HARLINGEN
CONSOLIDATED INDEPENDENT SCHOOL DISTRICT

Remote Learning

Student Packet

7th Grade Science

Weeks 1-2

7.10ABC Ecosystems and Environments
7.5B Energy Flow Through Living Systems

Instructions: Students please complete the attached packet. If you need assistance, please let your campus contact know when they reach out to you each week.

Reflect

Suppose you are packing a bag to go visit some friends or relatives for a winter vacation. You live in the southern part of the United States. Even in winter, your hometown is warm; but your relatives live far up North, where it is cold in the winter. You'll need to pack some warm clothes to protect you from the cold wind and snow. You will also bring your camera to take pictures of the wildlife up North. Your hometown is near a sandy desert that has cacti, rattlesnakes, and antelope. But your relatives live near a forest with tall trees, deer, and moose.

Why do some areas have forests and cold weather, while other areas have dry, sandy deserts? What makes these areas different from each other? What are these areas called?

Earth's Biomes

An area that has similar **ecosystems** and a similar climate is called a *biome*. Earth has many different types of biomes. Biomes can be classified by their abiotic (nonliving) factors. For example, biomes can differ in the type of soil they have, how much water they have, their climate, and their geology. Each biome is a home to organisms that are adapted to life there. The biotic factors that live in a biome are dependent on the abiotic factors available in that biome.

ecosystem: a system consisting of the interactions that occur between the living and nonliving things in an area

- **Freshwater:** About 3% of water on Earth is fresh water. Areas around fresh water sources are called freshwater biomes. Fresh water is water that contains very little, or no, salt. Organisms that live in freshwater biomes cannot survive in salt water. Freshwater biomes include rivers, lakes, ponds, streams, and wetlands. Algae are tiny plants that live in freshwater biomes. They use energy from the Sun to make their own food. Many other organisms that live in freshwater biomes depend on the algae for food.

Reflect

- **Marine:** About 97% of Earth's water is salty. Areas made up of salt water are called marine biomes. Marine biomes include oceans, coral reefs, and estuaries. Some marine biomes are warm, such as tropical reefs. Some marine biomes are cold, such as the Arctic and Southern oceans. Marine biomes are home to many different kinds of organisms. Sharks, whales, fish, sponges, and **plankton** all make their home in marine biomes. All of these organisms are adapted to live in salt water.

plankton: microscopic plants and animals that live in water

- **Desert:** Deserts are biomes with very little precipitation and extreme temperatures. Some deserts are hot most of the time, such as the Chihuahuan desert in Texas. Other deserts are cold most of the time. Did you know that Antarctica is a desert? It gets very little precipitation and has extremely cold temperatures all year. Organisms that live in deserts are very good at conserving water and surviving in extreme temperatures.

- **Forest:** There are several types of forest biomes. Forests that get a lot of rain are called rainforests. Forests with trees that shed their leaves in the fall are called deciduous forests. Some forests have trees that stay green all year. These are called coniferous forests. Many types of organisms make their home in the forest biomes. For example moose, deer, and mice commonly live in deciduous or conifer forests. Tree frogs, toucans, monkeys, and vines typically live in rainforests.

Reflect

- **Grassland:** A grassland biome is well named since it is covered with grasses! Grasslands may also have a few short trees, bushes, or shrubs. The grassland biome usually has rich soil that supports the grassy vegetation. Many organisms in the grassland biome depend on the plants for food and shelter. Grasslands are home to grazing animals, such as bison or antelope.

- **Tundra:** Tundra biomes, like deserts, are very dry. They are also cold most of the year. The tundra has little vegetation because of the harsh conditions. Most plants that inhabit the tundra have adapted to the cold, windy conditions. They are short and sturdy, making it difficult for them to be blown down by the wind. Most of the animals that live in the tundra migrate to warmer areas in the wintertime. The animals that stay are adapted to the cold weather and scarce food. For example, some animals grow thicker fur or hibernate.

Look Out!

Deserts are a harsh environment. You would have a hard time surviving in a desert biome. You might be surprised to learn that deserts are full of life. Desert organisms are able to survive extreme temperatures, very little rainfall, and scarce food. Deserts cannot support as many organisms as a rainforest, but they are not lifeless. The swift fox, red tailed hawk, rattlesnake, kangaroo rat, bighorn sheep, and horned lizard are just some of the many organisms that live in the desert.

What Do You Think?

Suppose that a scientist has discovered a new species of animal. This animal has large ears that help heat escape from its body, keeping the animal cool. The animal only comes out at night, when it's cooler, to hunt. It has wide paws that help it walk through sandy soil. It can get all the water it needs from the food it eats. In which biome do you think this animal lives? Explain your answer.

What Do You Think?

Organisms in Habitats

The place in which an organism naturally lives and grows is called a *habitat*. A habitat includes all the biotic and abiotic factors that help the organism survive. Some habitats are large. An animal that migrates hundreds of miles to find food needs a very large habitat to support itself. Some organisms only need a very small habitat. Their habitats are called *microhabitats*. "Micro-" comes from a Greek word for "small." A microhabitat might be a vegetable garden, a schoolyard, or even the space between two rocks. Usually the organisms living in a microhabitat are also small. Earthworms, insects, and fungi are some examples of organisms that live in microhabitats. The organisms sharing a microhabitat depend on each other for survival. For example, when an earthworm digs into the ground it loosens the soil around it. This helps plant roots to grow into the soil to get nutrients and water.

Healthy Ecosystems

Have you ever visited a rainforest or seen a photograph of one? Rainforests are home to many different kinds of organisms. This type of forest has high *biodiversity*. Biodiversity is a scientific term that combines two words: "biological" (living) and "diversity" (variety). Biodiversity is a measure of how many different species are living in one area. An ecosystem with only a few species of organisms has low biodiversity. An ecosystem like a rainforest with many species of organisms has high biodiversity. It is home to many types of **producers**, such as trees, vines, and fruit plants. It also has many types of **consumers**, such as birds, monkeys, sloths, and snakes.

producer: an organism such as a plant that can make its own food

consumer: an organism that eats plants or other organisms

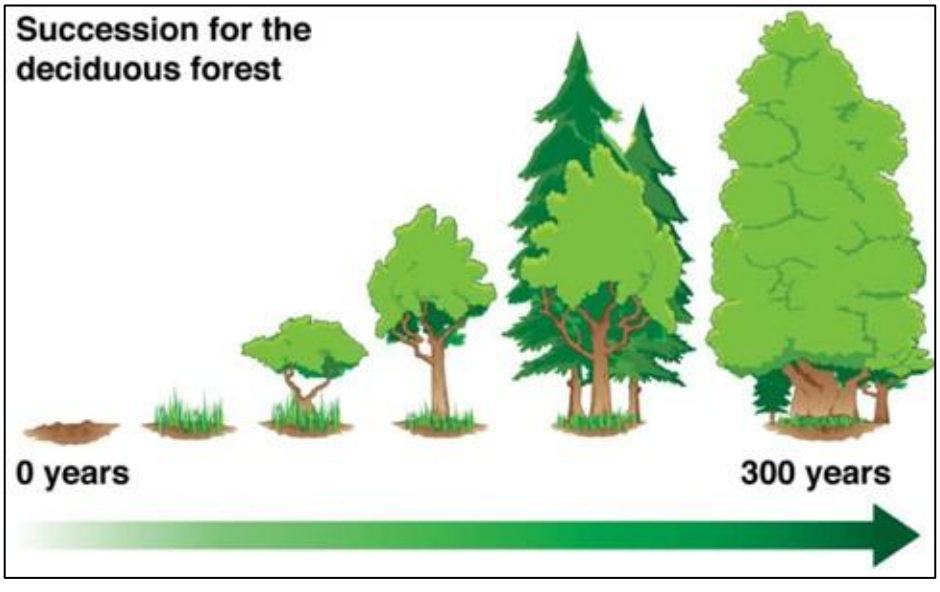
Ecosystems with high biodiversity are healthier than ecosystems with low biodiversity. Why is that? Suppose you are studying an ecosystem that only has one type of producer (grass) and one type of consumer (rabbits). If the grass dies off, all the rabbits will die, too. The entire ecosystem will collapse. What if the ecosystem had several types of producers instead of just one? Then, even if the grass died off, the rabbits would have several other types of plants they could eat. An ecosystem with many different types of species can survive the loss of a single species.

