

Get It!?

Introduction:

The flow of energy from sun to organism through an ecosystem can be shown in diagrams or flow charts called *food chains* or *food webs*.

The first organism in a food chain is always a *producer*. They include plants, algae and other microorganisms that can carry on *photosynthesis*. Producers can make their own food by combining carbon dioxide and water to make simple sugars. Producers make food from these raw materials and pass it on to consumers. Plants deposit carbon.

Consumers are organisms that eat other plants and animals. Animals that eat other animals are *predators*. Animals that are eaten are called *prey*.

So the energy of the sun is captured by producers, then passed from consumer to consumer. Most producers and consumers are a part of a food chain. The food chain shows a typical path for the flow of energy through an ecosystem.

When organisms die, their remains are broken down into carbon dioxide gas, water and minerals by decomposers. Decomposers include bacteria, termites and fungi.

Food chains are usually linked together. Often a predator of one food chain may eat prey from more than one food chain. Linked food chains are called food webs.

Directions:

1. Using arrows like this (\rightarrow), begin with the Sun and list a food chain that contains a producer and two consumers (predator and prey) and a decomposer.

2. Consumers that feed on dead organisms, changing their bodies back into carbon dioxide, water and minerals, are called:

3. Consumers that eat only animals are called:

4. Organisms that make their own food are called:

5. In question one you made a food chain. Why do the arrows have a point on only one end and what does this mean?

6. Make a food web and a food chain from these organisms: *grasshopper, grass, mouse, coyote*

Ecosystem Interdependence

Objective

TLW differentiate and identify relationships of relationships of producers, consumers, and decomposers.

Directions

On the lines below, define the terms. Determine the category of each organism. Is it a producer, a consumer, or a decomposer? Place a check in the appropriate box.

Producers - _____

Consumers - _____

Decomposers - _____

Organisms	Producer	Consumer	Decomposer
bacteria			
beaver			
black walnut			
cattails			
crayfish			
dragon flies			
duck weed			
frog			
fungi			
grasses			
mallard duck			
marsh marigold			
mold			
mosquitoes			
mushrooms			
muskrat			
northern pike			
pitcher plant			
raccoon			
red-winged blackbird			
sandhill crane			
skunk cabbage			
snake			
trees			
turtles			
water lily			
water striders			
white tail deer			
wild iris			
wood duck			

The Food Web

Objective

TLW identify familiar organisms as part of a food web and describe their feeding relationships within the web.

Directions

In a small group, select an ecosystem and create a food web with at least 15 organisms from that ecosystem. Create a poster or other method to display your web. Label each organism as a producer, consumer, or decomposer. Connect each organism in the web with an arrow on one end of each line, showing the direction of the flow of energy within in the web. Each group should present your web to the classroom or other audience.

Examples of Ecosystems

fallen log

swamp

wetlands

bog

ocean

tropical rainforest

temperate rainforest

arctic tundra

grassland

prairie

temperate forest

mountain

desert

boreal forest

streams and rivers

ponds and lakes

tidal pool

coral reef

city park

Essential Questions

- How does a magnetic compass work?
- How does the Earth compare to a magnet?
- How much do tectonic plates move each year?

Prerequisite Vocabulary

attract	earthquake	magnetic field	repel
centimeter	force	magnetic force	volcanic eruption
compass	magnet	magnetic poles	volcano

