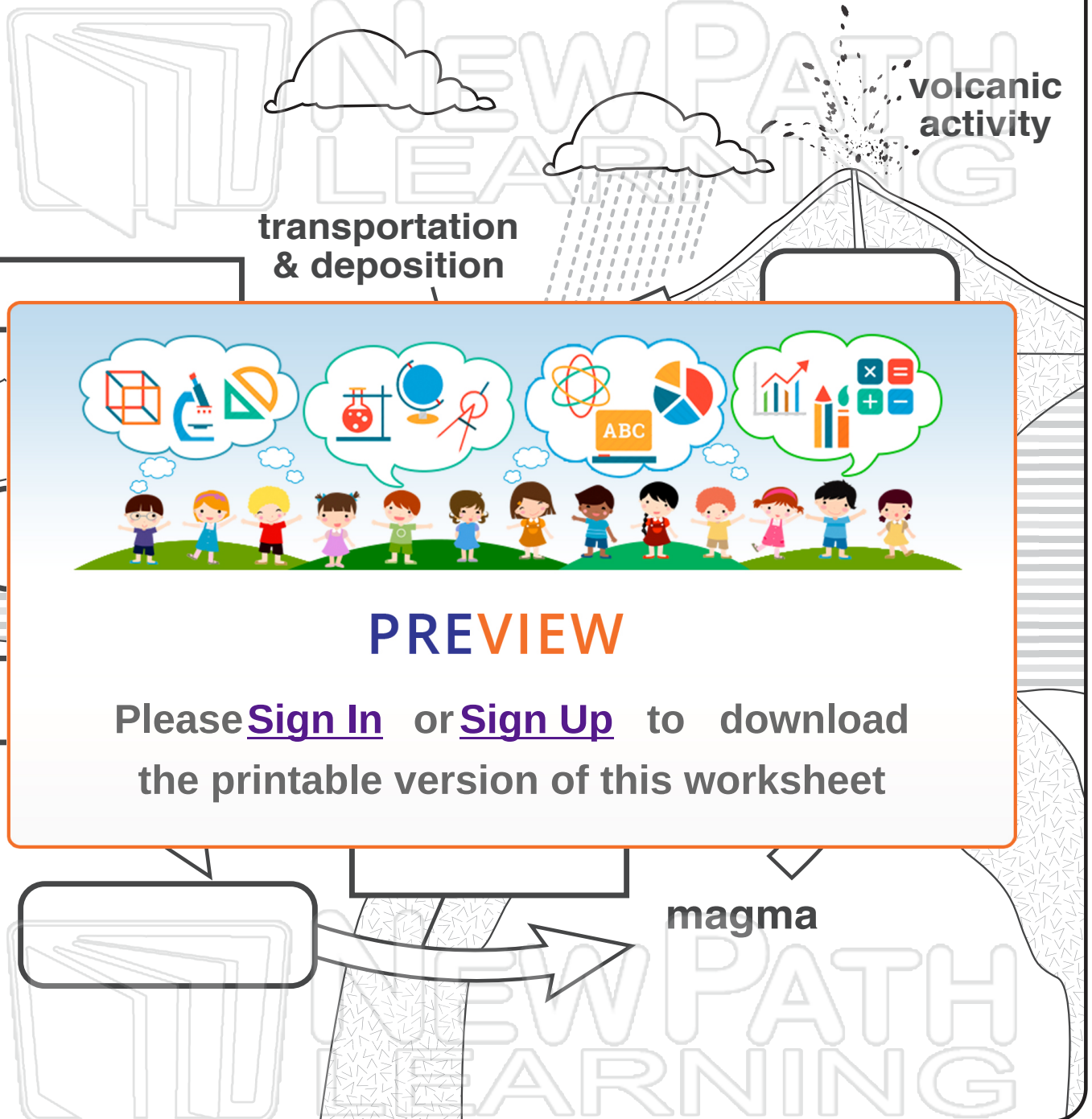


The Rock Cycle

Name _____ Class _____ Date _____

The **rock cycle** is the recycling of old rocks into new rocks. It's caused by heat, pressure, weathering and erosion.

Complete the Rock Cycle





Rocks

Name _____ Class _____ Date _____

Make a chart similar to the one below. Find pictures of each type of rock. You could also draw examples. Name the rock and briefly describe characteristics of each.