What Do You Think?

Changing Ecosystems

The picture on the right shows a tiny plant growing in an ecosystem that was likely destroyed by hot liquid rock (called lava) from a volcano. This is similar to what happened in 1980 when a volcano named Mount St. Helens erupted. The forests that once surrounded the mountain were gone. The trees, along with fungi, plants, and animals, were killed by the eruption. The mountainside was covered with lava, ash, and other harmful substances. It seemed as if nothing would ever grow there again. But just a few months later, scientists noticed small fungi and plants growing out of the ash. Over the next 30 years, many living things returned to the mountainside. Today, trees, grasses, fungi, and large and small animals live in the area once again.

The growth of an ecosystem over time is called *succession*. After the eruption of Mount St. Helens, there was almost nothing left of the previous ecosystem. Soon, small organisms such as fungi and tiny plants began to grow. They made the ecosystem more livable for other, larger organisms. The ecosystem was eventually filled with bacteria, fungi, plants, and animals that were all interacting with each other. Succession can also happen on a smaller scale. For example, if you plant a garden, you must first get rid of all the weeds. You might even put a fence around the garden to keep animals out. But if you do not take care of the garden regularly, the weeds will grow back. Eventually, other plants and animals will also return to the area. The space you marked out as a garden will eventually go “natural” again.



What Do You Think?

Scientists in the Spotlight: Eugene Odum

Dr. Eugene Odum was an ecologist. Ecology is the study of how the abiotic and biotic factors in an ecosystem interact. In the 1950s, very few scientists studied ecology. Scientists studied individual organisms, but they usually did not observe how organisms interact with each other and their environments. Dr. Odum looked at the natural world as a system with many interacting parts. He and his brother, Howard, wrote the first textbook about ecology. Dr. Odum was responsible for getting many other scientists and students interested in ecology. This interest in ecology led people to understand the impact of humans on the natural world. People began to look for ways they could help, rather than harm, nature.

Try Now

What do you know?

Use what you know about ecosystems and environments to fill out the table below. First, decide if you agree or disagree with the statement in the left column. Write an "X" next to your choice. Then, explain your decision in the right column.

Agree/Disagree?	Explanation
The tundra is a biome with tall trees and lots of rainfall. . Agree . Disagree	
A habitat contains all of the abiotic and biotic factors an organism needs to live. . Agree . Disagree	
A farmer has a large field with one type of crop. This area has high biodiversity. . Agree . Disagree	

Connecting With Your Child

Ecological Succession after a Natural Disaster

To help your child learn more about succession, work together to create a teaching tool for educating younger students. This teaching tool could take many forms, but a suggestion is to author a small storybook about an ecosystem recovering from a natural disaster. An example could be the regrowth of the forest community at Mount St. Helens or an area in Texas such as the Bastrop State Park recovering from a wildfire.

First, research the event with your child. It might help to construct a timeline with the following items:

- When did the disaster occur?
- When did the first organisms return to the ecosystem?
- When did the ecosystem return to normal? If it hasn't, when do scientists expect it to?

Research the ecological facts of the event:

- What types of organisms lived in the area before the disaster occurred? What happened to them during the disaster?
- What kinds of organisms came back to the area later? What was the order of succession of the returning organisms?
- Did the structure of the ecosystem change from how it was before? Did any non-native species start growing in the area?

Structure the storybook from the perspective of an organism that lived in that area. For example, the story could be told from the perspective of a pine tree. Perhaps the forest fire burned the adult trees, but the pinecones survived and grew into new pine trees. One of these pine trees could describe how it noticed other organisms returning to the ecosystem over time.

Find photographs or draw pictures that detail how the ecosystem looked before and after the natural disaster. Use these images as a guide for the book's illustrations. Encourage your child to be creative, but make sure the scientific information is accurate.

Here are some questions to discuss with your child:

- How did this disaster affect the ecosystem?
- How did the ecosystem grow back over time?
- Which organisms began to grow first? How did they help make the ecosystem more livable for other organisms?

Reading Science

Name: _____ Date: _____

Biodiversity and the Ecosystem

1 Where is your habitat? You, like a bird or an ant, need a healthy habitat to survive. A habitat is the place where an animal or plant lives. Organisms get all the things needed for survival from their habitat. They get food and water. A habitat must also have space for organisms to grow, breed, and raise young. Within each habitat, there are many small areas that are different from the rest of the habitat. For example, there may be more or less light. There may be differences of temperature. These small areas are called microhabitats. Each microhabitat has its own variety of plant and animal life. These are often similar to the others in the habitat. So how are habitats and ecosystems related?

2 An ecosystem is all of the living things in an area and what surrounds them. It includes the ways that the living things influence each other. The ecosystem also includes the ways that non-living, or abiotic, factors influence animals and plants. These factors include weather, water, sun, soil, and air. Ecosystems are made of many parts that act together to form a whole. A microhabitat is related to the ecosystem that surrounds it. For example, the microhabitats of a rotting log in the forest and a log rotting in a lake will be different. Ecosystems come in a variety of sizes as well. We could study the ecosystem of a puddle of water at your school. We could also study the ecosystem of the Atlantic Ocean.

3 Ecosystems are always changing. Many factors influence an ecosystem. These biotic and abiotic factors do not remain the same. For example, temperature can change or the amount of rain or food. As changes occur, the ecosystem itself will change as well.

4 An ecosystem affects the other ecosystems next to them. A microhabitat is especially related to the larger ecosystem it lies within. This is easily seen when we study a lake's ecosystem. Its ecosystem will be related to the ecosystem of the stream that flows into it. The stream's ecosystem is also related to the mountain forest it flows through. A recent forest fire in the area could have an effect on the forest's ecosystem. The circles of influence go on and on.

Reading Science

5 What ties the ecosystems together? Food. Food is basically energy. It flows through every ecosystem. Within an ecosystem, nutrients are recycled as living things eat and then get rid of waste. Food chains can be made by finding out what eats what. Energy flows through the chain from producer, to primary consumer, to secondary consumer, and so on. This food chain relies on the abiotic factors to drive it. The producers must have sunlight, water, and nutrients to make food to the chain of consumers.

6 You cannot gather wood for a fire at a state park when you go camping. Do you know why? A state park is a protected environment. Taking firewood can hurt native habitats. Dead wood is an important habitat. Many species of animals, plants, and fungi live in dead wood. The microhabitats of the firewood help the overall ecosystem. Taking these from the ecosystem breaks vital links in the flow of energy.

