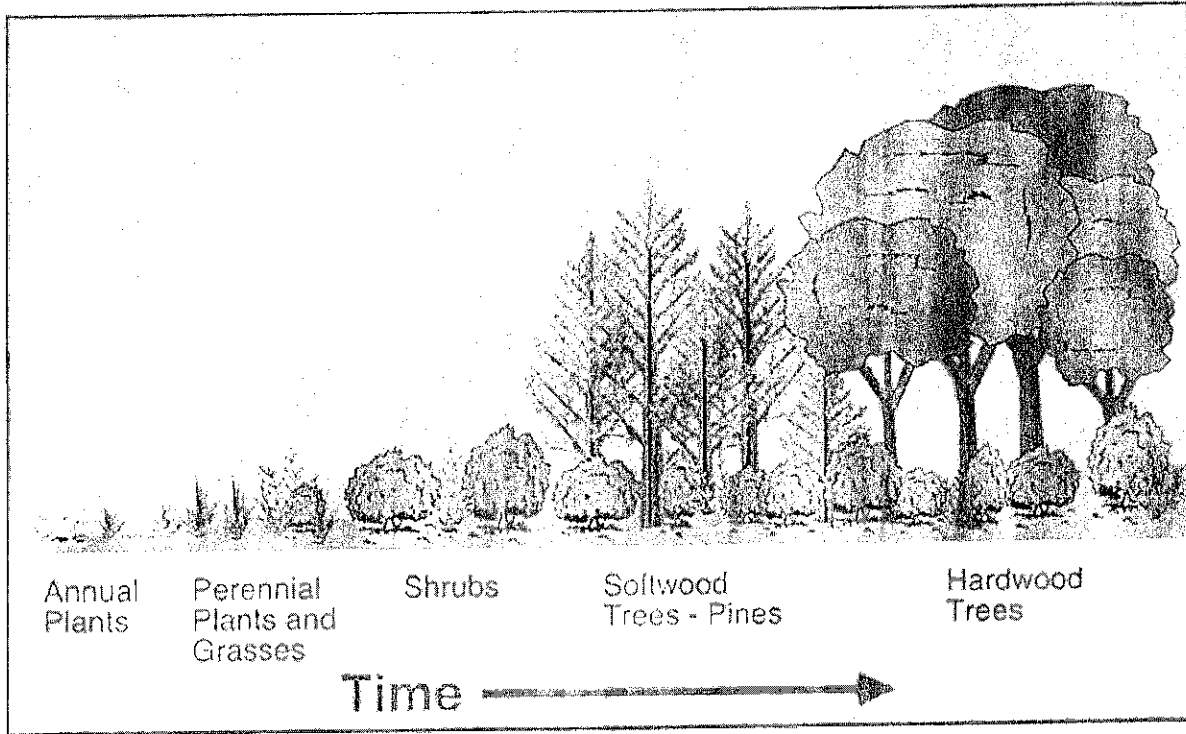


Name: _____

Period: _____ Teacher: _____



Unit 3: Analyzing Ecosystems Part 2

Changes in Ecosystems

Topic	Textbook Pages
Weather, Erosion, Deposition	220-231
Catastrophic Events	206-219
Ecological Succession	342-351
Watersheds	220-231

Hopewell Middle School

7th Grade Science

Mrs. Rothenhausler, Mrs. Hinds and Mr. Crellin

1

Name _____ Week _____ Period _____ Student # _____

Learning Target	Success Criteria

Reflection

Learning Target	Success Criteria

Reflection

Learning Target	Success Criteria

Reflection

Learning Target	Success Criteria

Reflection

Learning Target	Success Criteria

Reflection

Unit 3: Analyzing Ecosystems Part 2 (Changes in Ecosystems)

TEKS Analysis

TEKS 7.8A- predict and describe how different types of *catastrophic events impact ecosystems* such as floods, hurricanes, or tornadoes.

Describe how the following catastrophic events might affect the resources of plants and animals.

Flood	
Hurricane	
Tornado	

Essential Questions

How do catastrophic events impact ecosystems?