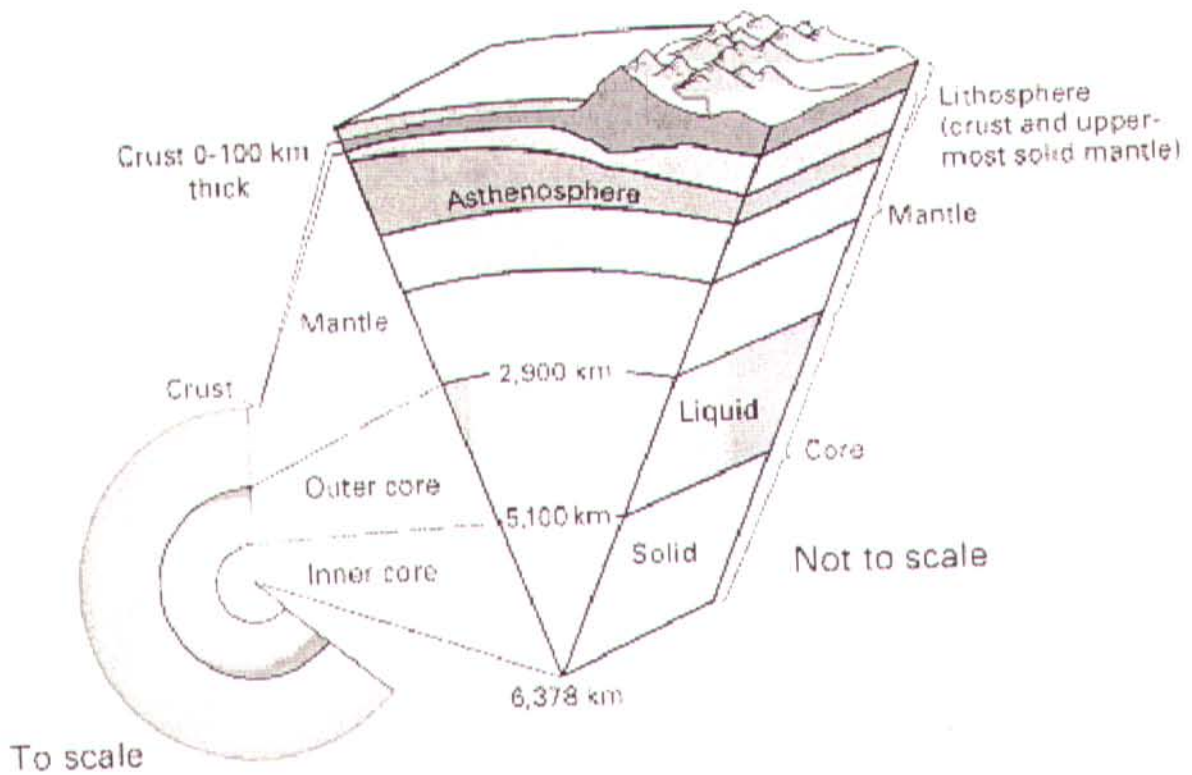
New Vocabulary

convecting mantle	geological events	metallic core	plate tectonic movement
crust	lithosphere	mountain building	upper mantle
Earth processes	lithospheric plates	navigation	

Enrichment Vocabulary

Earth's layers	magnetic properties of the Earth	north pole	south pole
inner core	magnetite	outer core	tectonic plates
lodestone	man-made magnet	Pangea	tectonic plates
magma	natural magnet	rock cycle	tremor

Layers of the Earth



Essential Questions

- How do physical and chemical weathering contribute to the formation of soil?
- How does the Earth change gradually and how does it change rapidly?
- How does the rock cycle explain the formation of rock types and the changes they undergo?
- How is the Earth's surface changed through the rock cycle?
- What is soil?
- What properties make Earth materials useful and what are examples of useful Earth materials?

Prerequisite Vocabulary

boulder	heat	sand	volcano
clay	minerals	soil	water
earthquake	mixture	temperature	weathered rock
erosion	plain	texture	weathering
glacier	plateau	valley	wind
gravel	rock	vibrations	