7 Biodiversity, or biological diversity, is the variety of life in an area or ecosystem. It is very important in the life of some species. For example, tropical forests are the most diverse ecosystems in the world. Here, the variety of fruits can provide fuel, food, and medicine important for human life. Another example of biodiversity is seen in the macarena tree. They grow in southeast Asia and eastern Australia. These trees provide a habitat for ants. The ants protect the trees from other insects and plants.

8 Biodiversity plays an important role in keeping air and water clean. Biodiversity also helps produce food. Having a variety of animals in an ecosystem helps plants get pollinated and spread their seeds. Biodiversity also helps control agricultural pests and diseases. It can help the climate remain suitable for people, animals, and plants. Biodiversity also affects how soil is formed and how fertile it is. In this way, biodiversity indirectly gives us food, clean water, shelter, and medicines. Biodiversity even helps keep people healthy.

9 We must stay aware of how important Earth's biodiversity is. Without it, we run the risk of causing species to become extinct. Some say that we must preserve biodiversity so we can discover new medicines. Others say we must keep ecosystems healthy so we can enjoy activities such as fishing, camping, and swimming. In any case, biodiversity is needed to keep habitats healthy.

Reading Science

1 Which words from the article help the reader to understand the importance of a special **habitat**?

A place where animals or plants live and survive

B includes all living things in an area

C consists of the light and temperature of an area

D microhabitats and ecosystems that house species

2 What can the reader conclude about ecosystems based on the information in this passage?

A Ecosystems are always distinctly different and unique.

B Ecosystems are interrelated with other ecosystems surrounding or including them.

C Ecosystems are slow-developing entities of biological communities.

D Ecosystems are clusters of communal habitats in an area.

3 Which of the following are **not** biotic or abiotic factors in an ecosystem?

A water and air

B rocks and energy

C plants and animals

D cultural components

Reading Science

4 Paragraph 8 is mostly about _____.

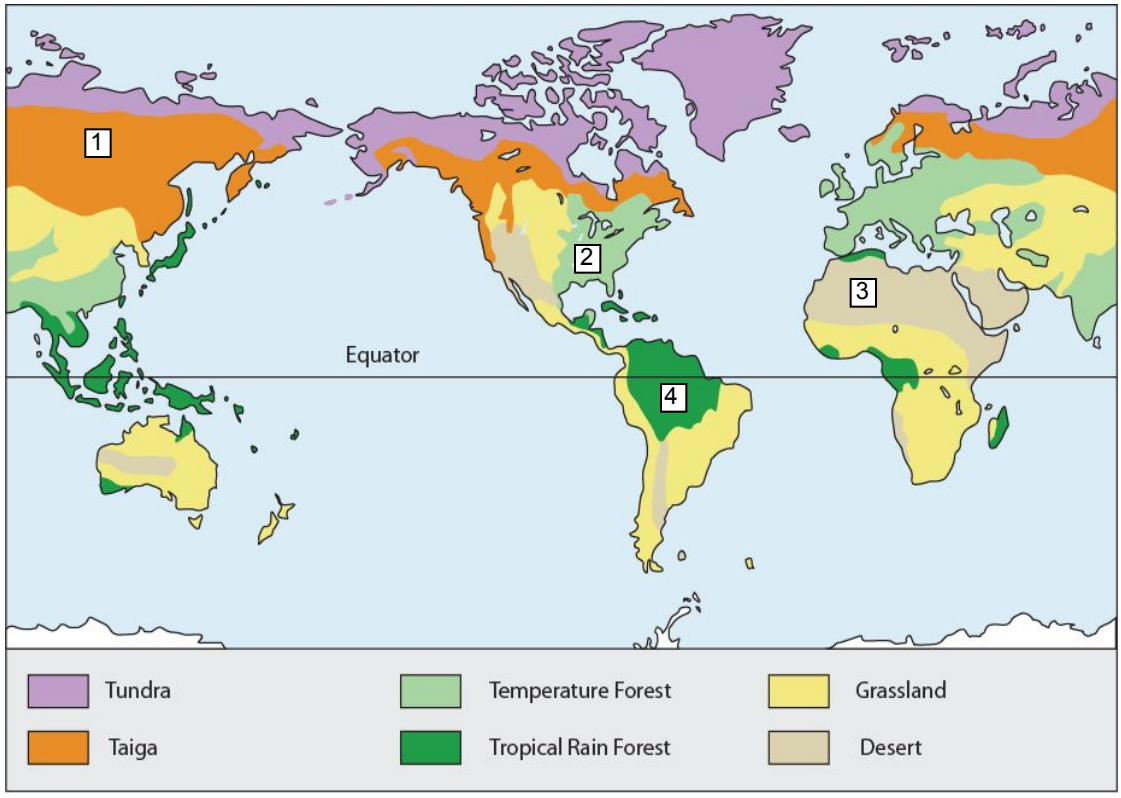
A biospheres of Earth and all living organisms

B the effects of abiotic factors on living things

C the importance of biological diversity in the ecosystem

D the interaction of the interrelated ecosystems

Reading Science



5 Which marked location on the map above would you expect to have the greatest biodiversity?

A 1

B 2

C 3

D 4

Reading Science

6 Which of the following statements is not a similarity between a habitat and an ecosystem?

A Habitats and ecosystems are both simply an area where an organism lives.

B Habitats and ecosystems can each be either very large or quite small.

C Both habitats and ecosystems are influenced by the area surrounding them.

D There are a wide variety of both habitats and ecosystems.

Energy Flow Through Living Systems

Reflect

Enter the word “domino” as a search term on the Internet; you can find some amazing domino runs. You can make your own by setting up a series of dominoes in a line. When you push the first domino in line, it falls into the next domino, which falls into the next one, and so on down the line. One push starts a chain reaction that results in the whole trail of dominos falling.

One push, and a trail of dominos falls.

How is a domino trail helpful in describing the movement of energy through living systems?

Energy flows through living systems.
When you push on the domino at the start of a trail, you can see the energy from your push being transmitted from one domino to the next. Your push represents the energy that started the run. This energy moves along the line as each domino topples into the next.

Energy also moves from a starting point through living systems in a one-way direction. This movement is described as a *flow*. The Sun is the major starting point for most of the living things on Earth. A small percentage of organisms uses sulfur compounds from volcanic sea vents deep in the ocean as their source of energy. Instead of using sunlight in photosynthesis, these organisms use chemicals to aid in *chemosynthesis*. They make their own food, just like in photosynthesis.

Let’s focus on the major pathway that energy takes on Earth. It begins with light energy from the Sun. Green plants convert solar energy into chemical energy using photosynthesis. Chemical energy refers to the bonds between atoms in molecules like glucose ($C_6H_{12}O_6$). Photosynthetic organisms are known as *producers* because of their role in this type of energy conversion. Producers use energy from the Sun to make their own food. This food is simply a source of energy that organisms can store for later use.

