



DISTANCE LEARNING PACKET

5TH GRADE

SCIENCE

CHANGES IN LANDFORMS

Weathering

Weathering is the breakdown of rock or soil. Although rocks seem hard and impossible to change, they do change over time. Physical forces, such as wind, running water, moving ice, and even plants and animals can physically break up rock into smaller particles. For example, ocean waves can break up large rocks and shells into tiny pieces of sand. Even very large mountains can weather to become shorter and rounder over time.

There are many forms of weathering. Plants can weather rocks with their roots as the roots grow. When water freezes in the cracks of a rock, the water expands as it becomes ice. This makes the cracks larger, and it breaks the rock apart. Ice can break up rocks in other ways too. For example, large moving masses of ice called **glaciers** can grind rock up as they slowly slide across the surface of the Earth. Temperature changes can also cause weathering. Many materials, such as rocks, expand (get larger) when they are heated and contract (shrink) when they are cooled. This change in size can cause cracks to form and break large rocks into smaller pieces. How quickly a rock weathers is related to the properties of the rock and the causes of the weathering. Harder rocks weather more slowly over time, but softer rocks can break apart more quickly.

Erosion

Erosion is the transport of weathered materials from one place to another by natural processes. For example, running water in a river picks up weathered sediment and carries it downstream. Ocean waves pick up material along the coastline and carry the material away. Very often, the natural process that weathers a rock is the same natural process that ends up eroding it.

Human changes to the land can cause erosion to occur faster. For example, if a farmer removes all the plants from a field by plowing, soil will be more easily eroded because it is no longer held in place by plant roots. Proper farming techniques minimize the amount of time that the soil is exposed in order to decrease erosion.

Once material has been broken up by weathering, there are many natural processes that can cause the material to move. Gravity can pull loose and broken rocks so that they fall down a cliff. Wind can blow soil to new locations. Water as runoff or in rivers, streams, and oceans can carry material from one place to another. The removal of material by erosion creates many different landforms, including canyons, valleys, cliffs, and arches. Many geologists believe that the Grand Canyon was formed in just this way by the Colorado River.

Erosion is often a slow process, but some materials erode faster than others. For instance, beach sand erodes more quickly than large rocks. Also, the rate of erosion can depend on what natural force is responsible for the eroding. A hurricane or a flood can possibly erode more material from a coastline or riverbank more quickly than the everyday forces that usually act in those areas.

Erosion can also be caused by movement of glaciers. For example, the rock fragments and sediments in glaciers often abrade the surface below the glacier as they move. This abrasion causes the surface to be polished or striated.

Deposition

As water moves down a river, the water flows less quickly. Sediment begins to settle out of the water in a process called **deposition**.

Near the place where a river empties into the ocean, the water flow becomes very slow. The slow-moving water lays down the rest of the sediment it is carrying. A new landform is created from the sediment. This landform is called a **delta**.

Formation of sand dunes is another example of deposition. Wind erodes sand from one location and deposits it in another.

Scientists use **stream tables** to model the way that erosion and deposition change the land. A stream table is a waterproof table or pan covered in silt, sand, or some other type of soil. Water is poured or sprayed at the top of the table, and then it is allowed to flow to the bottom of the table.

The water erodes some of the soil on the table. The amount of erosion can be measured by collecting the soil that is carried to the end of the table by the water.

SCIENCE DAY 1: CHANGES IN LANDFORMS

NAME: _____

DATE: _____

New landforms are often created or destroyed by geologic processes, such as erosion and volcanoes. However, humans and animals can change landforms as well.

A beaver dam can change a landform by

- A. causing river water to move more swiftly, resulting in deepening of the riverbed.
- B. causing deposition which eventually results in very tall mountains.
- C. causing flooding which may result in the formation of new ponds.
- D. creating strong winds which form arches by weathering and eroding rock.

Which of the following processes makes mountains become rounder as they age?

- A. deposition
- B. volcanic eruptions
- C. weathering
- D. mountain building

Many materials, such as rocks, expand (get larger) when they are heated and contract (shrink) when they are cooled. This change in size can cause cracks to form and break large rocks into smaller pieces.

In this example, what is caused by heating and cooling?

- A. decay
- B. erosion
- C. earthquakes
- D. weathering

Lyle filled a glass bottle completely with water. He put the lid on tightly, then he put the water in the freezer to cool it down quickly. Lyle forgot about his water until the next day.

When Lyle took his bottle out of the freezer, all the water was frozen solid. The bottle had cracked in several places and was broken.

If water in the ground acts like water in the bottle when it freezes, how does water in the ground affect layers of rock and soil?

- A. It breaks them up.
- B. It rearranges them.
- C. It makes them larger.
- D. all of these

SCIENCE DAY 2: CHANGES IN LANDFORMS

NAME: _____ date: _____

Landforms are a result of a combination of **constructive and destructive forces**. Collection and analysis of data indicates that **constructive forces** include crustal deformation, faulting, volcanic eruption and deposition of sediment, while **destructive forces** include weathering and erosion.

Multiple Choice: Choose the BEST answer.