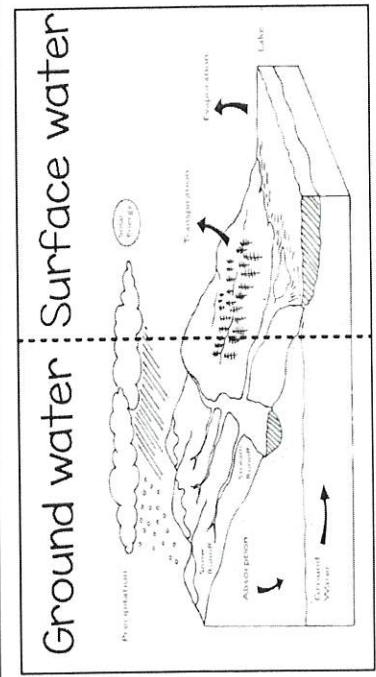
TEKS 7.8B- analyze the effects of *weathering, erosion, and deposition* on the environment in ecoregions of Texas

Illustrate the weathering, erosion and deposition of a rock by wind, water, ice or a combination forces. (Describe and label events of your drawing)

Essential Question

How do weathering, erosion and deposition affect the environment in ecoregions of Texas?

TEKS 7.8C- model the effects of *human activity on groundwater and surface water* in a watershed [supporting standard]



List ways that humans can contaminate or decrease levels of groundwater or surface water.

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

Essential Question

How do human activities affect groundwater and surface water in a watershed?

How are organisms affected by changes in the quality or quantity of groundwater?

TEKS 7.10C- observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds [supporting standard]

Ecological-
the relation of
living organisms
to one another
and to their
physical
surroundings.

Succession-
is the change in either species
composition, structure, or
architecture of vegetation
through time.

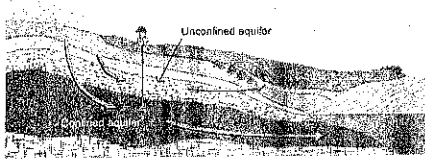
Define ecological succession in your own words after
reading the definition of the words individually.

Essential Questions

How does succession restore equilibrium
after a system has been altered?

How does succession create equilibrium in
an ecosystem?

1. aquifer:



A body of permeable rock that can contain or transmit groundwater.

2. catastrophic event:



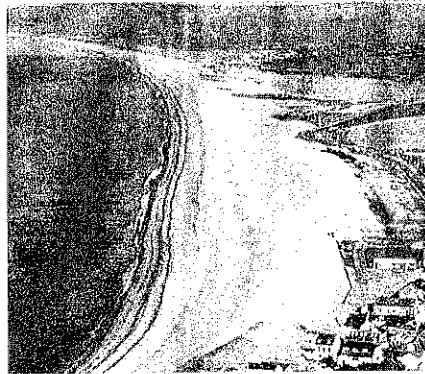
disastrous event

3. chemical weathering:



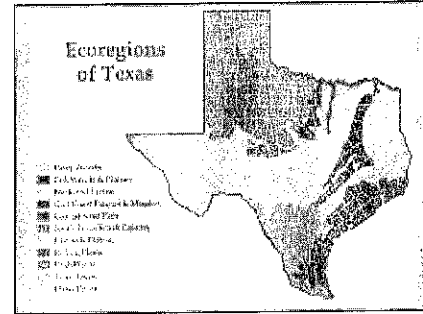
the process that breaks down rock through chemical changes

4. deposition:



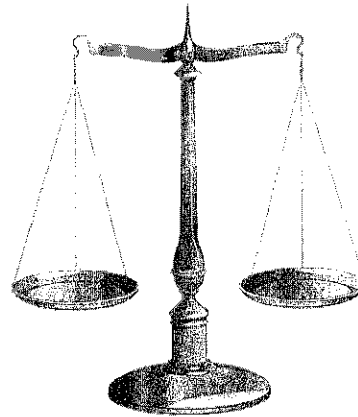
Process in which sediment is laid down in new locations.

5. ecoregion:



an area defined by its environmental conditions, landforms, and soil characteristics

6. equilibrium:



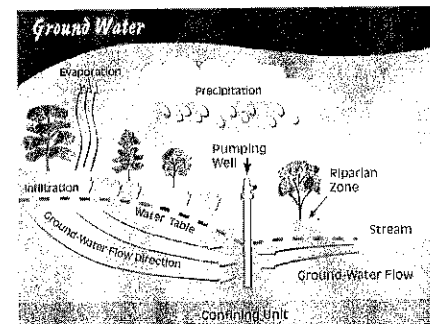
opposing forces in a system are equally balanced or stable (not changing/moving)

7. erosion:



Movement of sediment by wind, water, ice, or gravity.