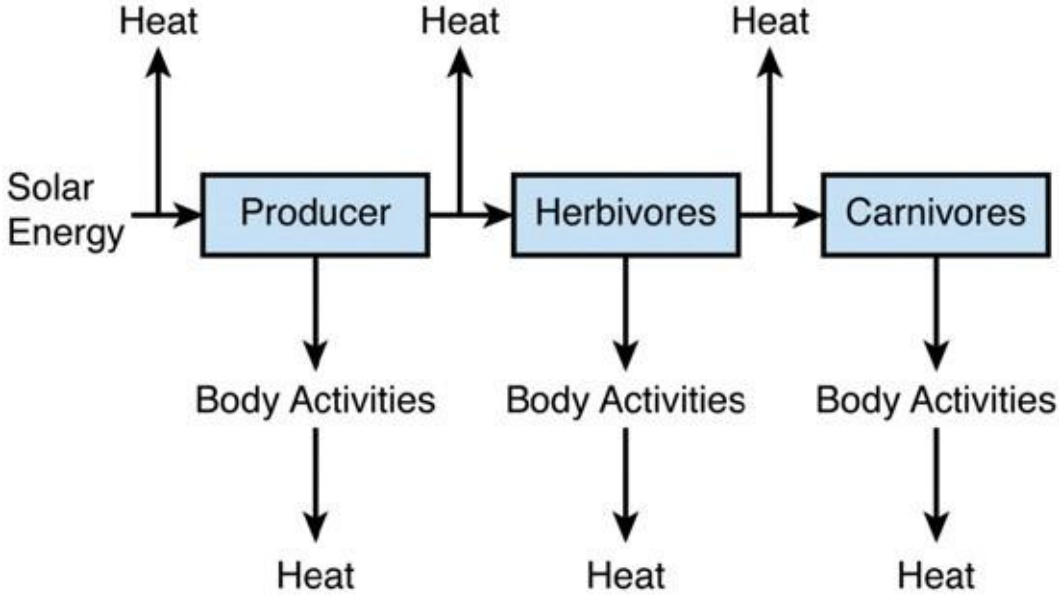
During photosynthesis, green plants use energy from the Sun to convert carbon dioxide and water into sugar molecules.

Each organism on Earth must take in energy from its environment to stay alive. The cells of all living things need constant inputs of energy so they can carry out the metabolic functions necessary to remain alive, grow, and reproduce. Producers provide a source of chemical energy for organisms that eat them. The organisms that use plants as a source of food are known as *herbivores*. Organisms that eat—or *prey on*—herbivores are called *carnivores*.

Energy Flow Through Living Systems

Reflect

The diagram below shows the overall flow of energy through living things. At each step, the transfer of energy involves a loss of energy in the form of heat and body activities. For example, when you exercise you get hot. The heat you feel in your body results from the energy transfers that happen when you move. When you sweat, your body expends energy to cool itself down.



Look Out!

Energy may be lost in living systems as it flows through them. However, this energy is not lost completely from the universe. All energy within the universe can be accounted for at any time because it remains constant. Energy is never created and never destroyed. Energy is only converted from one form into another. As energy moves between living things, some energy—in the form of heat—is lost. This thermal energy escapes into the environment and is no longer useful to organisms, but it is not destroyed.

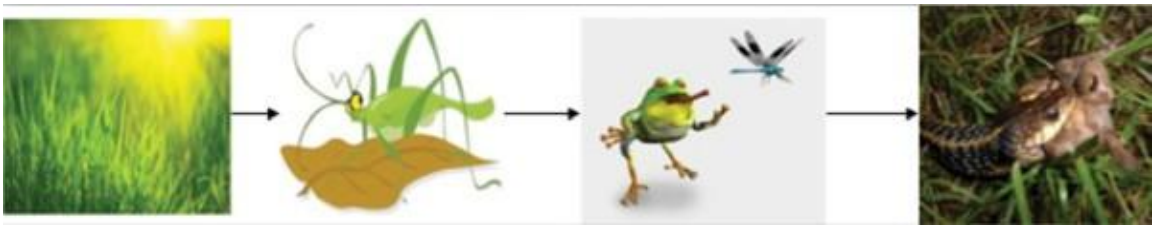
Reflect

A food chain shows how energy flows from one organism to another.
In general, energy flows from the Sun to producers and then to consumers. The path is linear as the energy present in one step is transferred to the next. You can find specific examples of this pathway in an ecosystem.

For example, suppose you observed a grassland ecosystem. There, you would see grass and scattered trees growing in a field. The grass and trees are producers that use sunlight to carry out photosynthesis. Grasshoppers are herbivores that live in grassland ecosystems. They get energy by eating grass and leaves.

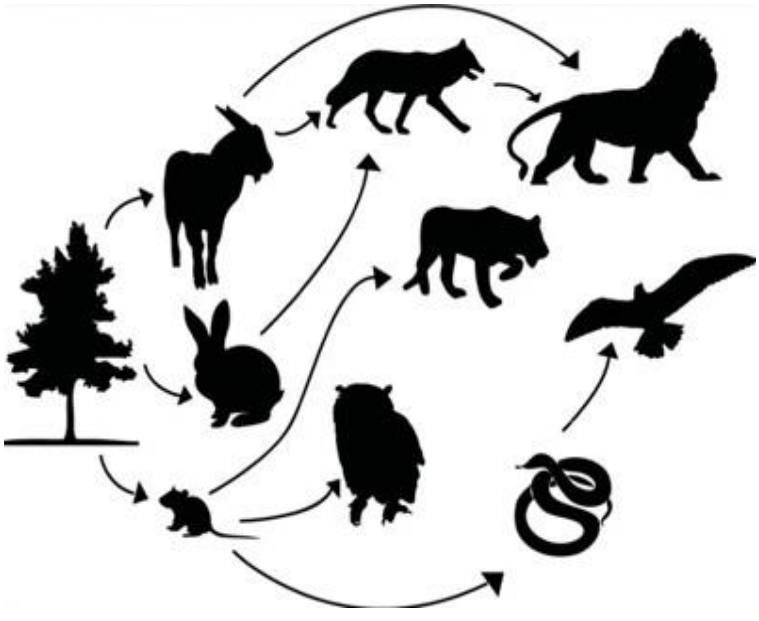
Reflect

Another transfer of energy occurs when a frog preys on a grasshopper. Later, another energy transfer occurs when a snake captures and eats the frog. We can represent the path of energy flow in this scenario using the following flowchart:



A food chain is a specific path of energy transfer within an ecosystem. In this food chain, energy flows from the Sun to grass to a grasshopper to a frog to a snake. What organism could be the next step in this food chain?

A food web represents the interconnected food chains within an ecosystem.
There are many food chains in any given ecosystem. Any one organism often plays a role in several food chains. All of the food chains, with their many interconnections in an ecosystem, make up a food web. A portion of the food web for the grassland ecosystem discussed above could be diagrammed as follows:



The arrows in a food web indicate the direction of energy transfer. Within one food web are many food chains. For example, you can see in the food web shown above that the mouse is part of three food chains. It eats plants and is eaten by cougars, owls, and snakes.

Reflect

An energy pyramid shows the distribution of energy within an ecosystem.
So far we have looked at ecosystems with an emphasis on the direction of energy flow. We have looked at ecosystems while emphasizing the direction the energy flow, but what do we know about the amount of energy within an ecosystem? How is the amount of energy distributed?

