Rocks & Fossil Formation

Directions: Watch the video for each section, then answer the questions that follow.

Introduction to Sedimentary Rocks Video - Click here to watch video

1. What do sedimentary rocks help to preserve at the time of their formation?

_____

2. What are sedimentary rocks formed from (made up of)? _____

3. What are the steps to sedimentary rock formation?

   1. _____
   2. _____
   3. _____
   4. _____
   5. _____

4. What is at least one way weathering can occur? _____

5. What is at least one way erosion can occur? _____

Introduction to Fossils Video - Click here to watch video

1. What kind of rocks do fossils form in? _____

2. How is sediment created? _____ & _____

3. What are 2 pieces of information that sedimentary rocks provide us with?

   a. _____

   b. _____

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

Passage A

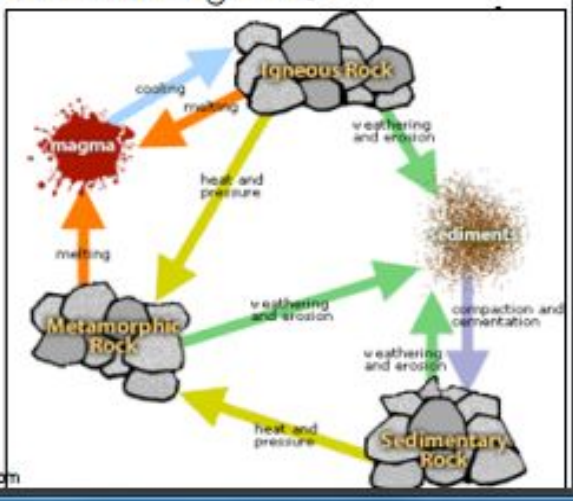
Rocks

A rock is made of two or more minerals. Rocks are constantly changing, because after they form, they wear down and then form again. This process is called the rock cycle.

Igneous rocks are formed when volcanoes erupt and magma flows to the earth's surface. These rocks were once melted rock, but they cooled and hardened over time. There are over 700 types of igneous rocks! One example of an igneous rock is granite, which is a hard rock that is often used for monuments and countertops. Pumice is another type of igneous rock, and it is light and airy. Pumice is often used in manicures and pedicures.

Sedimentary rocks can be made from weathering and erosion. Rain, wind, and running water cause rocks to break down a little bit at a time. These rock pieces fall to the bottom of the lake or ocean they run into. Over time, the layers of sand and mud at the bottom of rivers, lakes, and oceans harden and turn into sedimentary rocks. Fossils are usually found in sedimentary rocks, because the layers help preserve the animal parts or trace evidence. Some examples of sedimentary rocks are sandstone, limestone, and breccia. Limestone is used to make many things like paper, glass, and even the coating on some chewing gum

Metamorphic rocks are rocks that have changed because of heat and pressure. These rocks were once igneous or sedimentary rocks, but they have changed and turned into metamorphic rocks. These rocks are usually formed deep beneath the earth's surface. Marble and gold are both types of metamorphic rocks. Computer chips are made from silicon, and silicon comes from quartz, which is a metamorphic rock.



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Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

Passage A

Fossils

A fossil is the preserved remains of plants and animals. All fossils were formed at least 10,000 years ago. There are two main types of fossils, body fossils and trace fossils. Both types of fossils can tell us many things about plants and animals from long ago.

Body fossils are the remains of a plant or animal's body. For an animal to become a fossil, it was quickly buried after its death. Over time, sediments would cover the remains. Then, the parts of the animals that didn't decay (bones and teeth) would be encased in newly formed sediment. After a long time, the bone would slowly decay and water infused with minerals would seep into the bone and replace the chemicals in the bone with rock-like minerals. Other body fossils are found in Amber, a hardened form of tree sap. This is usually where we find insects or pieces of plants.

Trace fossils are the remains of an animal, such as footprints, egg shells, and nests. A mold is the shape of a plant or animal left in sediments when the rocks are formed. A cast forms when mud or minerals fill a mold. An imprint is a mold of a leaf or other thin object.