8. groundwater:



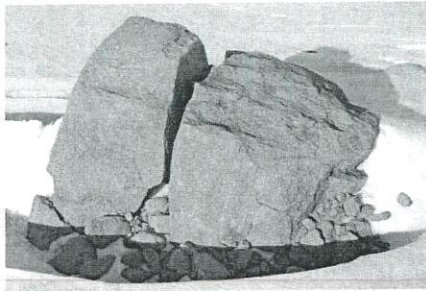
water that fills the cracks and spaces in underground soil and rock layers

9 lichen:



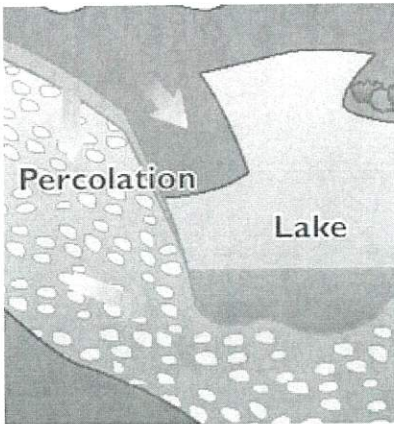
A type of fungus that grows in combination with algae and usually forms crust-like growth on rocks or trees

10 mechanical weathering:



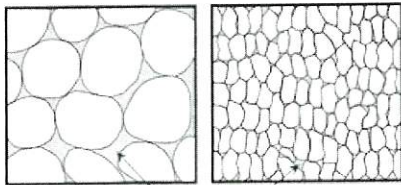
the type of weathering in which rock is physically broken into smaller pieces

11 percolation:



to pass (a liquid) gradually through small spaces or a porous substance; filter

12 permeable:



Pore Space

characteristic of materials such as sand and gravel which allow water to pass easily

13 porosity:



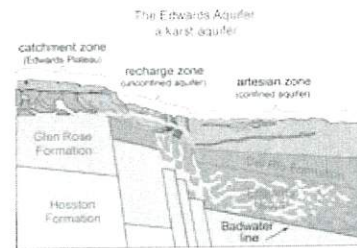
full of tiny holes that water or air can get through

14 primary succession:



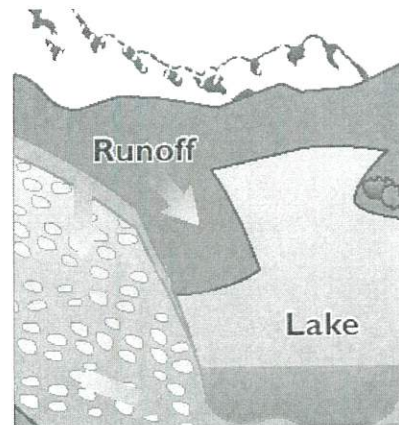
changes that occur in an area where no ecosystem had existed.

15. recharge zone:



area surrounding an aquifer from which water in the form of precipitation or surface waters replenishes the groundwater stored in the aquifer

16. runoff:



water that flows over the ground surface rather than soaking into the ground

17. secondary succession:



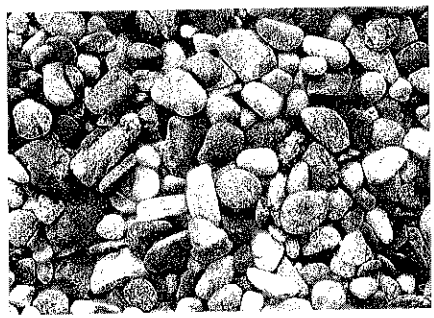
changes that occur AFTER a disturbance in an ecosystem

21. weathering:



Breakdown of rock to form sediment

18. sediments:



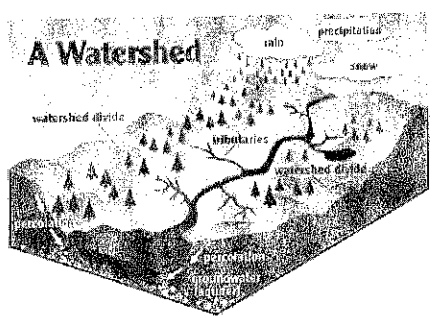
loose particles created by the weathering and erosion of rock

19. surface water:



water in streams, rivers, lakes, oceans

20. watershed:



the area drained by a river or river system



Name: _____ Date: _____ Group: _____

Weathering and Erosion

A group of students discussed the picture below.



Each of the students made a claim about the formation of this landform.

Student 1: Mountains got pushed up on both sides of a river slowly over thousands of years.

Student 2: A giant crack in the land formed when the crust of the earth was split open by an earthquake and the river rushed into the crack.

Student 3: At one time, this area was flat and the rock was together. The river carved out a canyon over a very long time.

Which student do you agree with most and why?



Name: _____ Date: _____ Group: _____

Weathering and Erosion Anticipation Guide

In the Before Reading column, circle either an **A** for agree or **D** for disagree beside each statement. After reading the passage, go back and read the statements again and respond in the After Reading column.