IGNEOUS	SEDIMENTARY	METAMORPHIC
		



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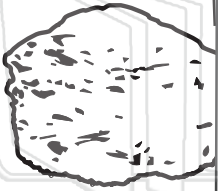
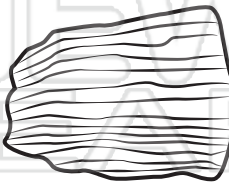
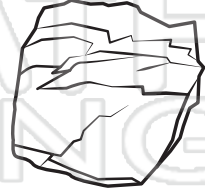
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Rocks

Answer Key - Example

Make a chart similar to the one below. Find pictures of each type of rock. You could also draw examples. Name the rock and briefly describe characteristics of each.

IGNEOUS	SEDIMENTARY	METAMORPHIC
		
pumice - lightweight, light color, felsic, extrusive	sandstone - clastic, made from existing rock	slate - foliated, arranged in visible layers
 PREVIEW Please Sign In or Sign Up to download the printable version of this worksheet		
		
obsidian - heavy, dark color, mafic, extrusive		

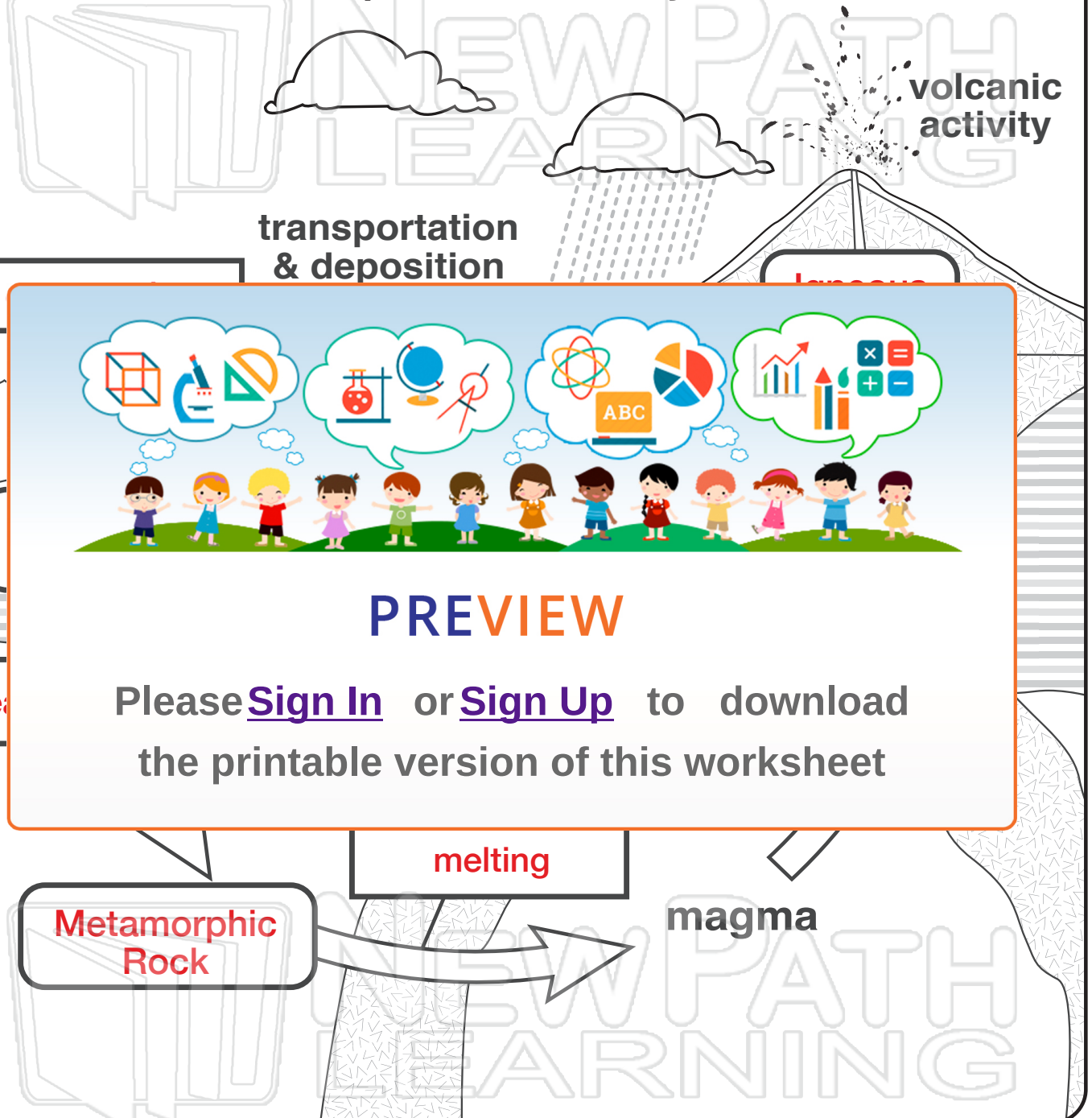


The Rock Cycle

Answer Key

The **rock cycle** is the recycling of old rocks into new rocks. It's caused by heat, pressure, weathering and erosion.

