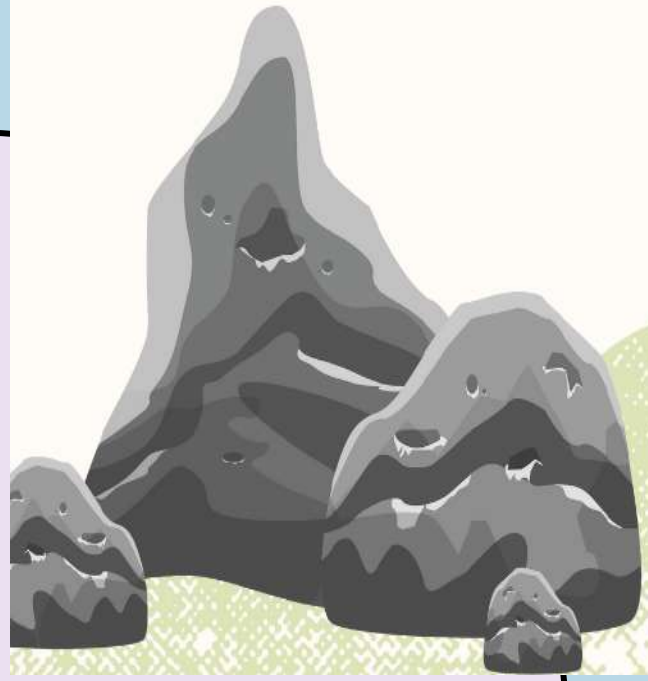
LESSON 8: THREE TYPES OF ROCKS AND THE ROCK CYCLE



Three Types of Rocks and the Rock Cycle

PRIMARY FOCUS OF LESSON

Reading

Students will identify rocks as solids made of minerals, describe the formation, characteristics of three types, explain how the rock cycle causes long-term changes.

Writing

Students will use a graphic organizer to take notes by paraphrasing text and will also draft a wiki entry.

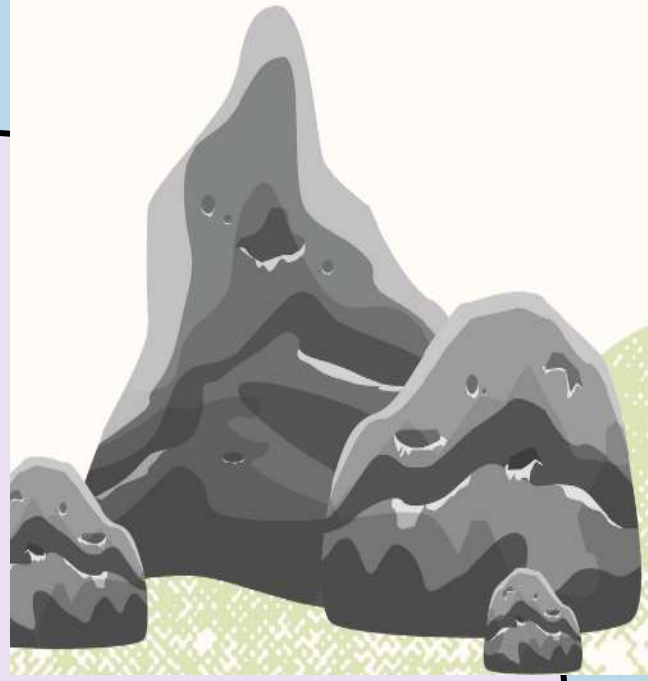
FORMATIVE ASSESSMENT

Activity Page 7.3	**Excerpts from *The Changing Earth*** Students compare information and stories about volcanoes based on the text.
Activity Page 8.2	**Earth's Building Blocks** Students answer questions based on the text, citing the source for each response.
Activity Page 8.3	**Take Notes on a Volcano** Students take notes about a volcano and provide information about their sources.
Activity Page 8.4	**Volcano Wiki Entry** Students fill in a form giving information about a volcano they are researching.

LESSON AT A GLANCE

	Grouping	Time	Materials
Reading (45 min.)			
Review	Whole Group	5 min.	❑ Answer Key for Activity Page 7.3 ❑ Activity Pages 7.3, 8.1, 8.2 ❑ *The Changing Earth*
Introduce the Chapter	Whole Group	5 min.	
Read "Earth's Building Blocks"	Small Groups	25 min.	
Lesson Wrap-Up	Whole Group	5 min.	
Word Work: Class	Whole Group	5 min.	
Writing (45 min.)			
Take Notes for a Wiki Entry	Whole Group/ Independent	20 min.	❑ Activity Pages 8.3, 8.4 ❑ Volcano Graphic Organizer ❑ *The Changing Earth*
Draft a Wiki Entry	Independent	25 min.	❑ Volcano Wiki Entry

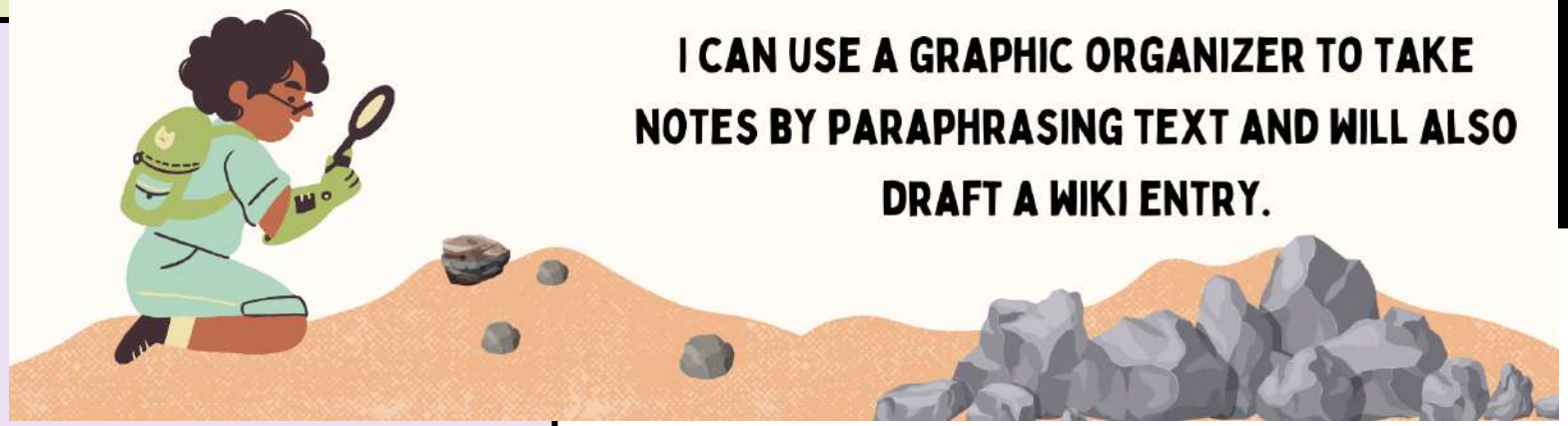
LESSON 8: THREE TYPES OF ROCKS AND THE ROCK CYCLE



LEARNING TARGETS LESSON 8

I CAN IDENTIFY ROCKS AS SOLIDS MADE OF MINERALS, DESCRIBE THE FORMATION AND CHARACTERISTICS OF THREE TYPES OF ROCK, AND EXPLAIN HOW THE ROCK CYCLE CAUSES LONG-TERM CHANGES.