Before Reading	Statements	After Reading
A D	Weathering only occurs with wind and water.	A D
A D	Erosion is the movement of sediment.	A D
A D	Humans increase the effect of chemical weathering to rocks from pollution.	A D
A D	Weathering and erosion change the landscape of our Earth and create underground formations, like caves.	A D
A D	Wind and water do not impact the erosion of sediment.	A D
A D	Animals and humans are not agents of erosion.	A D
A D	Chemical weathering can be reversed.	A D
A D	Mechanical weathering is a physical change to the rocks.	A D

Choose one statement you changed your response to. What evidence in the reading caused you to change your mind?



Name: _____ Date: _____ Group: _____

Weathering and Erosion

Using evidence from your reading describe the geological processes and the changes that occur on the Earth's surface, in each column.

Weathering	Erosion	Deposition

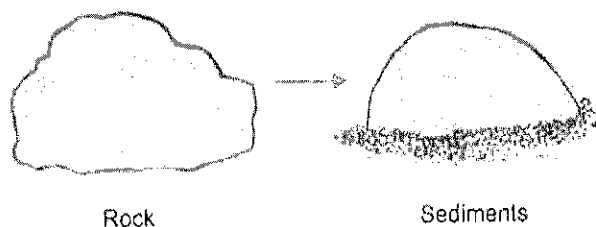
Weathering and Erosion

Have you ever looked at the land around you and wondered how it was shaped? The geologic features that help define the world are still being shaped by the natural processes of weathering, erosion, and deposition. These processes affect land differently, depending on the types of soil, rocks, and vegetation found in an ecoregion.

These processes can also be affected by other natural features, such as **climate** and **topography**. Later in this companion, you will learn how human activities can also affect how weathering, erosion, and deposition shape the land.

Weathering

Weathering is the process by which rocks are broken down into sediments slowly over time. There are two major types of weathering: mechanical (or physical) and chemical.



Mechanical weathering breaks down rocks into smaller pieces—called **sediments**—through physical processes. Mechanical weathering changes the shape and size of a rock, but it doesn't change the rock's chemical composition. Wind and water are two of the main agents that cause mechanical weathering. Other agents include living things and changing temperatures. (An **agent** is something that causes something else.)

For example, winds can pick up small particles and blast them against rock, slowly scraping away at the rock over time. Moving water can weather rocks in a similar way; water often carries larger particles that scrape away at the rock more quickly. Millions of years ago, the Colorado River flowed over relatively flat land in what would become the southwestern United States. Slowly, over time, the river carved away the rocks and carried the sediments downstream. This process created a depression in the flat land that gradually became a deep, wide canyon that we call the Grand Canyon today.



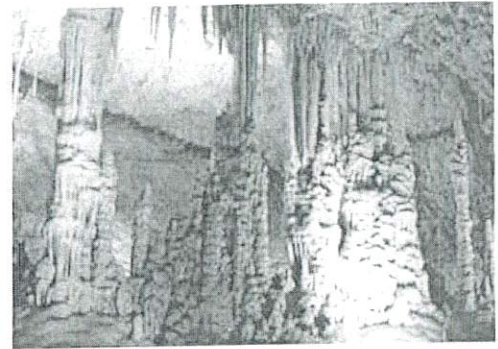
Like many canyons, the Grand Canyon was created through mechanical weathering by water flowing in the Colorado River.

Reflected

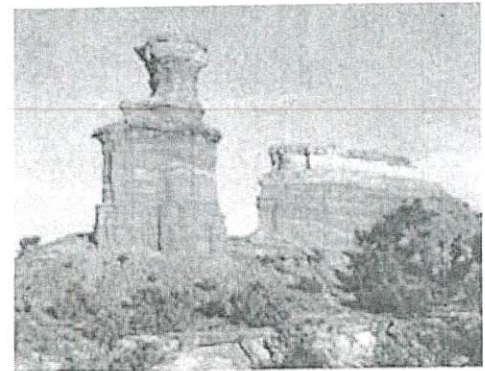
Water can also weather rocks by getting into cracks and freezing. When water freezes, it expands. When the water freezes in the cracks, it pushes the rocks apart. Plants growing in the cracks of a rock can also push apart the rock in a similar manner. Drastic changes in temperature, from fires or volcanic activity, can also cause rocks to crack and break down as they expand and contract from heating and cooling.