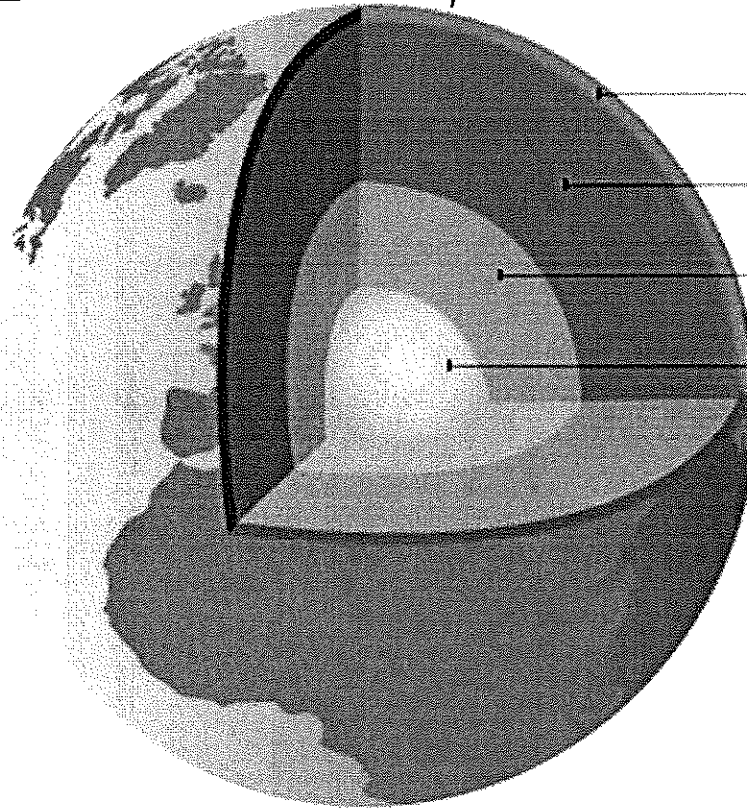
1. What are the two types of weathering?
 - a. Physical and Mechanical
 - b. Chemical and Physical
 - c. Behavioral and Mechanical
2. Which of the following are BOTH constructive and destructive forces?
 - a. Earthquakes
 - b. Volcanoes
 - c. Both of these!
3. Mudslides, rockslides, and avalanches are examples of
 - a. Landslides
 - b. Sinkholes
 - c. Tornadoes
4. Which was formed by destructive forces?
 - a. Sea Cave
 - b. Mountain
 - c. Island
5. Which of the following is TRUE?
 - a. Destructive forces build-up the land.
 - b. Destructive forces break down the land.
 - c. Constructive forces break down the land.
6. Which of the following is NOT responsible for weathering?
 - a. Electricity
 - b. Wind
 - c. Living Organisms
7. Which of these can form above a limestone cave?
 - a. Earthquake
 - b. Sinkhole
 - c. Mudslide
8. What happens to water when it freezes?
 - a. It shrinks.
 - b. It evaporates.
 - c. It expands.

Constructed Response: Choose **VOLCANOES** or **EARTHQUAKES** and describe how the one you chose has BOTH a constructive AND destructive impact on the Earth's surface.

SCIENCE DAY 3: CHANGES IN LANDFORMS

NAME: _____ date: _____

Directions: Use the Word Bank to label the layers of the Earth.



1.

2.

3.

4.

Word Bank

Inner Core

Crust

Mantle

Outer Core

Constructed Response: Explain why the Earth's surface looks much different now, than it did millions of years ago.

SCIENCE DAY 4: HUMAN IMPACT

NAME: _____ date: _____

Vocabulary: Match each vocabulary word with the correct definition. Write the LETTER on the line.

- | | |
|---------------------------|---|
| 1. _____ Flood | a. Plowing in curved rows that follow the shape of the land. |
| 2. _____ Levee | b. The practice of raising crops in leveled sections along a hillside. |
| 3. _____ Dam | c. A wall along the banks of the river, designed to stop flooding. |
| 4. _____ Storm Drain | d. An island near the shore, formed by currents that deposit sediments. |
| 5. _____ Jetty | e. A system of pipes or channels that carry away water from storms. |
| 6. _____ Sea Wall | f. An event in which water flows over land that is usually dry. |
| 7. _____ Barrier Island | g. A wall across a river or other waterway, designed to hold back the water. |
| 8. _____ Reservoir | h. An artificial lake, used to hold water for future use and to control floods. |
| 9. _____ Terrace Farming | i. A long, narrow wall from the shore into the ocean. |
| 10. _____ Contour Plowing | j. A tall wall built along the back edge of beach, designed to prevent erosion. |

Constructed Response: Why is it important for humans to reduce erosion and control flooding?

SCIENCE DAY 5: W.E.D. SORT

NAME: _____ date: _____

Weathering, Erosion, or Deposition? Read each scenario. Decide if it is describing weathering (W), erosion (E), or deposition (D). Write the correct letter on the line.

1. _____ Water seeps into cracks of a mountain and freezes. New, larger cracks develop.
2. _____ Sediment is picked up from the banks of a flowing river.
3. _____ A shield volcano erupts and forms an island in the Pacific Ocean.
4. _____ The roots of a plant grow in the cracks of a sidewalk. As the root grows larger the cement begins to crack.
5. _____ A glacier drops sediment that builds up to form a moraine.
6. _____ A rabbit burrows into the crack of a large rock and widens and splits the rock.
7. _____ Dust and sand are blowing in the air during a windstorm.
8. _____ Rushing flood waters rush down a steep slope, dropping sediment at the bottom, and forming an alluvial fan.
9. _____ The repeated motion of waves pick up loose sand from the beach.
10. _____ The rock on the side of a cliff is carried away by waves, forming a sea cave.
11. _____ Limestone begins to soften because of acid rain.
12. _____ Rocks are smoothed by water repeatedly washing over them in a stream.
13. _____ A delta is formed at the mouth of a large river.
14. _____ Rock and sediment from the side of a mountain are picked up by a moving glacier.
15. _____ Wind drops sand in the desert and forms a sand dune.

Constructed Response: Describe what would happen to Earth's surface if weathering, erosion, and deposition suddenly stopped happening? Be specific and give details.