I CAN USE A GRAPHIC ORGANIZER TO TAKE NOTES BY PARAPHRASING TEXT AND WILL ALSO DRAFT A WIKI ENTRY.



NAME: _____ **8.1** ACTIVITY PAGE

DATE: _____

Vocabulary for "Earth's Building Blocks"

1. **mineral**, ***n.*** a solid, nonliving substance found in the earth that makes up rocks (**minerals**) (**53**)
2. **texture**, ***n.*** the size, shape, and sorting of the mineral grains in rocks (**53**)
3. **solidify**, ***v.*** to make or become hard or solid (**solidifies**) (**54**)
4. **obsidian**, ***n.*** a dark rock or natural glass formed from lava that cooled very quickly (**54**)
5. **granite**, ***n.*** a common igneous rock that forms from magma that cooled within Earth's crust (**54**)
6. **durable**, ***adj.*** able to last a long time in good condition (**55**)
7. **compact**, ***v.*** to closely pack or press together (**compacts, compacting**) (**56**)
8. **dissolved**, ***adj.*** mixed with liquid so no solid pieces are visible anymore (**56**)

Word(s) from the Chapter	Pronunciation	Page
gneiss	/nis/	58
Agnes Nyanhongo	/ag*nes/ /nie*an*hong*goe/	59
Zimbabwe	/zim*bob*wae/	59

Whisper read into your cupped hands or choral read:

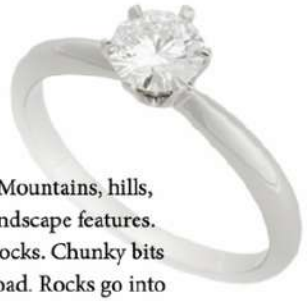
How can changes in rocks over time be explained by the rock cycle?

PURPOSE FOR READING: Read to learn about three classes of rocks and how the rock cycle changes them.

Chapter 6

Earth's Building Blocks

THE BIG QUESTION
How can changes in rocks over time be explained by the rock cycle?



You don't have to look hard to find rocks. They are all around you—and under you, too! Earth's crust is made almost entirely of rocks. Mountains, hills, and cliffs are huge masses of rock that form landscape features. Pebbles in a streambed are smooth, rounded rocks. Chunky bits of broken rock form the gravel on a country road. Rocks go into making sidewalks and streets. Slabs of rock cover the outside of many buildings. Indoors, pieces of rock often make up floors, walls, stairs, and countertops. Museums are good places to see rocks that artists have carved into sculptures. The polished stones in some types of jewelry are rocks that people wear.

Rocks are all around. Some are carved into sculptures, others are used for jewelry.

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How are rocks used in nature?

Where can you find rocks?

BEFORE READING: WHAT ARE ROCKS?

All the varieties of rocks can be organized into three classes.

Rocks and Building Blocks

Just what are rocks, exactly? Rocks are naturally occurring materials made of solid, nonliving substances called **minerals**. Think of minerals as the building blocks of rocks. Some rocks are formed from just one mineral. Most rocks, however, are combinations of two or more minerals. Minerals appear as different-sized pieces, or grains, in rocks. Some rocks have very tiny mineral grains, giving the rocks a smooth, even **texture**. Other rocks have larger mineral grains and a rougher texture.

Imagine hiking up a mountain and picking up rocks along the way. When you reach the top, you'll probably have quite a collection. Your rocks may have different colors and textures. Some may have stripes or layers. Some might be hard and others crumbly. Some have tiny grains whereas others have large grains that glitter when they catch the light. All this variety might seem confusing. Yet geologists organize all rocks into just three classes, or basic types: igneous, sedimentary, and metamorphic.

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AFTER READING: WHAT ARE ROCKS? TELL A PARTNER WHERE IN THE TEXT YOU FOUND THE INFORMATION THAT ANSWERS THE QUESTION.

HOW MIGHT ROCKS DIFFER FROM EACH OTHER?

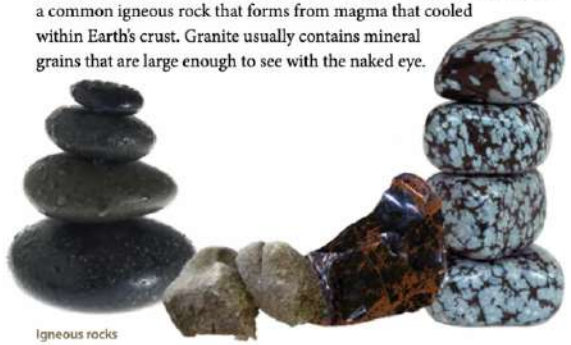
WHY WOULD ROCKS WITH LARGER MINERAL GRAINS HAVE A ROUGHER TEXTURE?

Born from Magma: Igneous Rock

Let's start with **igneous rocks**, the most abundant class of rocks on the earth. Igneous rocks form when magma cools and **solidifies**. When you think of igneous rocks, think of volcanoes.

There are two basic types of igneous rock. One type forms from magma that erupts onto Earth's surface as lava. The lava cools and hardens into rock. The faster it cools, the smaller the mineral grains will be in the resulting rock. **Obsidian** is an igneous rock formed from lava that cooled very quickly, so quickly, there wasn't time for the minerals to form grains. As a result, obsidian is as smooth and shiny as glass. In fact, it is often called volcanic glass. Basalt is an igneous rock formed from lava that took longer to cool. Basalt is typically a dark-colored rock. It has fairly small mineral grains that give it a fine-grained texture.

The second type of igneous rock forms from magma that solidifies below Earth's surface. Magma cools very slowly when it's deep beneath the surface. Slow cooling leads to igneous rocks with relatively large mineral grains. The slower the cooling, the larger the grains. **Granite** is a common igneous rock that forms from magma that cooled within Earth's crust. Granite usually contains mineral grains that are large enough to see with the naked eye.