Scientist can use animal fossils to determine how an ancient animal looked and lived. A paleontologist, scientist who studies fossils, can reconstruct the skeletons of dinosaurs to show how large the animal was and how the animal moved. The skeletons can also tell us the types of food the animals ate.

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

3 Sedimentary Rocks

Reading Focus

Key Concepts

- How do sedimentary rocks form?
- What are the three major types of sedimentary rocks?
- How are sedimentary rocks used?

Key Terms

- sediment • erosion
- deposition • compaction
- cementation • clastic rock
- organic rock • chemical rock

Target Reading Skill

Outlining As you read, make an outline about sedimentary rocks. Use the red section headings for the main topics and the blue headings for the subtopics.

Sedimentary Rocks
I. From sediment to rock
A. Erosion
B.
II.
A.

Lab zone Discover Activity

How Does Pressure Affect Particles of Rock?

1. Place a sheet of paper over a slice of soft bread.
2. Put a stack of several heavy books on top of the paper. After 10 minutes, remove the books. Observe what happened to the bread.
3. Slice the bread so you can observe its cross section.
4. Carefully slice a piece of fresh bread and compare its cross section to that of the pressed bread.

Think It Over

Observing How did the bread change after you removed the books? Describe the texture of the bread. How does the bread feel? What can you predict about how pressure affects the particles that make up sedimentary rocks?

Visitors to Badlands National Park in South Dakota see some of the strangest scenery on Earth. The park contains jagged peaks, steep cliffs, and deep canyons sculpted in colorful rock that is layered like a birthday cake. The layers of this cake are red, orange, pink, yellow, or tan. These rocks formed over millions of years as particles of mud, sand, and volcanic ash were deposited in thick layers. The mud and sand slowly changed to sedimentary rock. Then, uplift of the land exposed the rocks to the forces that wear away Earth's surface.

Badlands National Park ▲

From Sediment to Rock

If you have ever walked along a stream or beach you may have noticed tiny sand grains, mud, and pebbles. These are particles of sediment. **Sediment** is small, solid pieces of material that come from rocks or living things. In addition to particles of rock, sediment may include shells, bones, leaves, stems, and other remains of living things. Sedimentary rocks form when sediment is deposited by water and wind. **Most sedimentary rocks are formed through a series of processes: erosion, deposition, compaction, and cementation.** Figure 9 shows how sedimentary rocks form.