Chemical weathering breaks down rocks through chemical processes that change the rocks' chemical composition. For example, when carbon dioxide in air dissolves in rain water, carbonic acid is formed. This can dissolve some rocks, including limestone. Oxygen can also cause chemical reactions that weather rocks. Many rocks contain minerals that are composed of the element iron. Oxygen in the air or dissolved in water can cause the iron in these minerals to rust or **oxidize**. Rusting changes the iron (Fe) into iron oxide (Fe_2O_3), a different kind of chemical.

Some rocks are better able to withstand weathering agents than others. Rocks made of quartz, a very hard mineral, are highly resistant to mechanical weathering. Limestone, made of the mineral calcite, is the opposite of quartz. It is very easy to dissolve through chemical weathering. When a region contains many rock types, those that are more resistant to weathering will take longer to break down. This is called **differential weathering**. Differential weathering can shape the landscape by leaving peaks of highly resistant rocks and holes or depressions where less-resistant rocks have been broken down.



Many caves are formed as a result of chemical weathering, when large areas of limestone are dissolved by acidic water.



Differential weathering can create unique landforms like the one shown above. Weathering by wind created this rock formation. The less resistant rock weathered away, while the more resistant rock remained.

Reflect**Erosion**

Weathering breaks rocks down into sediments, and the process of **erosion** moves these sediments to other locations. Water—liquid and frozen—is an important agent for erosion. Flowing water can carry rocks, sediments, and soil downstream. The faster the water flows, the larger the particles it can carry. These particles may scrape against each other or nearby rocks, causing mechanical weathering at the same time as erosion. Glaciers—large sheets of moving ice—can also cause mechanical weathering, ripping chunks of rock out of the ground as they move across the land. The rocks and sediments caught up in a glacier are carried along the glacier's path, causing erosion.

Wind is another agent of erosion. Compared to water, winds usually carry smaller sediments. As these sediments scrape against rock in the wind's path, they can cause mechanical weathering at the same time as erosion. Animals are agents of erosion as they burrow into the ground, moving sediments out of their way.

Another erosional agent is gravity, which constantly pulls rocks downhill. Many rocks break as they erode downhill, causing additional mechanical weathering.

Because weathering and erosion tend to occur at the same time, rocks that are carried long distances by erosion tend to be more weathered. These rocks tend to be broken into smaller pieces and become more rounded. Rocks that are carried shorter distances, particularly through gravity, tend to have larger pieces with more angular edges. Differential weathering also plays a role. For example, if many different types of rocks are carried downstream for the same amount of time, those that are more resistant to weathering tend to be larger and less rounded than those that are less resistant.



As water laps against the shore, it erodes bits of rock. Blowing winds and the force of gravity also carry sediments into the sea.

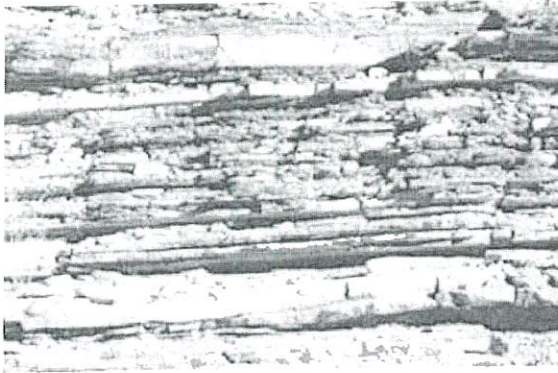
Look Out!

Many people confuse weathering and erosion or use the terms interchangeably. While weathering and erosion often happen at the same time, they are not the same processes. Weathering is the process by which rocks are broken down. Erosion is the process by which rocks, sediments, or soil are moved or carried away.

Look Out!

Deposition

Sediments, rocks, and soil cannot keep moving forever. Eventually, the particles stop moving and settle where the erosional agents have carried them. This process is called **deposition**. When sediments are eroded by wind, flowing water, ice or gravity, they are deposited in horizontal layers. The oldest layer of sediments is positioned at the bottom, and the more recently deposited layers are at the top. Depending on which agents caused the erosion, the sediments may be deposited in different ways.



Sediments are deposited in horizontal layers.



As a river flows into the ocean, sediments carried by the flowing water begin to pile up around the river's mouth. These sediments create rich deposits of land, called deltas. Deltas are excellent places to farm because their soil contains many nutrients picked up along the river's path to the sea.

What Do You Think?

Can you think of some other landforms caused by weathering, erosion or deposition?

Human Activities

Weathering, erosion, and deposition are natural processes. However, human activities can affect how these processes shape the land. Humans can cause mechanical weathering and erosion by digging into the ground and moving rocks, sediments, and soil to other places during construction. The roots of trees and other plants help hold soil in place. When humans cut down trees, the soil loses its support and becomes more vulnerable to erosion.