Complete the Rock Cycle





Name _____ Class _____ Date _____

1

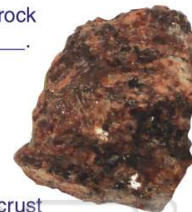
The metamorphic rock quartzite forms when **sandstone changes** under tremendous **heat** and **pressure**. Sandstone consists of small grains of quartz. The **composition** of quartzite is _____.

- A the same as the composition of sandstone
- B different than the composition of sandstone, because of metamorphism
- C similar to limestone
- D similar to granite which has quartz, feldspar, and mica

2

The **composition** of a rock is **determined** by _____.

- A the environment in which it forms
- B the minerals that make up that rock
- C how deep the rock forms in the earth's crust
- D the type of rock it is (igneous, metamorphic, or sedimentary)



3

The **texture** of a rock is **defined by the size and shape** of the minerals, grains, and particles in a rock. Here is a picture of the sedimentary rock called **conglomerate**. What is the **texture** of this rock?

- A fine-grained



4

The texture of **igneous** rocks is determined by how **quickly** the **liquid rock cools**. The **slower** the cooling rate, the **larger** the crystals in the rock. Two igneous rocks can have similar mineral composition, as is true with these rocks, even if they have very different textures. Based on their **textures**, the rhyolite (left) **cooled slowly** and the granite (right) **cooled quickly**.

5



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7

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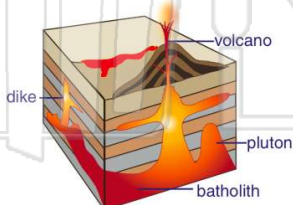
- B has erupted onto the surface of the earth
- C has melted into the inner core
- D never leaves the inner core

- D organic rocks

9

Which of the following igneous bodies is an **extrusive igneous** rock formation?

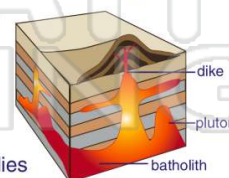
- A batholith
- B pluton
- C dike
- D volcano



10

In this picture are a number of igneous bodies **below** the earth's **surface**. Geologists refer to them as _____.

- A extrusive bodies
- B intrusive bodies
- C lava bodies
- D metamorphic bodies





Name _____ Class _____ Date _____

1

The metamorphic rock quartzite forms when **sandstone changes** under tremendous **heat** and **pressure**. Sandstone consists of small grains of quartz. The **composition** of quartzite is _____.

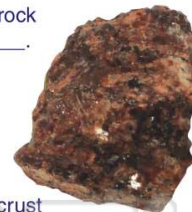
- A the same as the composition of sandstone
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- C similar to limestone
- D similar to granite which has quartz, feldspar, and mica

A

2

The **composition** of a rock is **determined** by _____.

- A the environment in which it forms
- B the minerals that make up that rock
- C how deep the rock forms in the earth's crust
- D the type of rock it is (igneous, metamorphic, or sedimentary)



B

3

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- A fine-grained



C

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B

5



D

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C

- B has erupted onto the surface of the earth
- C has melted into the inner core
- D never leaves the inner core

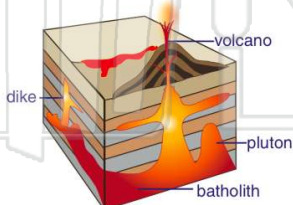
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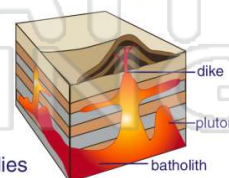


D

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B



Name _____ Class _____ Date _____

1

Rocks formed by the process of **erosion**, **deposition**, and **compaction** of **sediments** are called _____.

- A igneous rocks
- B metamorphic rocks
- C sedimentary rocks
- D biogenic rocks



2

Existing rocks are **broken** into smaller fragments by the forces of **wind**, **water**, **ice**, **sunlight**, and **gravity**. These fragments are the material that can **become** sedimentary rock. This is a process called _____.