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

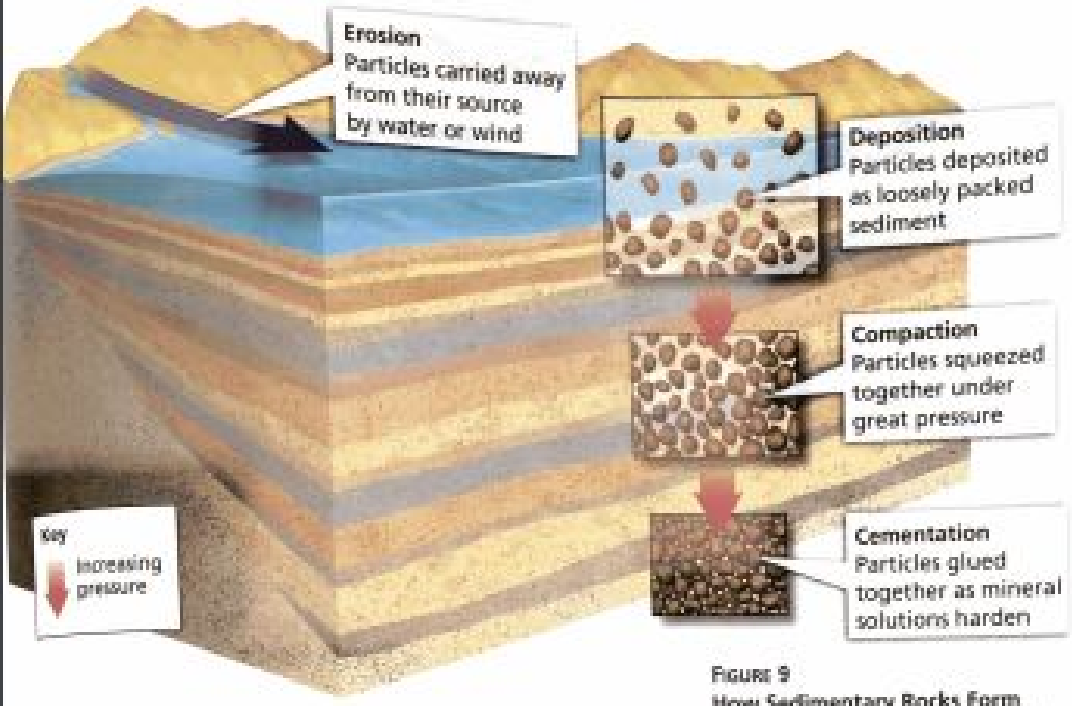


FIGURE 9
How Sedimentary Rocks Form
Sedimentary rocks form through the deposition, compaction, and cementation of sediments over millions of years.
Relating Cause and Effect *What conditions are necessary for sedimentary rocks to form?*

Erosion Destructive forces are constantly breaking up and wearing away all the rocks on Earth's surface. These forces include heat and cold, rain, waves, and grinding ice. The forces of erosion form sediment. In **erosion,** running water, wind, or ice loosen and carry away fragments of rock.

Deposition Eventually, the moving water, wind, or ice slows and deposits the sediment in layers. If water is carrying the sediment, rock fragments and other materials sink to the bottom of a lake or ocean. **Deposition** is the process by which sediment settles out of the water or wind carrying it.

Compaction The process that presses sediments together is **compaction.** Thick layers of sediment build up gradually over millions of years. These heavy layers press down on the layers beneath them. The weight of new layers further compacts the sediments, squeezing them tightly together. The layers often remain visible in sedimentary rock.

Cementation While compaction is taking place, the minerals in the rock slowly dissolve in the water. **Cementation** is the process in which dissolved minerals crystallize and glue particles of sediment together. In cementation, dissolved minerals seep into the spaces between particles and then harden.

Reading Checkpoint **What is deposition?**

Go Online
SCILINKS
For: Links on sedimentary rocks
Visit: www.SciLinks.org
Web Code: scn-1053

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

Section 1

Fossils

Reading Preview

Key Concepts

- How do fossils form?
- What are the different kinds of fossils?
- What does the fossil record tell about organisms and environments of the past?

Key Terms

- fossil
- sedimentary rock
- mold
- cast
- petrified fossil
- carbon film
- trace fossil
- paleontologist
- scientific theory
- evolution
- extinct

Target Reading Skill

Using Prior Knowledge Before you read, look at the section headings and visuals to see what this section is about. Then write what you know about fossils in a graphic organizer like the one below. As you read, write what you learn.

What You Know
1. Fossils come from ancient organisms.
2.

What You Learned
1.
2.

Lab zone Discover Activity

What's in a Rock?

1. Use a hand lens to carefully observe the rock sample provided by your teacher. You may also study the photograph of limestone below.
2. Make a drawing of any shapes you see in the rock. Include as many details as you can. Beneath your drawing, write a description of what you see.

Think It Over

Inferring What do you think the rock contains? How do you think the shapes you observed in the rock got there?

Millions of years ago, a fish died and sank to the bottom of a lake. Before the fish could decay completely, layers of sediment covered it. Minerals in the sediment seeped into the fish's bones. Slowly, pressure changed the sediment into solid rock. Inside the rock, the fish became a fossil.