Igneous rocks

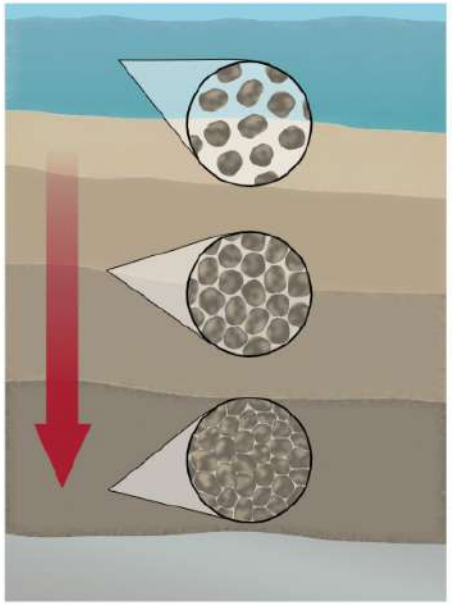
HOW DOES IGNEOUS ROCK FORM?

HOW DO GEOLOGISTS DISTINGUISH BETWEEN THE TWO TYPES OF IGNEOUS ROCKS?

— Irene M. Pepperberg

Layer after Layer: Sedimentary Rock

Sedimentary rock is the second major class of rocks. Sedimentary rocks are made of sediments. Sediments are tiny bits of rock and sand combined with fragments of once-living things. Sediments collect in low-lying areas both on land and in bodies of water. They form layers, one on top of another. Over long periods of time, the weight of overlying layers **compacts** the sediments in deeper layers, squeezing them closer together. Sediments also become cemented, or glued, together as **dissolved** minerals fill the spaces between the sediments. As the sediments dry, the dissolved minerals turn into solids, binding the sediments together. Over time, compacting and cementing processes transform sediments into sedimentary rock.



The weight of overlying layers compacts the sediments, squeezing them closer together.

Most sedimentary rocks are more easily broken than most igneous rocks. Hit a sedimentary rock with a hammer, and it will crumble or break apart. Some sedimentary rocks contain fossils. **Limestone** is a sedimentary rock often packed with the fossilized skeletons and shells of tiny ocean creatures. Some sedimentary rocks get their name from their sediments. Sandstone started as grains of sand, whereas mudstone formed from ancient mud.

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On page 78 (blank page) of your activity book:

DRAW YOUR OWN REPRESENTATION OF SEDIMENTARY ROCK USING THIS ILLUSTRATION AS YOUR INSPIRATION.

Layer after Layer: Sedimentary Rock

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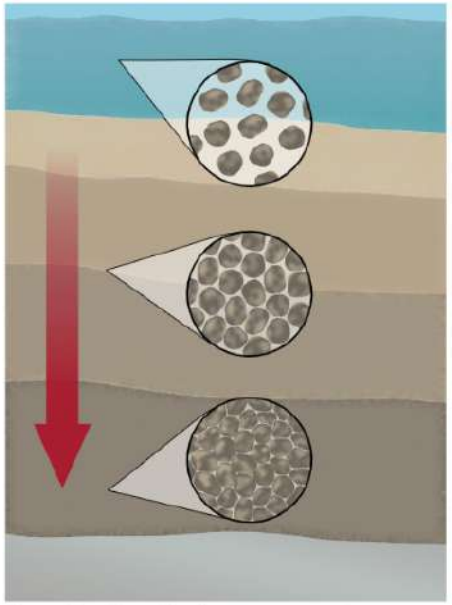

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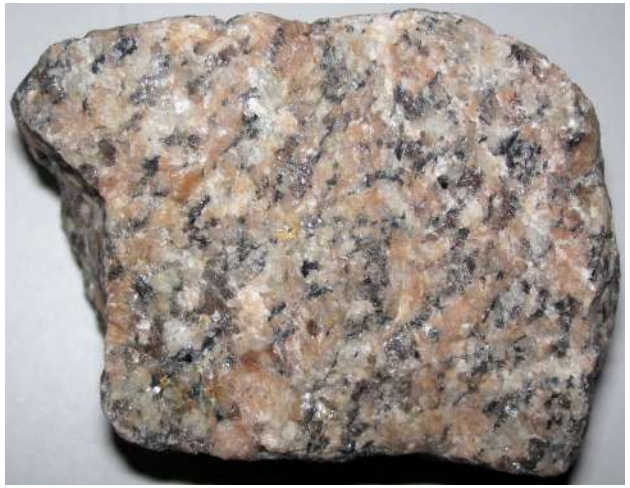
HOW DOES SEDIMENTARY ROCK FORM?

WHAT HAPPENS WHEN LAYERS OF SEDIMENTS ARE COMPACTED?

WHAT OCCURS WHEN LAYERS OF SEDIMENTS ARE CEMENTED?

What is one way in which sedimentary rock forms differently from igneous rock?

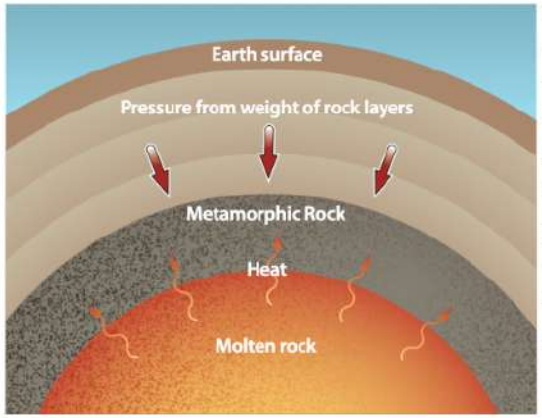


Changing Form: Metamorphic Rock

The third major class of rocks is **metamorphic rock**. Metamorphic rocks form when igneous or sedimentary rocks are exposed to extreme heat and pressure. They can even form from older metamorphic rocks. High temperatures and crushing pressure alter the minerals in the rocks. Mineral grains may be flattened or rearranged into layers, swirls, or stripes. They may also be changed into completely different minerals!

Remember granite, the igneous rock? When granite is subjected to intense heat and pressure, it becomes a metamorphic rock called gneiss. When the sedimentary rock limestone is squeezed and heated deep below ground, it becomes a metamorphic rock called marble.

Metamorphic rocks tend to form deep within Earth's crust. The pressure from countless tons of overlying rock is tremendous. Equally powerful is the heat rising from hot magma in the mantle beneath the crust. Metamorphic rocks often form where tectonic plates are slowly colliding. They can also form as magma travels up through cracks in Earth's crust and heats the rocks around the cracks. If the heat of the magma completely melts the rock again, then it becomes igneous rock. If the rock is heated just enough to be changed, however, it instead becomes metamorphic rock.



HOW DOES METAMORPHIC ROCK FORM?

WHAT CAN YOU INFER ABOUT WHEN THE FIRST METAMORPHIC ROCKS APPEARED ON EARTH, COMPARED TO IGNEOUS AND SEDIMENTARY ROCKS? WHY?

WHAT ROLE DO TECTONIC PLATES PLAY IN METAMORPHIC ROCK FORMATION?

Click here!

