Name: _____
Period: _____
Prior Research: Limestone Weathering/Erosion Lab

Score:

Use pages 239-243 in your Earth Science textbook to find the following information:

"Weathering and Erosion" (pg. 239)

1) Define "weathering": _____

2) Define "erosion": _____

3) What do weathering and erosion work together to do? _____

"Mechanical Weathering" (pg. 240-241)

4) What does "mechanical weathering" do to rocks? _____

5) What are 5 causes (types) of mechanical weathering? _____

6) Define "abrasion": _____

"Chemical Weathering" (pg. 242-243)

7) With "chemical weathering", what happens to rocks? _____

8) What are five causes of chemical weathering? _____

9) How do chemical and mechanical weathering work together? _____

10) How does water weather rock? _____

Weathering Lab: Prior Research, Article #1

Directions: Read the article below. As you read, highlight information that will be useful formulating the hypothesis for the limestone weathering lab. This would include information about how water, acids, and/or "shaking" might affect limestone. After reading and highlighting the article, choose two statements that you will present to your team. Write each of your selected sentences (the entire sentence for each) on the provided "index card form" at the bottom of the page.

Title: "What is Limestone?"
Source: Website: Graniteland.com
Address: http://www.graniteland.com/infos/home/limestone
Date: Accessed March 23, 2015

What is limestone?

Limestone is a sedimentary rock composed of the mineral calcite (calcium carbonate). Most limestone comes from tiny marine organisms. These organisms secrete shells that settle out of the water column and are deposited on ocean floors. Another source of limestone is groundwater that filters through the ground to produce cave features like stalagmites and stalactites. Limestone makes up approximately 10 percent of the total volume of all sedimentary rocks.

Uses of limestone

Limestone is quarried (mined) to be used for roadbeds, building and landscape construction, and cement manufacture.

Limestone is especially popular in architecture, and many landmarks around the world, especially in North America and Europe, are made primarily of the material. Limestone is readily available and relatively easy to work with. It is also long-lasting and stands up well to exposure. However, it is a very heavy material, making it impractical for tall buildings; it is also quite expensive. Limestone was most popular in the early 20th and late 19th centuries. Many train stations, banks and other structures from that era are made of limestone. In North America, most limestone used in construction comes from Indiana.

Though the limestone used for construction is good for humid climates, it is vulnerable to acids. Because of this, acid rain is a problem when it occurs in where limestone is used extensively. The acids in the water weaken the rock and make it easier to wear away the details of statues and other art.

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Weathering Lab: Prior Research, Article #2

Directions: Read the article below. As you read, highlight information that will be useful formulating the hypothesis for the limestone weathering lab. This would include information about how water, acids, and/or "shaking" might affect limestone. After reading and highlighting the article, choose two statements that you will present to your team. Write each of your selected sentences (the entire sentence for each) on the provided "index card form" at the bottom of the page.

Title: "The Study of Our Earth"
Source: Website: Geology for Kids; Kidsgeo.com,
Address: http://www.kidsgeo.com/geology-for-kids/0067-chemical-weathering.php
Date: Accessed March 23, 2015

Mechanical Weathering
Mechanical weathering takes place when rocks are broken down without any change in the chemical nature of the rocks. The rocks are essentially torn apart by physical force, rather than by chemical breakdown.

The most common type of mechanical weathering is the constant freezing and thawing of water. In liquid form, water is able to penetrate the many holes, joints, and fissures within a rock. As the temperature drops below 32 ° F, this water freezes. As water freezes, it expands, becoming about 10% larger than it was in liquid form. The result is that the holes and cracks in rocks are pushed outward. Even the strongest rocks are no match for this force.

Another important type of mechanical weathering is salt wedging. As water enters the holes and cracks in the surface of rocks, it often carries salt with it. As the water later evaporates, the salt is left behind. Over time, these salt deposits build up, creating pressure that can cause rocks to split and weaken.