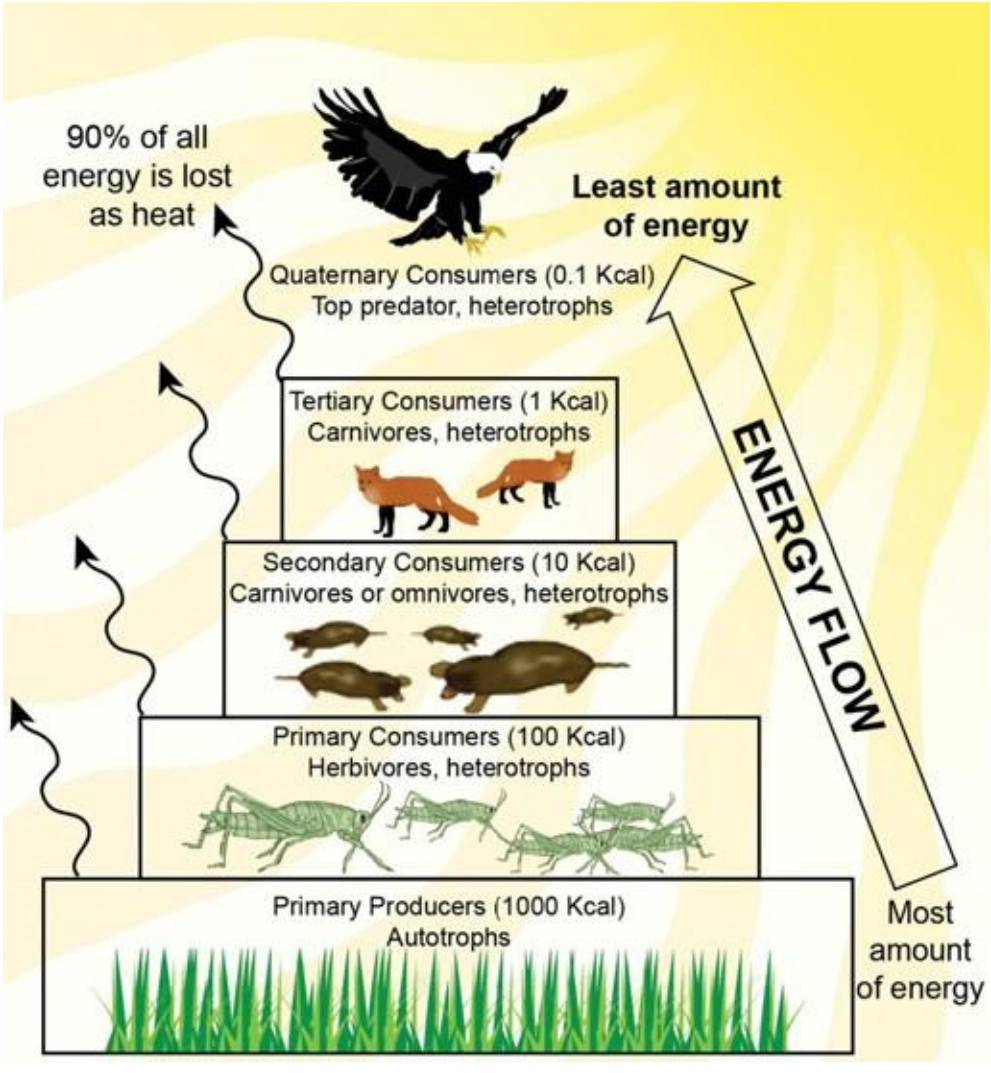
In order to answer these questions, we need to classify and define specific energy levels within an ecosystem. These levels are called *trophic levels*. Producers represent the first trophic level. Producers are sometimes also referred to as *primary producers*. Herbivores, or *primary consumers*, represent the second trophic level. Primary consumers feed on producers. Carnivores, or *secondary consumers*, represent the third trophic level. Secondary consumers feed on primary consumers. *Tertiary consumers* and *quaternary consumers* make up the last two trophic levels. (*Tertiary* means “third level,” and *quaternary* means “fourth level.”) Tertiary consumers feed on secondary consumers. Likewise, quaternary consumers feed on tertiary consumers. (Tertiary and quaternary consumers are also carnivores.)

Earlier, we briefly talked about how the amount of energy changes as it is transferred from one organism to the next. Recall that some energy is given off to the environment as heat during transfers. Because some energy is lost as heat during and between energy transfers, the amount of energy retained in living organisms decreases as you move up through each trophic level. In other words, less energy is available for consumers at each level of the energy pyramid. Specifically, only about 10% of the total energy at one trophic level is passed on to the next higher trophic level. For example, if 1,000 kilocalories of energy are present at the primary producer level, one-tenth of this energy (about 100 kilocalories) is passed to the primary consumers in the next level. Even less energy is available for secondary, tertiary, and quaternary consumers.

The diagram on the next page uses box sizes to represent the amount of energy present at each trophic level. The largest box at the bottom contains the primary producers. The next largest box contains the primary consumers. Secondary consumers are next, followed by tertiary consumers. At the top is the smallest box, representing the quaternary consumers. Altogether the stacked boxes make up a pyramid called an *energy pyramid*. An energy pyramid represents both the distribution of energy and the direction of energy flow within an ecosystem.

Energy Flow Through Living Systems

Reflect



This energy pyramid contains several terms you may not recognize. Primary producers are also called *autotrophs*. The prefix *auto-* means "self." (An *autobiography* is a book you write about yourself.) The root *troph* comes from a Greek word meaning "nourishment."
So, an *autotroph* is something that nourishes, or feeds itself, by producing its own food.
All consumers are *heterotrophs*. The prefix *hetero-* means "other."
So, a *heterotroph* is something that feeds itself by eating other things.

Look Out!

Decomposers, such as mushrooms and bacteria, break down the bodies of dead organisms. This recycles matter for future organisms to use. Decomposers do not occupy a specific trophic level of an energy pyramid. Instead, they extract energy from dead organisms throughout the pyramid.

What Do You Think?

Biomass is the mass of matter in living things. Like the quantity of energy in an ecosystem, the quantity of biomass in an ecosystem can be represented as a pyramid. How do you think the specific trophic levels are organized within the biomass pyramid? Do you think biomass increases or decreases as you go from producers to consumers? To help you answer these questions, try to sketch a biomass pyramid.

Everyday life: Where are humans located in an energy pyramid?
Think about the foods you eat. If you are like most people, you eat a variety of foods. These include fruits and vegetables, which came from producers. You may also eat beef, chicken, and fish, which are consumers. People who eat both meat and plant-based foods are *omnivores*. People who eat only plant-based foods call themselves *vegetarians*, and are classified as *herbivores*.

Omnivores move back and forth between several different trophic levels because of the variety of foods they eat. This makes omnivores primary, secondary, tertiary, and quaternary consumers. People who have vegetarian diets occupy only the lowest consumer trophic level because they eat only producers. Vegetarians are only primary consumers.

Try Now

What do you know?
The following images (A, B, and C) show three different organisms. Place each organism in the correct place in the energy pyramid on the next page. Use an arrow to indicate how energy would flow between these organisms. Use additional arrows to indicate where energy might be removed from living organisms as heat.