KAHOOT ABOUT 3 KINDS OF ROCKS

- **Landforms**
  From the mountains to the plains, the earth is covered with a huge variety of fascinating landforms. But how did they get there?
- **Volcanoes**
  What are the Earth's most fantastic, and sometimes most violent, geologic changes? Here is a hint: molten rock and ash shoot out of them!
- **Lithosphere, Hydrosphere, & Atmosphere**
  Did you know that there is a name for all of the rock on earth? Sure is. Here are a few names that will come in handy.
- **Igneous Rocks**
  Can you imagine melting a rock? It takes a lot of heat, but the earth has plenty!
- **Metamorphic Rocks**
  Take a rock, add a whole bunch of heat and pressure, and presto! You have a new kind of rock: a metamorphic rock.
- **Soil**
  You plant flowers in it. Farmers grow our food in it. It is a black and brown feast of minerals for plants. That is right. It is time to talk about soil!
- **Earthquakes**
  When the ground shakes, there is a hidden cause. There are plates in the Earth's crust moving around, and when they collide, it is called an earthquake!
- **Weathering & Erosion**
  Some of the world's most famous landmarks were created by weathering and erosion. Ever heard of the Grand Canyon? That is one of them.
- **Minerals**
  You may have heard of minerals. They are important to living things all over the planet.
- **Sedimentary Rocks**
  The Earth has layers, and so do some of its rocks! Sedimentary rocks are the product of a lot of pressure, and they even tell a lot about the Earth's history.
- **The Rock Cycle**
  You might think rocks never change, but that is not true. Like water and nitrogen, rocks have their own cycle, and it is all about change
- **Fossils**
  Fossils have stories to tell! These preserved bits of living things tell us a story of what the world was like thousands and millions of years ago.

STUDY JAMS QUIZZES, TEACHINGS, AND SONGS

Click here!

NAME: _____ **8.2** ACTIVITY PAGE

DATE: _____

Earth's Building Blocks

Answer each question thoughtfully, citing the page number(s) where you found evidence for each question. Answer in complete sentences and restate the question in your answer whenever possible.

1. How might rocks differ from each other?

_____

_____

_____

_____

Page(s) _____

2. How does igneous rock form?

_____

_____

_____

_____

Page(s) _____

pages 79-80 in your activity book

3. Which statement distinguishes between the two basic types of igneous rock?
   A. Two igneous rocks are granite and basalt.
   B. Different rocks have different size grains and different textures.
   C. One type forms on Earth's surface and the other forms below Earth's surface.
   D. The slower the rock cools and hardens, the larger its mineral grains will be.

Page(s) _____

4. How does a sedimentary rock form?

_____

_____

_____

_____

Page(s) _____

5. How does metamorphic rock form?

_____

_____

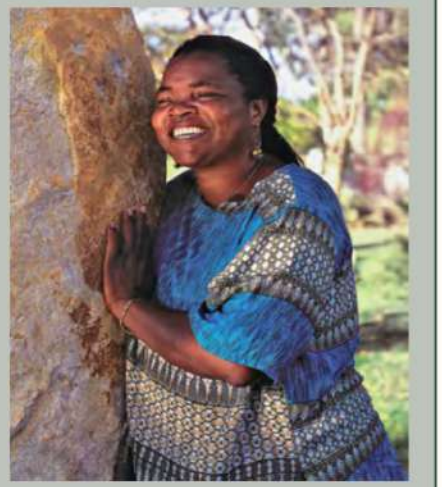
_____

_____

Page(s) _____

Agnes Nyanhongo's Stone Sculptures

Zimbabwean sculptor Agnes Nyanhongo became interested in carving rock at an early age. Her father, Claud Nyanhongo, was a sculptor. She worked in his studio as a young girl and learned how to cut and polish rock. She is now one of Zimbabwe's most well-known artists. Agnes Nyanhongo carves many of her sculptures from a type of rock called serpentine. Serpentine is a metamorphic rock. The type of serpentine Agnes Nyanhongo uses for many of her sculptures is very dark in color. She usually polishes only some parts of her sculptures, leaving the rest simply raw stone.



Agnes Nyanhongo

Sculptures carved from serpentine

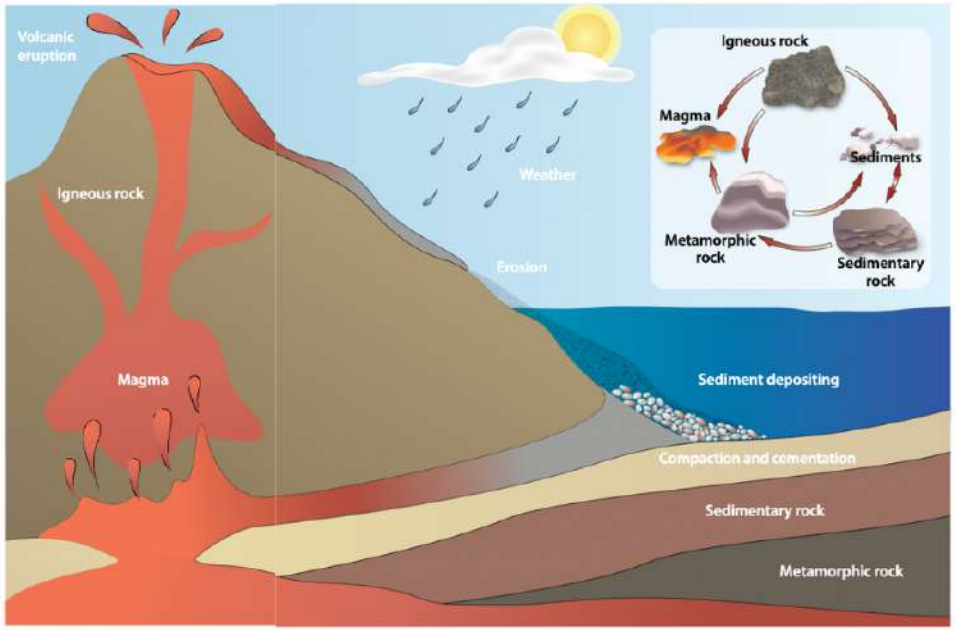
WHAT QUESTIONS DO YOU HAVE AFTER READING THIS?

SOME ANSWERS ARE IN THE TEXT, BUT SOME YOU HAVE TO INFER OR DO FURTHER RESEARCH.

The Rock Cycle

Rocks you see in the world around you might seem like permanent fixtures. Given enough time, however, all rocks change. They are created, destroyed, and recreated in a continuous cycle. Geologists call this ongoing process the **rock cycle**.

The rock cycle has no starting or ending point. You can jump in anywhere to see how it works. Let's begin with magma erupting from a towering volcano. The magma (now lava) cools and hardens into igneous rock. Over the course of thousands of years, sun, wind, rain, and freezing temperatures cause the rock to **weather**, or break down into smaller pieces. The pieces continue to weather, slowly breaking down into sediments. Howling winds, flowing water, and gravity gradually move the sediments down the sides of the volcano and beyond. Movement of sediments from place to place is called **erosion**.