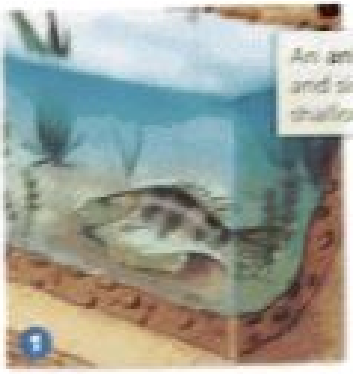
Fossils are the preserved remains or traces of living things. Fossils like the ancient fish in Figure 1 provide evidence of how life has changed over time. Fossils can also help scientists infer how Earth's surface has changed. Fossils are clues to what past environments were like.

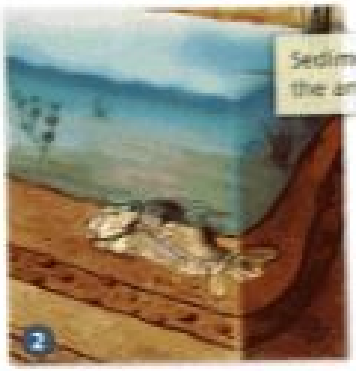
How a Fossil Forms

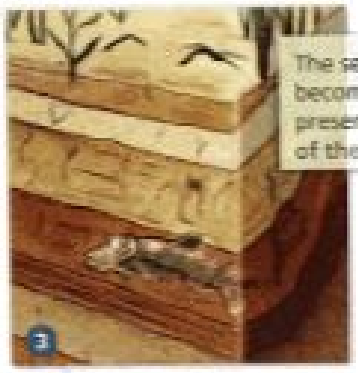
Most fossils form when living things die and are buried by sediments. The sediments slowly harden into rock and preserve the shapes of the organisms. Fossils are usually found in sedimentary rock. **Sedimentary rock** is the type of rock that is made of hardened sediment. Recall that sediment is the material removed by erosion. Sediment is made up of rock particles or the remains of living things. Sandstone, limestone, and coal are examples of sedimentary rocks. Most fossils form from animals or plants that once lived in or near quiet water such as swamps, lakes, or shallow seas where sediments build up. In Figure 1, you can see how a fossil might form.

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

FIGURE 1
How a Fossil Forms
A fossil may form when sediment quickly covers an animal's body. Classifying In what type of rock would this fossil be found?







When an organism dies, its soft parts often decay quickly or are eaten by animals. That is why only hard parts of an organism generally leave fossils. These hard parts include bones, shells, teeth, seeds, and woody stems. It is rare for the soft parts of an organism to become a fossil.

For a fossil to form, the remains or traces of an organism must be protected from decay. Then several processes may cause a fossil to form. **Fossils found in rock include molds and casts, petrified fossils, carbon films, and trace fossils. Other fossils form when the remains of organisms are preserved in substances such as tar, amber, or ice.**

Molds and Casts The most common fossils are molds and casts. Both copy the shape of ancient organisms. A **mold** is a hollow area in sediment in the shape of an organism or part of an organism. A mold forms when the hard part of the organism, such as a shell, is buried in sediment.

Later, water carrying dissolved minerals and sediment may seep into the empty space of a mold. If the water deposits the minerals and sediment there, the result is a cast. A **cast** is a solid copy of the shape of an organism. A cast is the opposite of its mold. Both the mold and cast preserve details of the animal's structure. Figure 1 shows a process that could form a mold and cast fossil.

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

Rocks & Fossils Reading Questions

1. Why do you think fossils are found in sedimentary rocks and not igneous or metamorphic rocks?

_____

_____

_____

2. What is sediment?

_____

_____

2. How is sedimentary rock formed and explain what is happening in each of these stages?

a. Weathering : Rocks are broken down into smaller pieces
b. _____: _____
c. _____: _____
d. _____: _____
e. _____: _____

3. Why do you think plant fossils are less common than animal fossils?

_____

_____

_____

4. What are fossils?

_____

5. How are body/most fossils formed?

_____

_____

Directions: Read the following pages on rocks and fossils, then answer the questions that follow.

6. Where would you find most fossils form?

_____

7. What are the 4 steps the books describes in the formation of fossils?

1. _____
2. _____
3. _____
4. _____

8. What can we learn from fossils?

_____

_____

_____