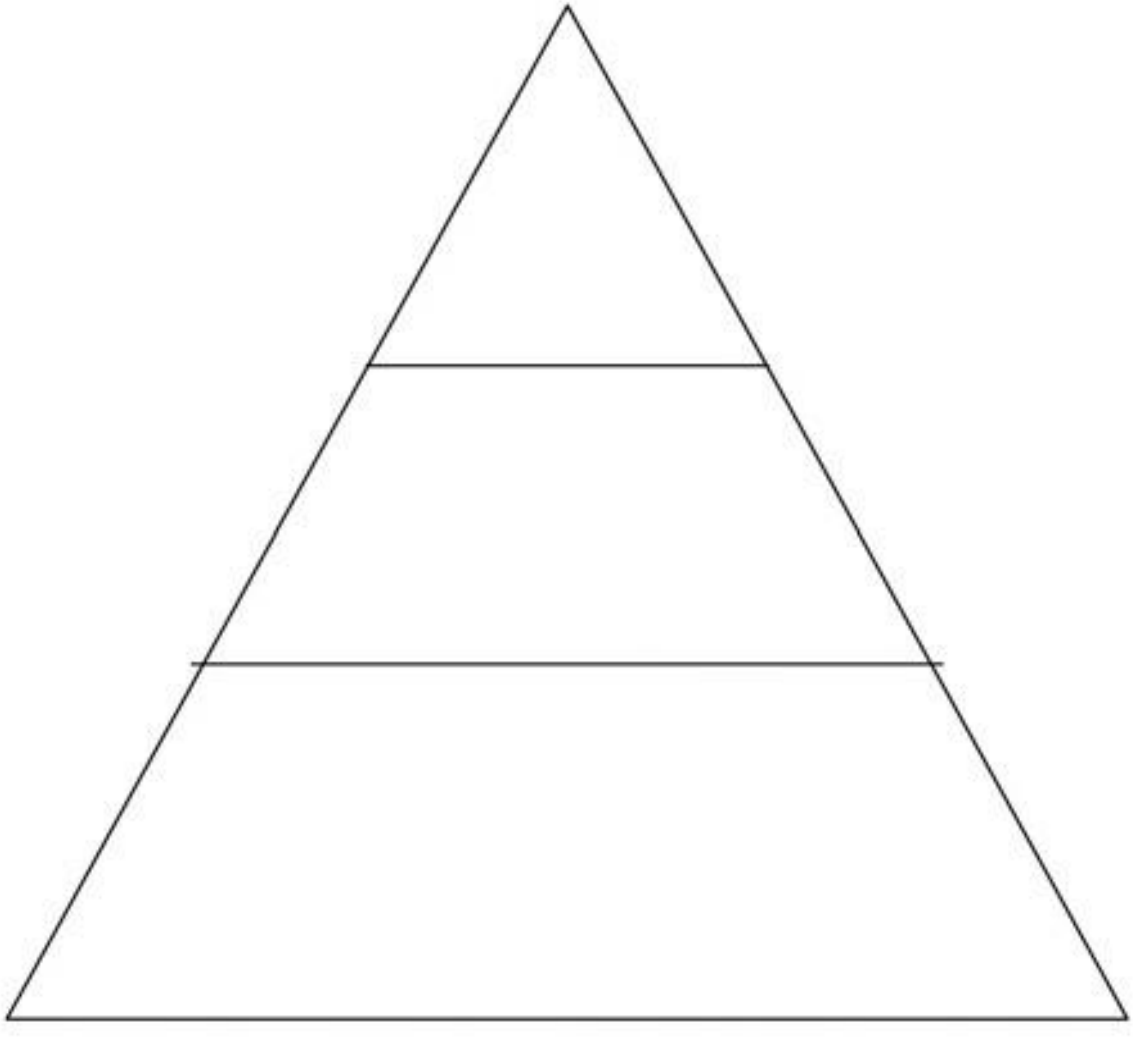
Image A: Deer

Image B: Wolves

Image C: Tree

Try Now

Energy Pyramid



Connecting With Your Child

Food Webs and Energy Pyramids in Marine Ecosystems

This companion focuses on terrestrial ecosystems, which are ecosystems on land. To help your child learn more about food webs and energy pyramids, have him or her conduct research in the library or on the Internet to find examples of food webs in marine ecosystems (ecosystems in water, including oceans, lakes, rivers, ponds, and wetlands). Have your child use the information he or she collects to draw a detailed food web showing specific marine organisms and their relationships to one another. Your child will then take this information, construct an energy pyramid, and label the trophic levels with the names of the organisms that occupy them.

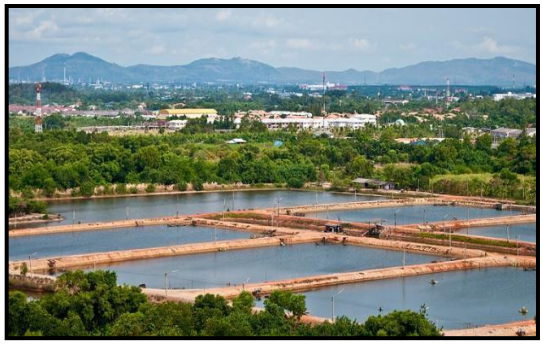
Here are some questions to discuss with your child:

- What organisms carry out photosynthesis in this marine ecosystem?
- What organisms would be considered primary consumers in this marine ecosystem?
- What organisms are secondary consumers?
- What organisms are at the tops of the food chains in this marine ecosystem?

Reading Science

Name: _____ Date: _____

Let's Farm Some Shrimp!



1 All living things must eat, and most living things are eaten by bigger things. The way organisms get food is linked in a sort of chain (and sometimes a web). This chain of life is called the food chain.

2 Food chains, food webs, and energy pyramids all explain these eat-or-be-eaten relationships. Meet a farmer named Jacob Adamson. He is an aquaculture technician. That just means he grows shrimp in large outdoor earthen tanks. “Aqua” means “water,” and “culture” means “cultivate” or “grow.” Mr. Adamson must know all about food chains, food webs, and energy pyramids to make his shrimp farm successful.

3 Wild shrimp are close to the bottom of the food chain. Many animals like to eat shrimp. The shrimp must also eat. When they are young, shrimp eat plankton. As they grow bigger, shrimp eat small worms, mollusks, and fish. Mr. Adamson must feed his shrimp the right things to eat so they can grow. He must keep plankton, worms, small mollusks, and small fish for them.

4 Mr. Adamson also must keep predators out of his tanks. In the water, bigger shrimp, fish, and crabs are predators of shrimp. Ocean mammals, land mammals, and many birds also catch and eat shrimp. The pink flamingo gets its pink color from eating shrimp. The flamingo has a beak that can scoop shrimp out of the water. Roseate spoonbills also like to eat shrimp. Small birds wade into the shallows for small young shrimp. Large herons wade into deeper water to catch them. Pelicans scoop shrimp up when shrimp are close to the surface. All of these organisms can get to the outdoor tanks on the farm. Mr. Adamson must know how to protect his shrimp farm. If not, these predators will eat all his profits.

5 While all of these animals like shrimp, most aquaculture shrimp are eaten by people. Mr. Adamson will sometimes take shrimp home to his family. Everybody likes shrimp—from the wild or from a farm. That appetite is what makes a food chain.

Reading Science

1 Where are people in the shrimp food chain?

A close to the very bottom

B about in the middle

C close to the top

D at the very top

2 What is the main point of the reading?

A Shrimp are part of nature's food chain.

B Shrimp have very specialized diets and will not eat a variety of foods.

C Aquaculture is not a profitable business.

D Few birds or other animals eat shrimp.

3 Which of the following statements is true about aquaculture?

A An aquaculturist can throw some young shrimp in a pond, and they will take care of themselves.

B It means "cultivating small acreages of land."

C An aquaculturist must tend to the tanks carefully to make sure predators do not eat the shrimp.

D The tanks are large aquariums built in warehouses.