Imagine that the sediments end up in a lake, where they settle to the bottom. Over long periods of time, more layers of sediments are deposited on top of them. Compacting and cementing processes eventually turn the deeply buried sediments into sedimentary rock.

Now imagine that the sedimentary rock is near the edge of a tectonic plate. The plate collides with another plate—very slowly, of course. Tremendous heat and pressure generated by the collision gradually turn the sedimentary rock into metamorphic rock. As the plates continue colliding, their rocky edges crumple. The metamorphic rock is slowly pushed up higher onto Earth's surface. Think mountains! Exposed to air, rain, and snow, the rock begins to weather and erode.

Alternatively, one tectonic plate might be sliding beneath another. The metamorphic rock along the edge of the descending plate gets hotter and hotter as it nears the mantle. At some point it melts into magma—magma that someday might erupt from a volcano again.

Understanding how rocks change helps geologists understand how Earth has changed over time.

Read pages 60-61 in your reader.

What is the rock cycle?

ACT OUT HOW EROSION TAKES PLACE OVER A PERIOD OF MANY YEARS.

The Rock Cycle

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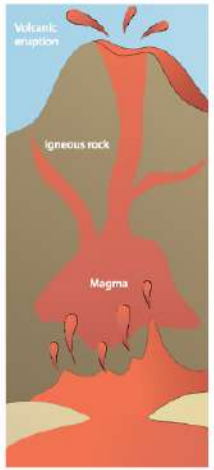

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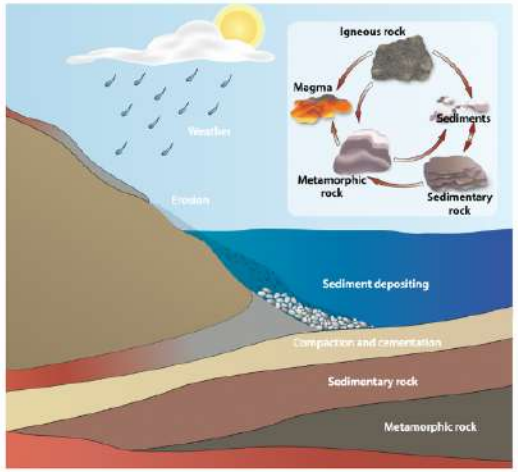

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LET'S BEGIN WITH MAGMA ERUPTING FROM A TOWERING VOLCANO.

THE MAGMA (NOW LAVA) COOLS AND HARDENS INTO IGNEOUS ROCK.

OVER THE COURSE OF THOUSANDS OF YEARS, SUN, WIND, RAIN, AND FREEZING TEMPERATURES CAUSE THE ROCK TO WEATHER, OR BREAK DOWN INTO SMALLER PIECES.

THE PIECES CONTINUE TO WEATHER, SLOWLY BREAKING DOWN INTO SEDIMENTS.

ACT OUT HOW EROSION TAKES PLACE OVER A PERIOD OF MANY YEARS.

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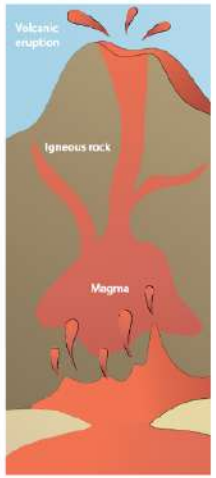

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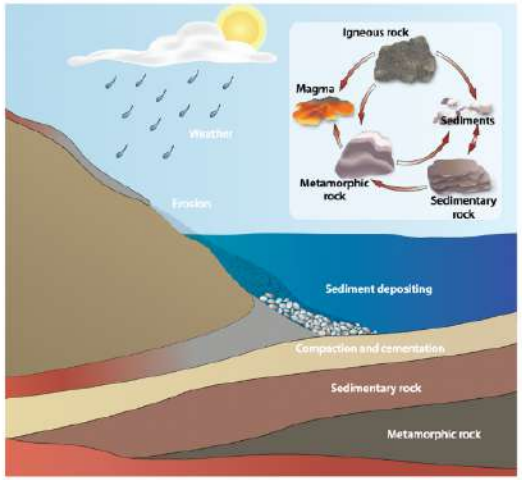

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HOWLING WINDS, FLOWING WATER, AND GRAVITY GRADUALLY MOVE THE SEDIMENTS DOWN THE SIDES OF THE VOLCANO AND BEYOND. MOVEMENT OF SEDIMENTS FROM PLACE TO PLACE IS CALLED EROSION.

IMAGINE THAT THE SEDIMENTS END UP IN A LAKE, WHERE THEY SETTLE TO THE BOTTOM. OVER LONG PERIODS OF TIME, MORE LAYERS OF SEDIMENTS ARE DEPOSITED ON TOP OF THEM. COMPACTING AND CEMENTING PROCESSES EVENTUALLY TURN THE DEEPLY BURIED SEDIMENTS INTO SEDIMENTARY ROCK.

NOW IMAGINE THAT THE SEDIMENTARY ROCK IS NEAR THE EDGE OF A TECTONIC PLATE. THE PLATE COLLIDES WITH ANOTHER PLATE—VERY SLOWLY, OF COURSE. TREMENDOUS HEAT AND PRESSURE GENERATED BY THE COLLISION GRADUALLY TURN THE SEDIMENTARY ROCK INTO METAMORPHIC ROCK. AS THE PLATES CONTINUE COLLIDING, THEIR ROCKY EDGES CRUMPLE.

ACT OUT HOW EROSION TAKES PLACE OVER A PERIOD OF MANY YEARS.

The Rock Cycle

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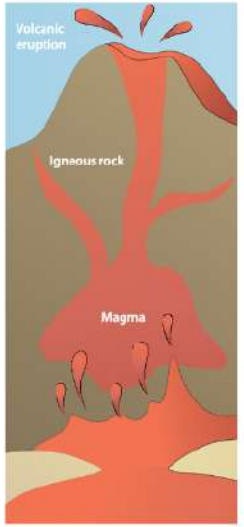