New Vocabulary

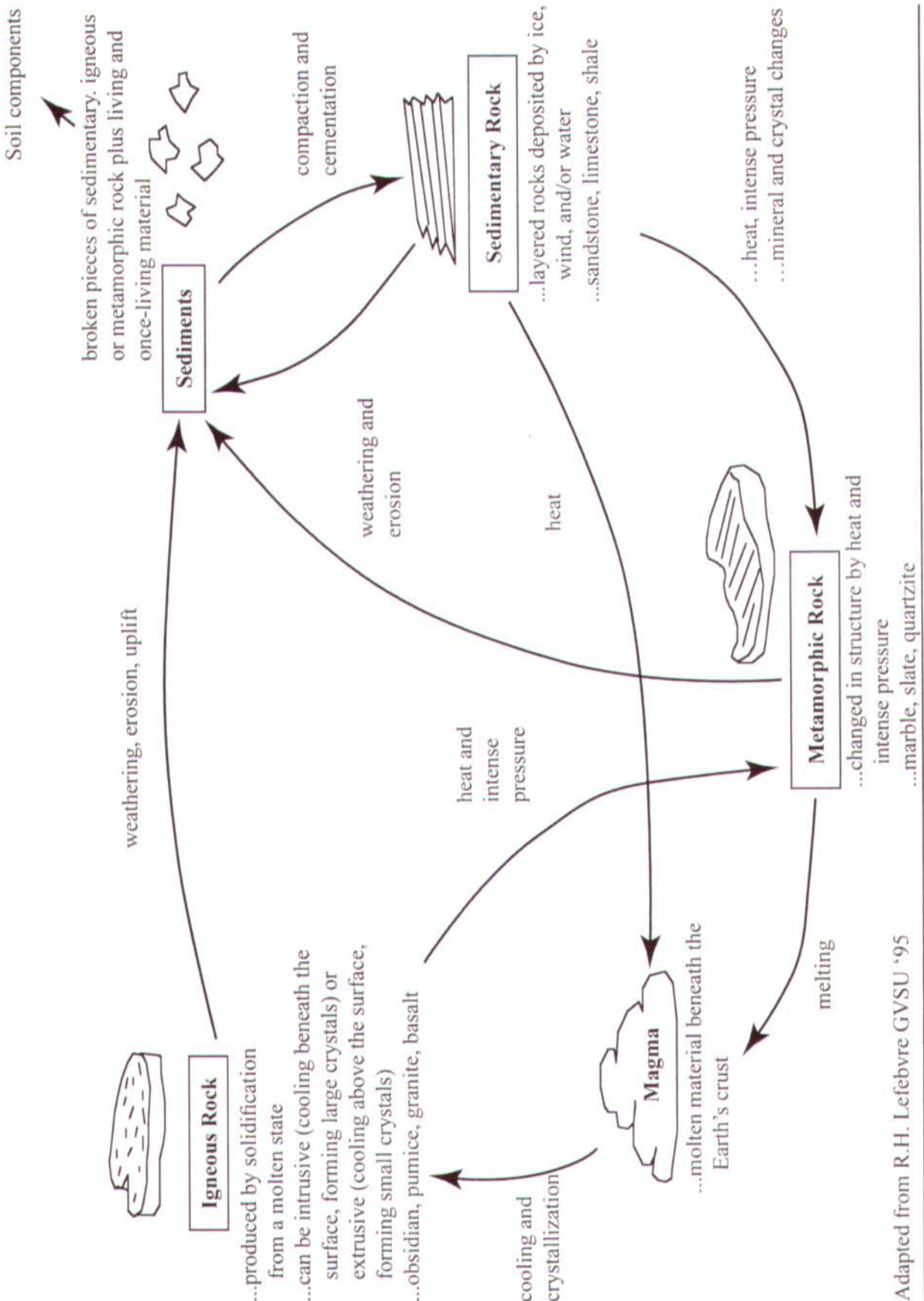
abrasion	magma	particle size	silt
crust	metamorphic rock	rock cycle	thermal contraction
Earth processes	organic material	sedimentary rock	thermal expansion
igneous rock	particle	sediments	