Reading Science

4 The main point of paragraph 4 is that -

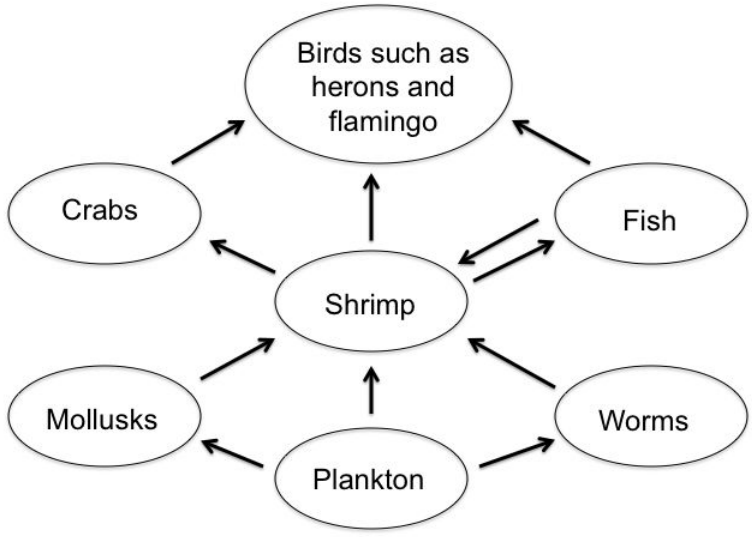
A wild shrimp are close to the bottom of the food chain

B Mr. Adamson needs to keep predators out of his tanks

C Mr. Adamson is an aquaculture technician

D most aquaculture shrimp are eaten by people

5 Examine the diagram of the food web described in this passage. Using arrows, how would you label the direction of energy flow through this web?



A starting at the edges and flowing toward the shrimp

B starting at the shrimp and flowing outward

C starting at the plankton and flowing upward

D starting at the birds and flowing downward

Post-Assessment

Name: _____ Date: _____

1 Which of the following characteristics is shared by both primary and secondary consumers?

A Uses the Sun's radiant energy to produce food.

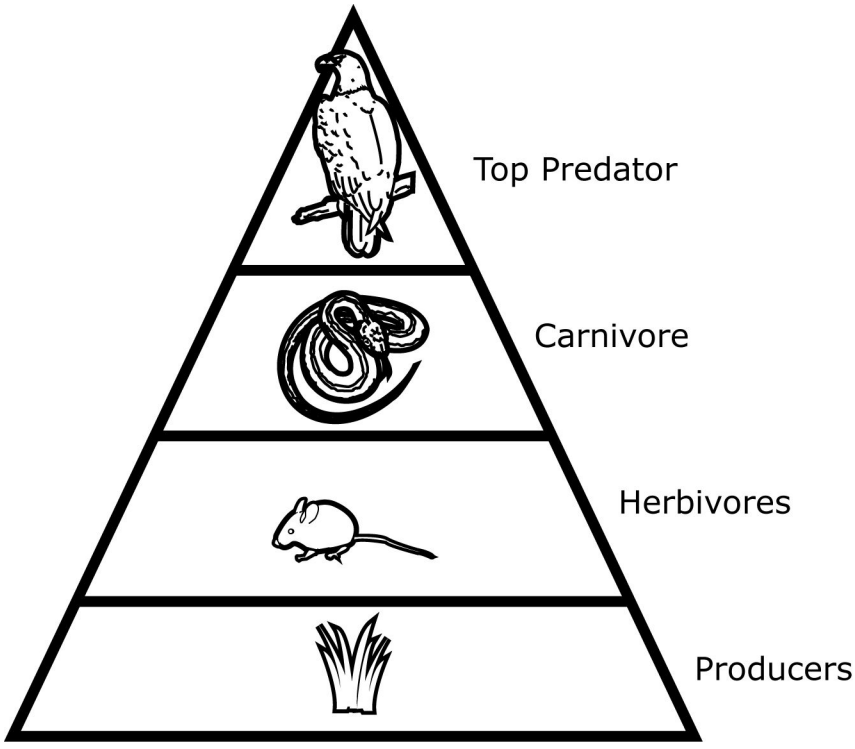
B The first step in any food chain diagram.

C Eats only plants to gain needed energy.

D Gains energy by eating other living things.

Post-Assessment

2 An energy pyramid is shown.



At which level of the energy pyramid would most of the biomass be found?

A Top Predator

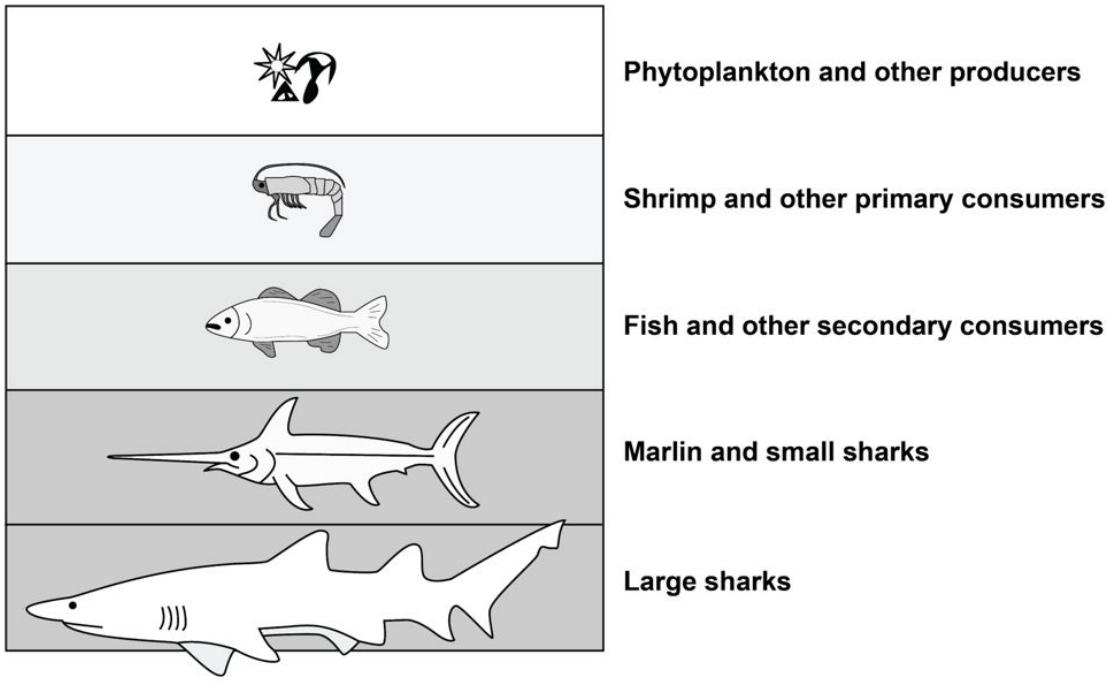
B Carnivore

C Herbivores

D Producers

Post-Assessment

3 A diagram of a marine food chain is provided.



Which of the organisms in the food chain transforms energy from the Sun into food?

A Large Sharks

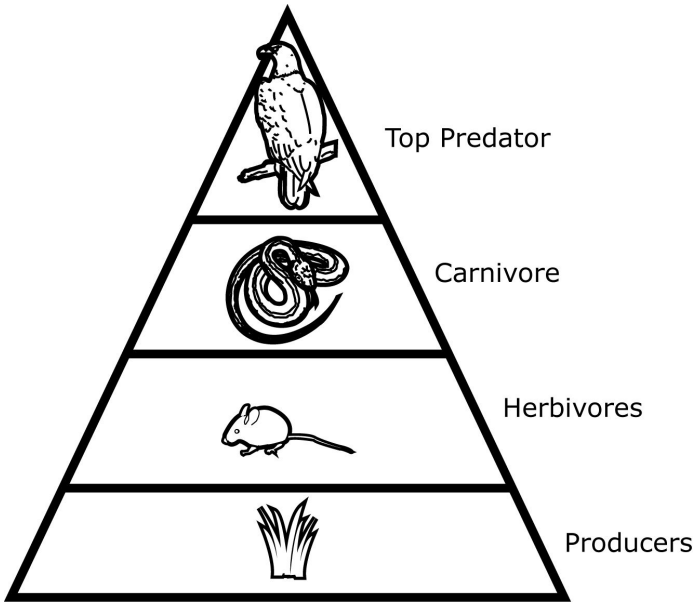
B Marlin

C Shrimp

D Phytoplankton

Post-Assessment

4 A diagram is provided.



Which portion of the diagram represents the level with the most available energy?