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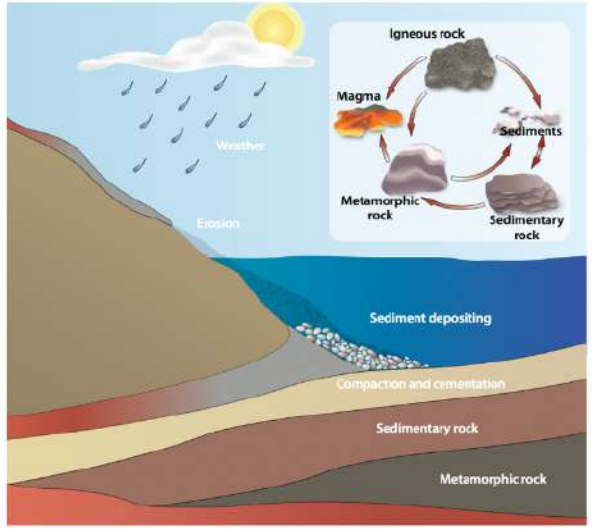
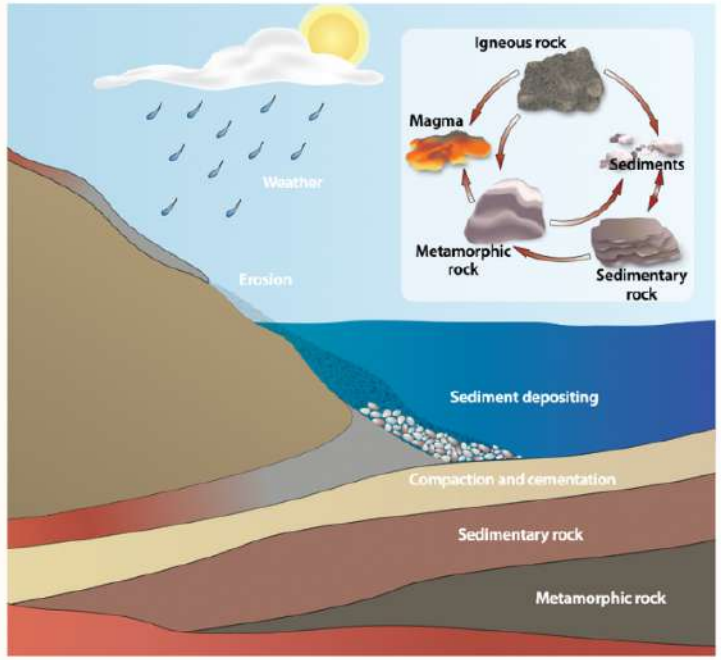


rock is slowly pushed up higher onto Earth's surface. Think mountains! Exposed to air, rain, and snow, the rock begins to weather and erode.

Alternatively, one tectonic plate might be sliding beneath another. The metamorphic rock along the edge of the descending plate gets hotter and hotter as it nears the mantle. At some point it melts into magma—magma that someday might erupt from a volcano again.

Understanding how rocks change helps geologists understand how Earth has changed over time.

ROCK IS SLOWLY PUSHED UP HIGHER ONTO EARTH'S SURFACE. THINK MOUNTAINS! EXPOSED TO AIR, RAIN, AND SNOW, THE ROCK BEGINS TO WEATHER AND ERODE. ALTERNATIVELY, ONE TECTONIC PLATE MIGHT BE SLIDING BENEATH ANOTHER. THE METAMORPHIC ROCK ALONG THE EDGE OF THE DESCENDING PLATE GETS HOTTER AND HOTTER AS IT NEARS THE MANTLE. AT SOME POINT IT MELTS INTO MAGMA—MAGMA THAT SOMEDAY MIGHT ERUPT FROM A VOLCANO AGAIN. UNDERSTANDING HOW ROCKS CHANGE HELPS GEOLOGISTS UNDERSTAND HOW EARTH HAS CHANGED OVER TIME.



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Understanding how rocks change helps geologists understand how Earth has changed over time.

DESCRIBE WHAT IS HAPPENING IN THIS ILLUSTRATION. RESPOND TO QUESTIONS 7-15 ON ACTIVITY PAGE 8.2.

NAME: _____

DATE: _____

8.2 CONTINUED ACTIVITY PAGE

6. What is the rock cycle?
   - A. the continuous process of volcanoes erupting
   - B. the continuous process of change in which rocks are created, destroyed, and recreated
   - C. the continuous process of sedimentary rock changing to become igneous rock
   - D. the continuous process of mineral grains making rocks smooth and shiny

   Page(s) _____

Complete the following items after you have finished reading the chapter. Match the following words with the correct definitions and examples. You may use some words more than once. Try to think of the answer to each item first from memory and then check back in the text to verify your answer before filling in the blank.

minerals	limestone	erosion
sedimentary rock	igneous rock	metamorphic rock

7. **Word:** _____
   Definition: any process or force that moves sediments to new locations

   Page(s) _____

8. **Word:** _____
   Definition: a rock that forms when magma cools and solidifies; the most abundant class of rocks

   Page(s) _____

9. **Word:** _____
   Definition: the building blocks of rocks that consist of solid, nonliving substances

   Page(s) _____

10. **Word:** _____
    Definition: a type of sedimentary rock that often has many fossils and shells of tiny ocean creatures

    Page(s) _____

11. **Word:** _____
    Definition: a type of rock that forms when either igneous or sedimentary rock is changed due to extreme heat and pressure

    Page(s) _____

12. **Word:** _____
    Definition: a type of rock made of tiny bits of rock and sand mixed with small pieces of things that were once alive

    Page(s) _____

13. **Word:** _____
    Examples: basalt, granite, and obsidian are examples of this class of rock

    Page(s) _____

14. **Word:** _____
    Examples: serpentine, marble, and gneiss are examples of this class of rock

    Page(s) _____

15. **Word:** _____
    Examples: sandstone, limestone, and mudstone are examples of this class of rock

    Page(s) _____

WORD WORK

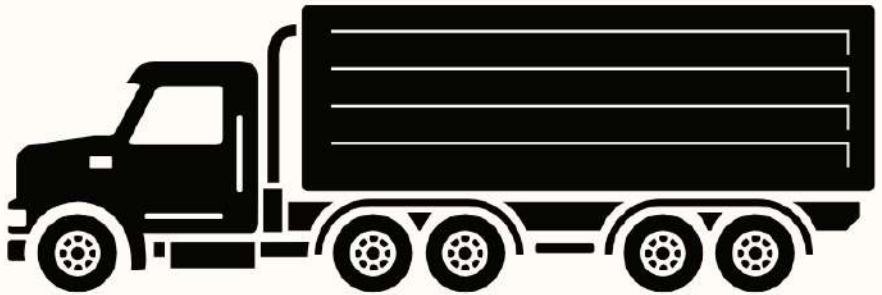
15 MINUTES

IN THE CHAPTER YOU READ, "YET GEOLOGISTS ORGANIZE ALL ROCKS INTO JUST THREE CLASSES, OR BASIC TYPES: IGNEOUS, SEDIMENTARY, AND METAMORPHIC."

Say the word class with me.

Class means a group of people or things that are similar in some way.

You need a special license to drive vehicles in certain classes, such as tractor trailor.



WHAT ARE SOME EXAMPLES OF CLASSES OF THINGS? BE SURE TO USE THE WORD CLASS IN YOUR RESPONSE.

What part of speech is the word "class"?

WRITING 45 MINUTES

Students will use a graphic organizer to take notes by paraphrasing text and will also draft a wiki entry.

WHAT IS A WIKI?