Enrichment Vocabulary

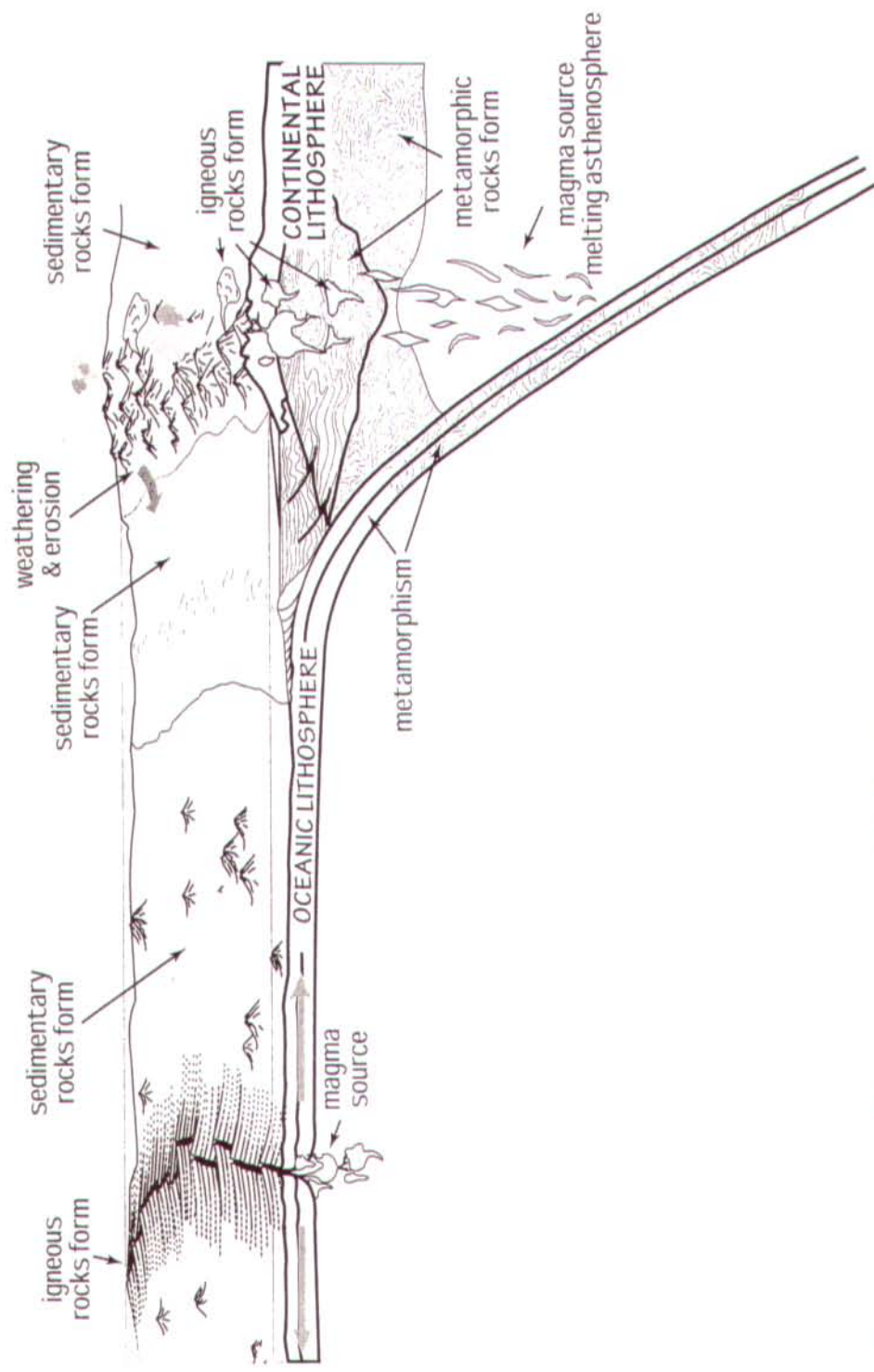
basin	decomposed	humus	pressure
cementing	deposition	lava	Richter scale
chemical weathering	depositional environment	loam	rock types
compaction	destructive force	magma	sedimentation
composition of soil	formation	mechanical weathering	seismograph
constructive force	freezing and thawing (weathering)	metamorphic environment	tremor
cooling	glacier movement	molten rock	water movement
crystallization	gradual		

The Rock Cycle

..... continuous change.....



The Rock Cycle



Rock On!

Vocabulary:	fossil	molten rock	metamorphic rock	mineral
	rock	rock layers	sedimentary rock	lava
	sand	magma	igneous rock	

Introduction

How many phrases can you think of that have to do with rocks? Rock and roll. Like a rock. Rock solid. Hard as a rock. Rock bottom. Rock candy. Rock of Gibraltar. Rock on. Rocks are all around us and are used in speech and writing as symbols of solid strength. A geologist's job is to study rocks. From rocks, geologists can tell a lot about the history of Earth.

What exactly is a rock? You know that minerals are not living things. They are solid matter with unique crystal patterns that are formed in nature. A rock is a solid mixture of one or more different minerals.

Rock Types

Scientists divide most rocks into three groups, according to how the rocks were formed. Some are called igneous rocks. Others are called metamorphic rocks. Still others are called sedimentary rocks.

What are igneous rocks?

The word igneous means "fiery." Igneous rocks have a hot liquid beginning. If you could watch a volcano erupt, you would be watching igneous rocks being formed. The lava that flows from a volcano is hot, molten rock. Magma is being pushed up from deep

inside Earth. Liquid rock at the surface is called lava. Basalt is a rock that commonly forms at the surface from lava. It forms much of Earth's crust, both on the continents and under the oceans. Rocks that cool quickly form very small mineral crystals. When lava reaches the surface, it cools rapidly and turns into igneous rock.

Igneous rock also forms below the surface of the Earth. When the magma does not break through the surface, it cools more slowly. When it cools enough to harden, it turns to solid rock. Granite is a kind of igneous rock that is formed this way. It has larger mineral crystals that are easier to see than those found in basalt because slow cooling allows time for large crystal formation.