What Do You Think?

Pollution from cars, factories, and other human activities can also put more chemicals in the air and water. This makes it easier for chemical weathering to occur. For example, pollution can mix with water vapor in the atmosphere and fall as acid rain. Acid rain can easily dissolve limestone, as you can see in the photograph to the right.



Discover Science: Galveston Barrier Island System

Galveston, Texas lies on a special type of island called a barrier island. A **barrier island** is a long, narrow island that stretches along a coastline. A typical barrier island is separated from the mainland by a small, shallow stretch of water such as a bay or lagoon. Barrier islands help protect the shoreline from weathering and erosion by waves and storms.

Barrier islands are made of small, fine-grained sediments. Scientists are not entirely certain how barrier islands formed. One hypothesis is that barrier islands formed through erosion and deposition caused by flooding after the last Ice Age. Thousands of years ago, glaciers on land began to melt. As water from the melting glaciers flowed downhill to the sea, they weathered and eroded sediment. As the water flowed into the ocean, it



Residents of Galveston, Texas, reenter the city two weeks after Hurricane Ike made landfall.

slowed down, depositing larger, heavier sediment further inland, and smaller, fine-grained sediment further into the ocean. This process continued until the glaciers had finished retreating (leading to a rise in sea level) and the piles of sediment were high enough to rise above sea level, creating a barrier island.

Today, many people have built homes and other structures on barrier islands. People enjoy living near the beach, so barrier islands are popular places for resorts and summer homes; however, this is not always safe. Barrier islands are exposed to ocean waves and erode easily. This is especially dangerous during violent storms like hurricanes, which cause powerful winds and waves that sweep sediments from the island into the ocean. This can damage or collapse buildings along the shoreline, as well as increase the risk of flooding as the ground is washed away. In 2008, Hurricane Ike made landfall over Galveston, killing 17 people and causing billions of dollars worth of damage.

Weathering, Erosion, and Deposition Notes

16

Weathering - the process of rock _____ into smaller pieces.

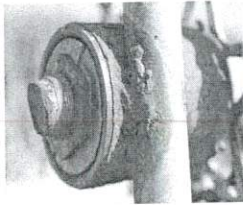
Chemical Weathering - _____ the chemical makeup of _____ or minerals.

- Carbonation
- _____
- _____
- Acid Rain

Carbonation - Carbon dioxide in the _____ mixes with water to form _____ which dissolves calcium carbonate in limestone rocks.

Example: _____

Oxidation- Oxygen in the air joins chemically with metals. Example:



Plant Acids - Plant roots produce _____ (humic acids) which can dissolve rocks.

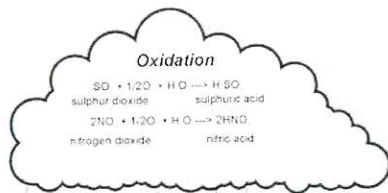
Example:

Lichens (fungus/algae)
growing on rocks

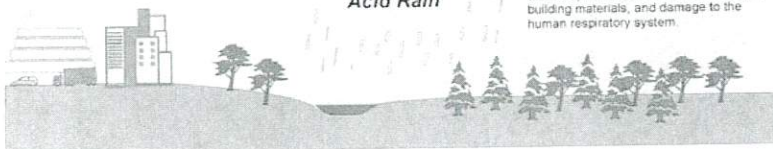


Acid Rain - Water in the air _____ with excess carbon, sulfur, and nitrogen compounds to form acids.

Sun's Energy
photochemical reactions are driven by the sun



Acid-forming gases and particles have been linked to a variety of impacts, including forest decline, accelerated leaching of metals from rocks and soils, the decay of limestone, marble, and other building materials, and damage to the human respiratory system.



Mechanical Weathering

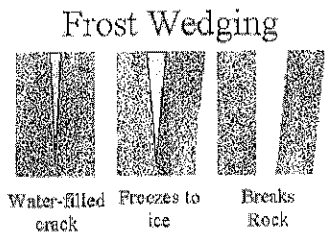
- 17
- _____
 - Root Pry
 - _____

- Exfoliation
- _____

Abrasion- Sand and other _____ that are carried by wind, water, or ice can _____ exposed rock surfaces, like sand paper on wood.

Root Pry - Roots of trees and other plants enter _____ in rocks, forcing the cracks farther apart.

Ice Wedging- When water _____ in a crack in a rock, it expands and makes the crack bigger.



Exfoliation - Extreme high temperatures cause the outside of the rock to crack and _____, like layers of an onion.