A WIKI IS A WEB-BASED TOOL THAT CAN BE USED BY EDUCATORS, STUDENTS, BUSINESSES AND STAFF TO WORK COLLABORATIVELY TO CREATE MATERIALS, RESOURCES AND INSTRUCTIONAL PRESENTATIONS. KNOWN FOR THEIR SIMPLICITY, USERS CAN EASILY ADD AND EDIT WIKI CONTENT, CREATING A GROUP WEB SITE.

WHAT ARE SOME ADVANTAGES OF A WIKI?

Contents [hide]

(Top)
Etymology
Plate tectonics
Volcanic features
Erupted material
Types of volcanic eruptions
Volcanic activity
Decade volcanoes
Volcanoes and humans
Volcanoes on other celestial bodies
History of volcanology
See also
References
Further reading
External links

Volcano

183 languages

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From Wikipedia, the free encyclopedia

This article is about the geological feature. For other uses, see Volcano (disambiguation) and Volcanic (disambiguation).

For broader coverage of this topic, see Volcanism.

A volcano is a rupture in the crust of a planetary-mass object, such as Earth, that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface.

Sabancaya volcano erupting, Peru in 2017

On Earth, volcanoes are most often found where tectonic plates are diverging or converging, and most are found underwater. For example, a mid-ocean ridge, such as the Mid-Atlantic Ridge, has volcanoes caused by divergent tectonic plates whereas the Pacific Ring of Fire has volcanoes caused by convergent tectonic plates. Volcanoes can also form where there is stretching and thinning of the crust's plates, such as in the East African Rift and the Wells Gray-Clearwater volcanic field and Rio Grande rift in North America. Volcanism away from plate boundaries has been postulated to arise from upwelling diapirs from the core–mantle boundary, 3,000 kilometers (1,900 mi) deep in the Earth. This results in hotspot volcanism, of which the Hawaiian hotspot is an example. Volcanoes are usually not created where two tectonic plates slide past one another.

Large eruptions can affect atmospheric temperature as ash and droplets of sulfuric acid obscure the Sun and cool the Earth's troposphere. Historically, large volcanic eruptions have been followed by volcanic winters which have caused catastrophic famines.[1]

Other planets besides Earth have volcanoes. For example, Mercury has pyroclastic deposits formed by explosive volcanic activity.[2]

Etymology

The word *volcano* is derived from the name of Vulcano, a volcanic island in the Aeolian Islands of Italy whose name in turn comes from Vulcan, the god of fire in Roman mythology.[3] The study of volcanoes is called volcanology, sometimes spelled *vulcanology*.[4]

Plate tectonics

Main article: Plate tectonics

NAME: _____

DATE: _____

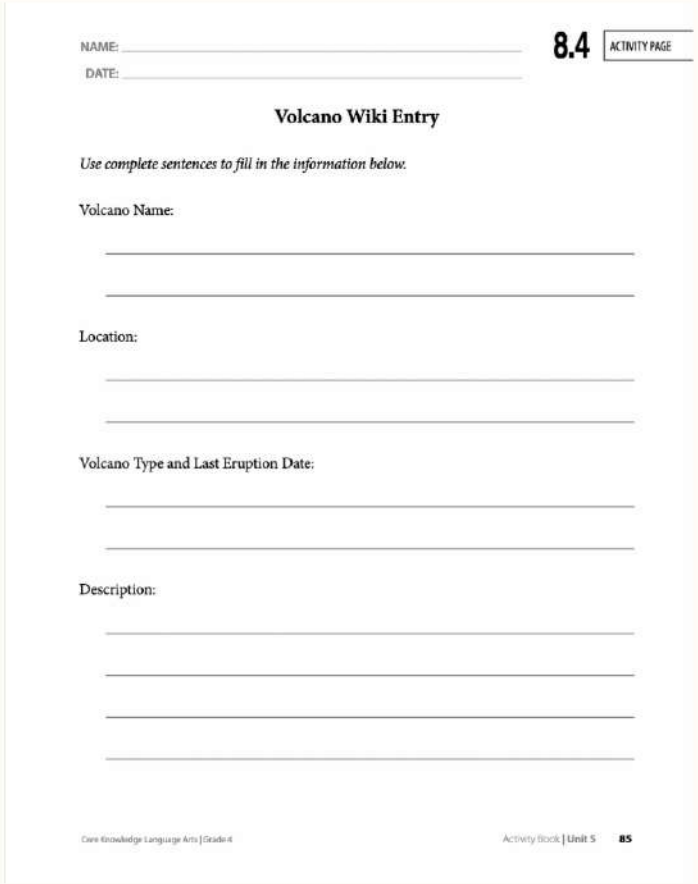
8.3 ACTIVITY PAGE

Take Notes on a Volcano

Take Notes on a Volcano	
Name of the Volcano	
Location of the Volcano	
Type of Volcano; Date of Last Eruption	
Description of Volcano or of Last Eruption	
Other Facts	

References for Volcano Wiki Entry		
Title	Date	Source (Book or Web Address)

Volcano Wiki Entry



NAME: _____ 8.4 ACTIVITY PAGE

DATE: _____

Volcano Wiki Entry

Use complete sentences to fill in the information below.

Volcano Name:

Location:

Volcano Type and Last Eruption Date:

Description:

Other Facts:

References:

NAME: _____

DATE: _____

9.1 TAKE-HOME

Excerpts from "Earth's Building Blocks"

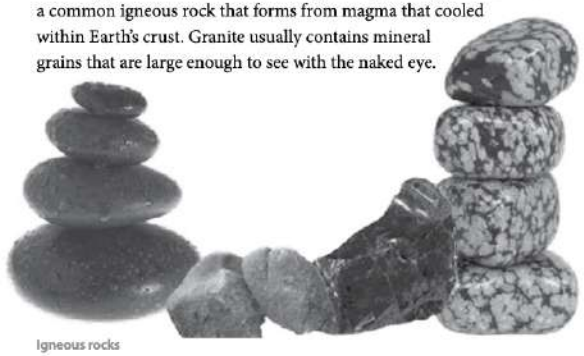
Read the following excerpt and use it to complete the activity that follows.

Born from Magma: Igneous Rock

Let's start with **igneous rocks**, the most abundant class of rocks on the earth. Igneous rocks form when magma cools and **solidifies**. When you think of igneous rocks, think of volcanoes.

There are two basic types of igneous rock. One type forms from magma that erupts onto Earth's surface as lava. The lava cools and hardens into rock. The faster it cools, the smaller the mineral grains will be in the resulting rock. **Obsidian** is an igneous rock formed from lava that cooled very quickly, so quickly, there wasn't time for the minerals to form grains. As a result, obsidian is as smooth and shiny as glass. In fact, it is often called volcanic glass. Basalt is an igneous rock formed from lava that took longer to cool. Basalt is typically a dark-colored rock. It has fairly small mineral grains that give it a fine-grained texture.