A Producers

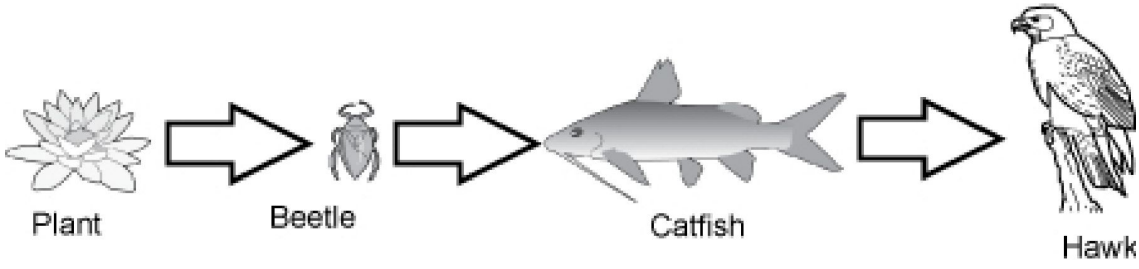
B Herbivores

C Carnivores

D Top Predators

Post-Assessment

5 A diagram of a pond food chain is provided.



Which of the following could possibly increase the total amount of energy the catfish population receives within its food chain?

A An increase in the number of beetles.

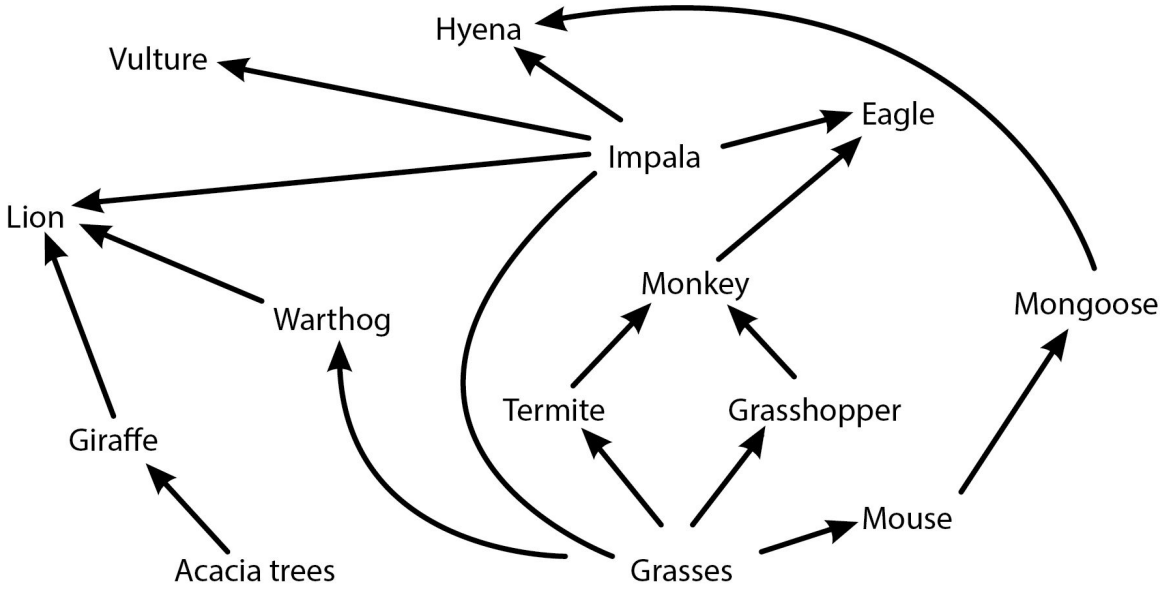
B An increase in the number of hawks.

C A decrease in the number of plants.

D A decrease in the number of hawks.

Post-Assessment

6 A diagram is provided.



Which of the following correctly shows one path that energy would flow through this ecosystem?

A Grasses → Termite→ Monkey→ Eagle

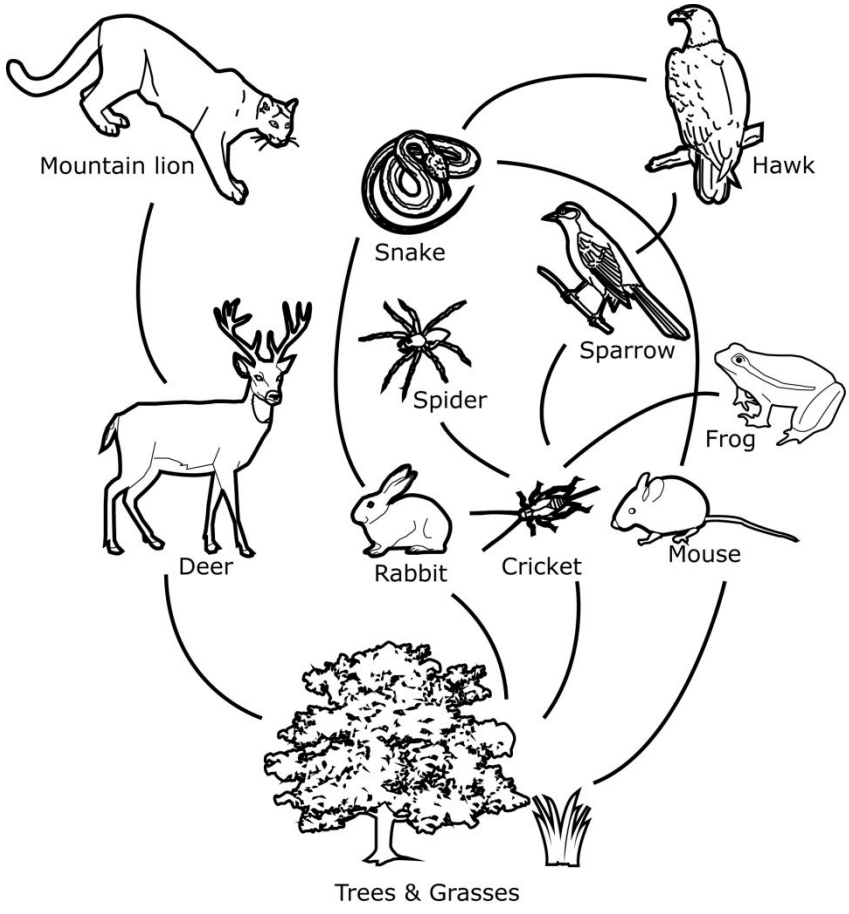
B Hyena → Mongoose → Mouse → Grasses

C Grasses → Termite→ Grasshopper → Monkey

D Acacia trees → Giraffe → Lion → Vulture

Post-Assessment

7 A diagram of a prairie food web is provided.



A reduction in deer population will have the effect in the amount of energy this ecosystem is able to provide for which of the following organisms?

A Rabbit

B Mountain lion

C Mouse

D Hawk