Animal Actions - Animals that _____ in the ground loosen and break apart rocks in the soil. Other animals erode landscape by walking on it.

Identify the forms of weather shown below.



Soil Formation - Soil forms as rock is broken down by weathering and mixes with other materials on the surface.

Soil Texture - Soil texture is determined by the size of the individual particles, which is directly related to the amount of pore spaces where water can be stored.

- _____ 2 mm and larger
- Sand <2 mm
- _____ – soil that is made up of equal parts of sand, silt, and clay
- _____ <1/16th mm
- Clay <1/256th mm

Soil Profiles - The arrangement of soil layers in an area, made up of _____ layers or horizons.

Soil horizon- An individual layer of soil that differs in _____ from the layers above or below it.



Rate of soil formation

The rate at which soil forms (weathering) depends on the _____.

- Most rapid weathering occurs in _____, rainy climates.
- _____ weathers _____ than granite.

Life in soil

Soil is one of Earth's _____ resources, because everything that lives on land depends directly or indirectly on soil.

- _____ of organisms live in every cubic meter of soil.
- All organisms that live in soil enrich humus with their _____ or waste.
- Animals and plant roots _____ the soil, opening up spaces for air and water.

Agents of Erosion

Erosion- is the action which remove soil and rock from one location on the Earth's crust, and then transport it to another location where it is deposited.

- _____
- _____

Moving Water

The major agent of erosion that _____ Earth's land surface.

- Rain water carries away sediment leaving tiny grooves in its path.
- Streams and rivers _____ large channels into the landscape.



Wind

Fast moving winds can carry _____ that scour and weather the surfaces they strike. Wind is considered the weakest form of erosion.

- Blowing away of exposed sediments.

- Dust Storms

Gravity

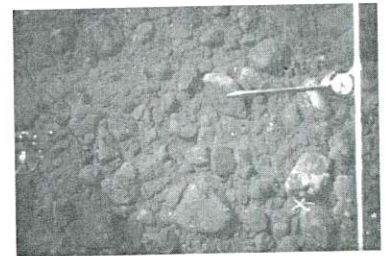
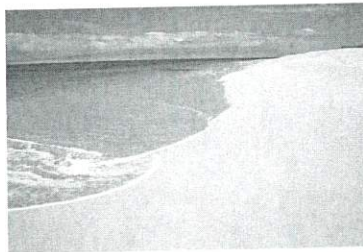
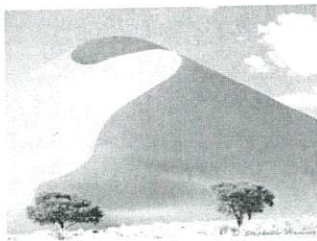
The force that moves rock and other materials _____ hill, causing mass movement.



Glaciers - A large mass of ice moving slowly over the land gathering rocks and soil as it _____ the land in its path.

Deposition - The _____ of eroded particles or sediment wherever they are transported by wind or water.

- Sediments on ocean and lake floors
- Sand dunes
- New beach sand
- River deltas



Name _____ Due Date _____ Pd. _____ Std # _____

Watch the videos or read the articles and infer what the impact on ecosystems may be. Be prepared to discuss your results. For more information see your textbook or ask your teacher for approved sites.

Type of Catastrophic Event	What is it? Describe what the event is like.	How Does it impact the ecosystem...Plants? Animals? Habitats? Resources? Environment? (Think also of how it might impact organisms interactions within the ecosystem)
<u>Catastrophic event #1</u> <u>Catastrophic event #1</u>		
<u>Catastrophic event #2</u>		
<u>Catastrophic event #3</u>		
<u>Catastrophic event #4</u>		
<u>Catastrophic event #5</u>		

Ecological Succession Two-Column Notes

Question	Notes
What is ecological succession ?	
What is primary succession ?	
What is secondary succession ?	
What kinds of disturbances can cause succession to occur?	
What is a pioneer species (also called pioneer organism)?	
What is a climax community ?	
In what order do species appear during primary and secondary succession?	
How are animals affected by succession?	

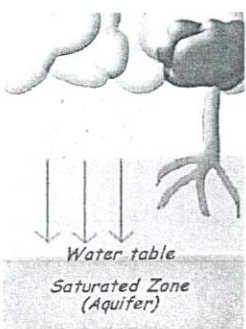
Name _____ Date _____ Period _____

Watersheds



Most of Earth's surface water is the salt water of the oceans. However, most of the surface water on the continents is fresh water. These waters are divided into watersheds. A watershed is an area of land where all of the water that drains off of it goes to the same major body of water, such as a river or lake. Eventually, the waters of each watershed drain into the ocean.