The second type of igneous rock forms from magma that solidifies below Earth's surface. Magma cools very slowly when it's deep beneath the surface. Slow cooling leads to igneous rocks with relatively large mineral grains. The slower the cooling, the larger the grains. **Granite** is a common igneous rock that forms from magma that cooled within Earth's crust. Granite usually contains mineral grains that are large enough to see with the naked eye.



Igneous rocks

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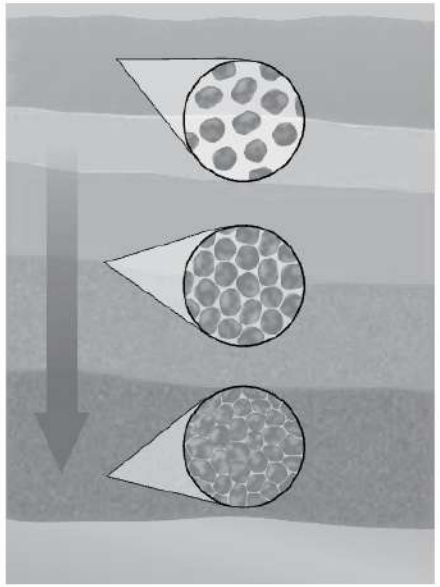
Rename

Layer after Layer: Sedimentary Rock

Sedimentary rock is the second major class of rocks. Sedimentary rocks are made of sediments. Sediments are tiny bits of rock and sand combined with fragments of once-living things. Sediments collect in low-lying areas both on land and in bodies of water. They form layers, one on top of another. Over long periods of time, the weight of overlying layers **compacts** the sediments in deeper layers, squeezing them closer together. Sediments also become cemented, or glued, together as **dissolved** minerals fill the spaces between the sediments. As the sediments dry, the dissolved minerals turn into solids, binding the sediments together. Over time, compacting and cementing processes transform sediments into sedimentary rock.



The weight of overlying layers compacts the sediments, squeezing them closer together.

Most sedimentary rocks are more easily broken than most igneous rocks. Hit a sedimentary rock with a hammer, and it will crumble or break apart. Some sedimentary rocks contain fossils. **Limestone** is a sedimentary rock often packed with the fossilized skeletons and shells of tiny ocean creatures. Some sedimentary rocks get their name from their sediments. Sandstone started as grains of sand, whereas mudstone formed from ancient mud.

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DATE: _____

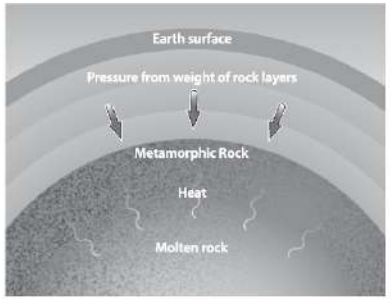
9.1 CONTINUED TAKE-HOME

Changing Form: Metamorphic Rock

The third major class of rocks is **metamorphic rock**. Metamorphic rocks form when igneous or sedimentary rocks are exposed to extreme heat and pressure. They can even form from older metamorphic rocks. High temperatures and crushing pressure alter the minerals in the rocks. Mineral grains may be flattened or rearranged into layers, swirls, or stripes. They may also be changed into completely different minerals!

Remember granite, the igneous rock? When granite is subjected to intense heat and pressure, it becomes a metamorphic rock called gneiss. When the sedimentary rock limestone is squeezed and heated deep below ground, it becomes a metamorphic rock called marble.

Metamorphic rocks tend to form deep within Earth's crust. The pressure from countless tons of overlying rock is tremendous. Equally powerful is the heat rising from hot magma in the mantle beneath the crust. Metamorphic rocks often form where tectonic plates are slowly colliding. They can also form as magma travels up through cracks in Earth's crust and heats the rocks around the cracks. If the heat of the magma completely melts the rock again, then it becomes igneous rock. If the rock is heated just enough to be changed, however, it instead becomes metamorphic rock.



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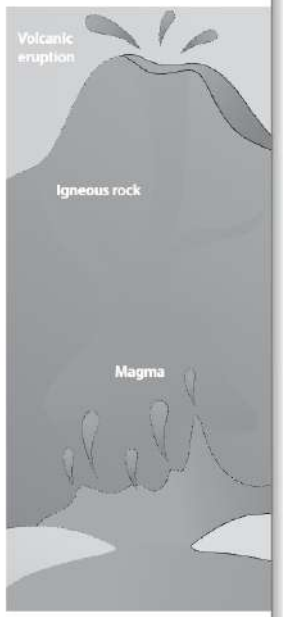
The Rock Cycle

Rocks you see in the world around you might seem like permanent fixtures. Given enough time, however, all rocks change. They are created, destroyed, and recreated in a continuous cycle. Geologists call this ongoing process the **rock cycle**.



The rock cycle has no starting or ending point. You can jump in anywhere to see how it works. Let's begin with magma erupting from a towering volcano. The magma (now lava) cools and hardens into igneous rock. Over the course of thousands of years, sun, wind, rain, and freezing temperatures cause the rock to **weather**, or break down into smaller pieces. The pieces continue to weather, slowly breaking down into sediments. Howling winds, flowing water, and gravity gradually move the sediments down the sides of the volcano and beyond. Movement of sediments from place to place is called **erosion**.

Imagine that the sediments end up in a lake, where they settle to the bottom. Over long periods of time, more layers of sediments are deposited on top of them. Compacting and cementing processes eventually turn the deeply buried sediments into sedimentary rock.

Now imagine that the sedimentary rock is near the edge of a tectonic plate. The plate collides with another plate—very slowly, of course. Tremendous heat and pressure generated by the collision gradually turn the sedimentary rock into metamorphic rock. As the plates continue colliding, their rocky edges crumple. The metamorphic

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NAME: _____

DATE: _____

9.1 CONTINUED TAKE-HOME

Write the correct word or phrase to complete each sentence. Each of the words/phrases will be used once.

compacted	erosion	magma	igneous	metamorphic
obsidian	rock cycle	sedimentary	solidified	texture

1. Lava flowed down the volcano's side and quickly hardened to form a glassy type of _____ rock.

2. Tiny flakes of _____ fell on the ground as an ancient tool maker worked to create a sharp blade for cutting.

3. The tiny flakes of rock were washed into a nearby stream, where they joined other sediments created by the _____ of rock from the nearby mountains.

4. The sediments formed layers on the stream bed, which _____ over time as the weight of the layers squeezed out the air and water.

5. The sediments cemented together and _____ into rock.

6. _____ rock was buried by even more layers of sediments over millions of years.

7. The heat and pressure from the weight of the overlying rock changed the _____ of the minerals in the rock.

8. New _____ rock formed and lay buried in the earth for millions of years.

Chapter 6 Earth's Building Blocks

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- Kahoot
- Blooket
- Quizizz
- Google Form