- A compaction
- B weathering
- C metamorphism
- D volcanism



3

There are three categories of sedimentary rock. **Clastic** refers to sedimentary rocks made of rock fragments. **Chemical** refers to sedimentary rocks formed through chemical processes. **Organic** refers to sedimentary rocks formed by the deposition of organic material. **Limestone** containing a **Phacops** fossil would be categorized as _____.

- A clastic sedimentary rock



4

Clastic sedimentary rocks form as sediment is deposited by wind or water. As the sediments settle out of a lake, for example, they form **layers**, such as those in this picture of sandstone. **The layering of sediments in sedimentary rock is called _____.**

- A metamorphism



5



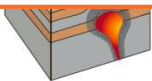
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True or false?

- A true
- B false



True or false?

- A true
- B false



9

The layers in a metamorphic rock are formed by intense pressure. The layers form **perpendicular** to the direction of the force (that is, pressure) that is exerted on the rock. **If this metamorphic rock has layering that runs north and south, from what direction did the pressure come?**

- A north and south
- B east and west
- C northeast and southwest
- D northwest and southeast



10

What is the name of the **nonfoliated** metamorphic rock shown here?

- A schist
- B marble
- C phyllite
- D gneiss





Name _____ Class _____ Date _____

1

Rocks formed by the process of **erosion**, **deposition**, and **compaction** of **sediments** are called _____.

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- A metamorphism



D

5



B

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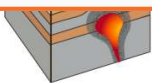
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B

True or false?

- A true
- B false



True or false?

- A true
- B false



9

The layers in a metamorphic rock are formed by intense pressure. The layers form **perpendicular** to the direction of the force (that is, pressure) that is exerted on the rock. **If this metamorphic rock has layering that runs north and south, from what direction did the pressure come?**

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B

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- A schist
- B marble
- C phyllite
- D gneiss



B



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Lava

Chemical sedimentary
rock

Igneous rock

Felsic

Contact metamorphism

Foliated metamorphic
rock

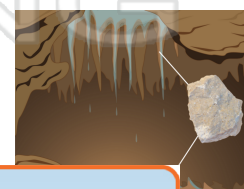
Clastic sedimentary
rock

Texture

1. - how something feels when you touch it



2. - sedimentary rock formed by the chemical precipitation of mineral material from ocean water (such as gypsum, limestone and halite)



3. fragm



4. heat f

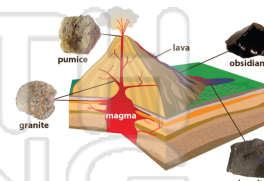
5. igneou

6. layere

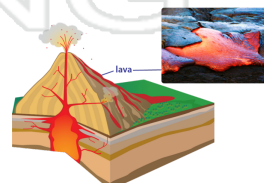
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7. - rocks that are formed underground when melted rock, called magma, deep below the Earth's surface, becomes trapped in small areas underground; they are formed above ground when lava erupts from a volcano and then cools



8. - liquid (molten) rock that is extruded through the surface of the Earth's crust; melted rock that comes above the Earth's surface





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Lava

Chemical sedimentary
rock

Igneous rock

Felsic

Contact metamorphism

Foliated metamorphic
rock

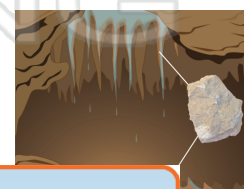
Clastic sedimentary
rock

Texture

1. **texture** - how something feels when you touch it



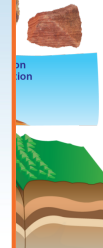
2. **chemical sedimentary rock** - sedimentary rock formed by the chemical precipitation of mineral material from ocean water (such as gypsum, limestone and halite)



3. **clastic sedimentary rock** - sedimentary rock formed from fragments of other rocks



4. **contact metamorphism** - a type of metamorphism that occurs when rocks are heated by the contact with a magma body



5. **felsic igneous rock** - igneous rock that is rich in silica and light-colored minerals

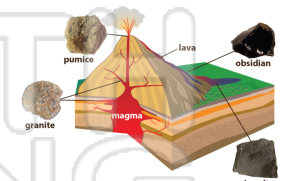
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6. **foliated metamorphic rock** - metamorphic rock that has a layered or banded appearance



7. **igneous rock** - rocks that are formed underground when melted rock, called magma, deep below the Earth's surface, becomes trapped in small areas underground; they are formed above ground when lava erupts from a volcano and then cools



8. **lava** - liquid (molten) rock that is extruded through the surface of the Earth's crust; melted rock that comes above the Earth's surface