Most water enters a watershed as precipitation. Some falls directly into lakes and rivers. Much of it falls on land and becomes runoff. The runoff flows over the ground and eventually reaches surface waters.



Some precipitation does not runoff; instead it soaks into the ground. As it soaks through the soil it passes through layers of porous rock. Porous rocks allow for water and air to travel through small spaces. The water will sink down until it reaches a layer of rock or clay that it cannot pass through. The water that collects on top of the rock or clay is called groundwater.

The layer of saturated rock is called an aquifer. The top level of an aquifer is called the water table. The depth of the water table can vary from very deep to very shallow and can even be on the surface of the Earth.

Analysis Questions:

- 1- What is a watershed? _____
- 2- How are runoff and groundwater different? _____

- 3- What is the connection between surface and groundwater? _____

- 4- What is an aquifer? _____
- 5- What is porous rock? _____
- 6- What would happen to the surface water level if the level of precipitation was low? _____

- 7- How does the amount of precipitation affect the amount of water in an aquifer? _____

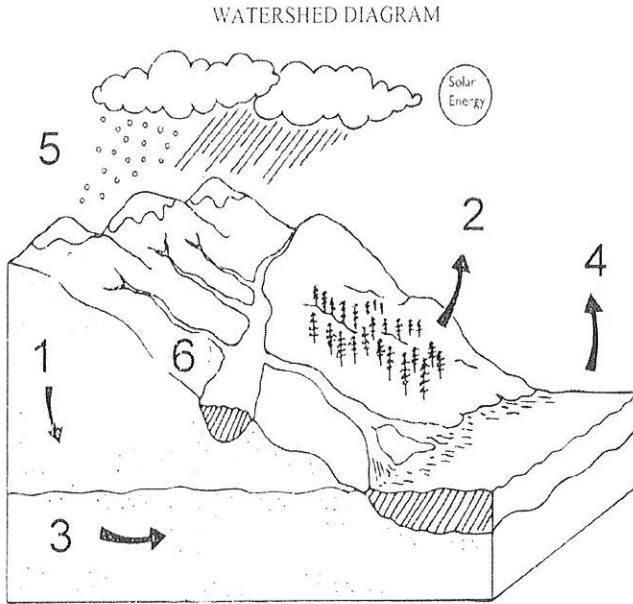
- 8- How do bodies of groundwater form? _____

23

9- What two things can happen to water as it hits the ground? _____

10- What is the water table? _____

Watershed Labeling: Label the diagram below using the word bank.



WORD BANK	
Precipitation	
Transpiration	
Evaporation	
Ground water	
Absorption	
Runoff	

1- _____

4- _____

2- _____

5- _____

3- _____

6- _____

Wells and Aquifers: More than half of the people in the US use groundwater as drinking water. People dig wells to reach the water below the surface. Many people in Texas use wells for drinking and irrigation. The Edwards Aquifer provides water for the Austin area. If water is removed from the aquifer faster than it is replaced the levels will decrease and make wells go dry.

Drawing: Using the information about watersheds and wells to draw a diagram. Your diagram must include: (1) surface water (2) aquifer (3) water table (4) rock or clay layer (5) house (6) well. Don't forget to include LABELS and COLOR!

Grade 7—Human Impact
RM 1: Photo Slideshow Observation Recording Sheet

Name: _____



Aquifer Activity Worksheet

Design your own Aquifer

Your job is to work as a team to design a model that shows how an aquifer works. You should discuss things as a team and share ideas, but each person complete his/her own report sheet.

Also: you must have your plan initialed before you can actually begin to make it. You have a limited amount of time so use it wisely!

Let's see if you can design your own aquifer!

Team members

Before you begin

What is an aquifer and how does it work?

What is point source and non-point source pollution?



Brainstorm:

How can you use the following materials to demonstrate how an aquifer works? Using food coloring, explain and demonstrate water pollution in an aquifer.

A plastic cup of gravel
A measuring cup
Food coloring

A small cup of dry sand
A pitcher of water

Note:

- You can ONLY use the materials listed.
- Explain how you are going to use the model to show how an aquifer works.
- Write out your ideas on the back of the sheet (number each step).
- GET THE TEACHERS INITIALS BEFORE YOU TRY OUT YOUR IDEA!
- Follow your procedure!
- All work needs to be done on the back of this sheet of paper and turned in.

Brainstorm

Materials

Explanation of Aquifer and Diagram

Procedure

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____

Teacher Signature _____