What are metamorphic rocks?

Metamorphic rocks are formed differently. Metamorphic means "changed." Heat and pressure inside the Earth changes rock. Pressure and heat can change the size and shape of the mineral crystals, changing one type of rock into another. The heat and pressure melt the rock, forming bands of crystal. These new types of rock are called metamorphic rocks. Slate, marble and gneiss are three kinds of metamorphic rocks.

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Section 3 cont.

Section 4

Section 5

Section 1

Section 2

Section 3

Rock On! (continued)

Section 5 cont.

Metamorphic rocks are hard and often very pretty, so they are used in buildings. Look for a sample of gneiss (pronounced NICE) to see a nice rock! (Gneiss was once granite.)

What are sedimentary rocks?

Sedimentary rocks are formed differently from igneous and metamorphic rocks. They are formed from sediment, small solid pieces of material that come from rocks or living things. Water, wind, and ice can carry sediment and deposit it. The deposited sediment gradually, over millions of years, piles up in layers. The weight of the top layers presses down on lower layers, pressing the sediments together. This is compaction. Meanwhile, the minerals in the rock dissolve in water that seeps through the layers. Dissolved minerals act as glue to cement the particles of sediment together. This is cementation. It takes a very long time for the processes of compaction and cementation to turn loose particles of sediment into sedimentary rock.

Sandstone is one type of sedimentary rock made from layer upon layer of sand sediments. Limestone is another type of sedimentary rock. It was formed from the broken shells of countless tiny sea animals. When these animals died, their shells settled on the floor of the ocean. Over millions of years, the layers of shells were squeezed and cemented together, turning into fossil-laden sedimentary rock.

Section 6

Section 6

Look carefully at a piece of sandstone. You may see different colored layers in the rock. These are the different layers of sediment that were piled on top of one another long ago, but were squeezed and cemented together to become rock.

Sedimentary Rocks Tell a Story

The story is in the layers of the rocks and the fossils the sedimentary rocks may contain. Fossils are traces of ancient plants and animals. A fossil can be a shell, a bone, or a skeleton that has been turned into rock. It can also be a footprint or the imprint of an entire animal or plant preserved in a rock. These fossil remains are here today because sedimentary rock does not require heat to form - just pressure and lots of time.

Section 6 cont.

Section 7

Questions

- Marble, a metamorphic rock, was formed by which of the following processes?
 - Heat and pressure
 - Cooling of magma
 - Depositing of sediments
 - Decaying plant material deposited long ago
- This selection is MOSTLY about:
 - Rocks changed by heat and pressure form metamorphic rock.
 - The three main types of rock and how they are formed.
 - Igneous rocks are sometimes formed just below the surface of the earth.
 - A mineral has a unique crystal pattern formed in nature.

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Rock On! (continued)

3. Which of the following is the BEST example of a rock?
- A. Any solid object found in nature
 - B. Gold that is made into jewelry
 - C. A mixture of cement, sand and gravel formed into a block
 - D. A solid mixture of one or more different minerals
4. What is NOT a characteristic of igneous rocks?
- A. They are formed both above and below the surface of the Earth.
 - B. They had a fiery beginning.
 - C. You can observe fossils in them.
 - D. They are formed from lava or magma.
5. Identify the source that would be LEAST helpful in finding detailed information about the topic of rock formation.
- A. Books about rocks and minerals
 - B. A dictionary
 - C. Web sites about types of rocks
 - D. Geologists

Application

Simulate fossil imprints. Mix plaster of paris according to the directions and pour it into aluminum pans up to a depth of about one inch. Lightly press shells, leaves, twigs, or other objects into the plaster. Allow the plaster to nearly dry and then to remove the objects. The objects will leave an imprint in the plaster. Discuss with classmates the similarities and differences between how their imprints were made and how fossil imprints found in sedimentary rocks are formed. Use water color paint to make your imprint fossils look authentic.

Written Response Question

Explain what the author means by “sedimentary rocks have a story to tell.”

Answer Key

1. A 2. B 3. D 4. C 5. B

Written Response Question: Sedimentary rocks are formed from sediment that hardened for millions of years. Fossils may form when sediment quickly covers an animal's remains in shallow water. The sediment becomes rock, preserving parts of the animal. Plants can also be fossilized in this way. Fossils may be exposed to “tell their story” as the result of mountain-building, weathering, and erosion.