Temperature changes also effect mechanical weathering. As temperatures heat up, the rocks themselves expand somewhat. As the temperatures cool down, rocks contract slightly. The effect can be the weakening of the rock itself.

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Weathering Lab: Prior Research, Article #3

Directions: Read the article below. As you read, highlight information that will be useful formulating the hypothesis for the limestone weathering lab. This would include information about how water, acids, and/or "shaking" might affect limestone. After reading and highlighting the article, choose two statements that you will present to your team. Write each of your selected sentences (the entire sentence for each) on the provided "index card form" at the bottom of the page.

Title: "The Study of Our Earth"
Source: Website: Geology for Kids; Kidsgeo.com,
Address: http://www.kidsgeo.com/geology-for-kids/0067-chemical-weathering.php
Date: Accessed March 23, 2015

Chemical Weathering

Chemical weathering takes place in almost all types of rocks. In chemical weathering, chemical reactions break down the bonds holding the rocks together, causing them to fall apart, forming smaller and smaller pieces. Chemical weathering is much more common in locations where there is a lot of water. This is because water is important to many of the chemical reactions that can take place. Warmer temperatures are also more friendly to chemical weathering. The most common types of chemical weathering are oxidation, hydrolysis and carbonation.

Oxidation takes place when oxygen combines with other elements in rocks to form new types of rock. These new substances are usually much softer, and thus easier for other forces to break apart.

Hydrolysis occurs when water combines with the substances in rocks to form new types of substances, which are softer than the original rock types. This allows other forces, such as mechanical weathering, to more easily break them apart.

Carbonation takes place when carbon dioxide reacts with certain types of rocks forming a solution that can easily be carried away by water.

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Weathering Lab: Prior Research, Article #4

Directions: Read the article below. As you read, highlight information that will be useful formulating the hypothesis for the limestone weathering lab. This would include information about how water, acids, and/or "shaking" might affect limestone. After reading and highlighting the article, choose two statements that you will present to your team. Write each of your selected sentences (the entire sentence for each) on the provided "index card form" at the bottom of the page.

Title: "What is Chemical Weathering? - Definition, Process & Examples"
Source: Website: Study.com
Address: http://study.com/academy/lesson/what-is-chemical-weathering-definition-process-examples.html
Date: Accessed March 23, 2015

Chemical Weathering

One of the reasons rocks look so varied in their appearance is because they are subjected to **chemical weathering**, which is the process by which rocks are broken down by chemical reactions. It is important to emphasize that because there is an actual chemical change taking place, rocks are not just crumbled into smaller rocks; they are actually being chemically altered. In other words, after chemical weathering, we end up with a different substance than the one we started with.

There are different types of chemical weathering. Let's start with a discussion of **hydrolysis**, which is the chemical breakdown of a substance when combined with water. You can recall this term by remembering that the prefix 'hydro' means 'water' and the suffix 'lysis' means 'to break down.' With hydrolysis, a chemical reaction happens between the minerals found in the rock and rainwater. When it rains, water seeps down into the ground and comes in contact with certain types of rocks. The crystals within the rock react with the water and are chemically altered to form different minerals that weaken the rock.

Another type of chemical weathering is **oxidation**. Oxidation is the reaction of a substance with oxygen. You are probably familiar with oxidation because it is the process that causes rust. So just like your car turns to rust through oxidation, rocks can get rusty if they contain iron. When a rock gets oxidized, it is weakened and crumbles easily, allowing the rock to break down. Iron oxide is a kind of brownish-red in color, and this explains why some rocks look red.

Carbonation is another type of chemical weathering. Carbonation is the mixing of water with carbon dioxide to make carbonic acid. This type of weathering is important in the formation of caves. Dissolved carbon dioxide in rainwater or in moist air forms carbonic acid, and this acid reacts with minerals in rocks. The mineral calcite, which is common in limestone, is particularly vulnerable to carbonation. This mineral dissolves in the carbonic acid and gets washed away. This can hollow out the rock and leave behind a cave.

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