

California
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Life Sciences

Pond Life



| Genre | Comprehension Skill | Text Features | Science Content |
|------------|---------------------|---|-----------------|
| Nonfiction | Predict | <ul style="list-style-type: none">• Captions• Labels• Text Boxes• Glossary | Ecosystems |

Scott Foresman Science 4.4



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by Barbara Fierman



Vocabulary

canopy
climate
coral reef
desert
rain forest
symbiosis
understory

Extended Vocabulary

carnivore
decomposer
herbivore
nocturnal
nymph
omnivore
organism

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Pond Life


by Barbara Fierman




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What You Already Know

 An ecosystem is all the living and nonliving things in an environment and the ways in which they interact. The nonliving parts of an ecosystem affect what kind of living things can survive there. Water, light, soil, and climate are different for each ecosystem. A tropical rain forest and a desert are examples of ecosystems. Both have many different populations of organisms.

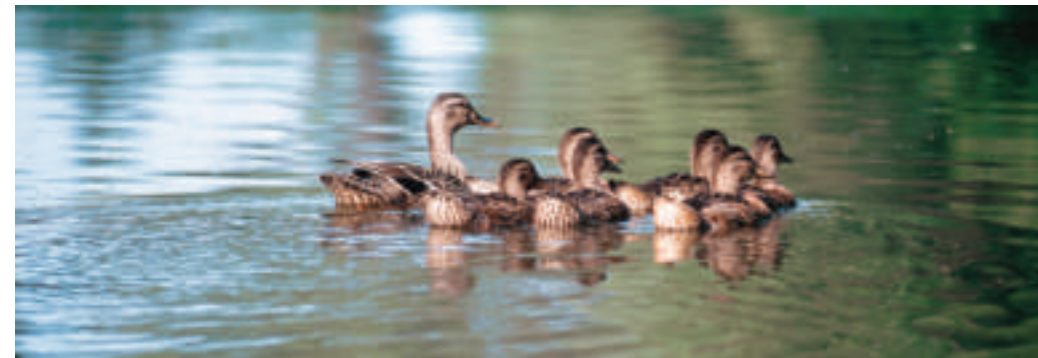
Desert ecosystems are dry. In a tropical rain forest the climate is hot and humid. There are many different plants and trees in this moist environment. The forest floor has a shady understory with flowers and vines. High in the trees a thick layer of branches and leaves form a canopy.

 A rain forest is a large ecosystem with many plants and animals.



 There are also many living things beneath the surface of the ocean. Coral reefs are often called the rain forests of the sea. There are many different kinds of plants and animals in rain forests and coral reefs. In these ecosystems living things often have symbiotic, or close, relationships. For example, plantlike algae live inside reef-building coral. The algae produce food and oxygen that is useful to the coral. In return the algae get important nutrients and carbon dioxide.

In the following pages you will learn more about pond ecosystems. You will be introduced to the living things that make up a pond ecosystem and learn how they interact and survive.



 Ducks are omnivorous consumers in a pond ecosystem.





Pond Life

Suppose you were walking by a pond on a lazy summer day. Do you notice the bullfrog sunning itself on the leaf of a water lily? Look, a dragonfly swoops through the air to grab a snack. There go the ducklings waddling clumsily as they follow their mother into the water for their first swim. The pond may seem like an animal playground. Actually, a pond is a busy community of plants and animals living and working together.

A pond is a small, fairly shallow body of fresh water. Ponds can be formed when rivers overflow, when rainwater collects, or when beaver dams stop the flow of a river. Other ponds are made by people. Unlike lakes, ponds are still, which means that they are not fed by streams or rivers. As a result, ponds may become very shallow when there is a drought.

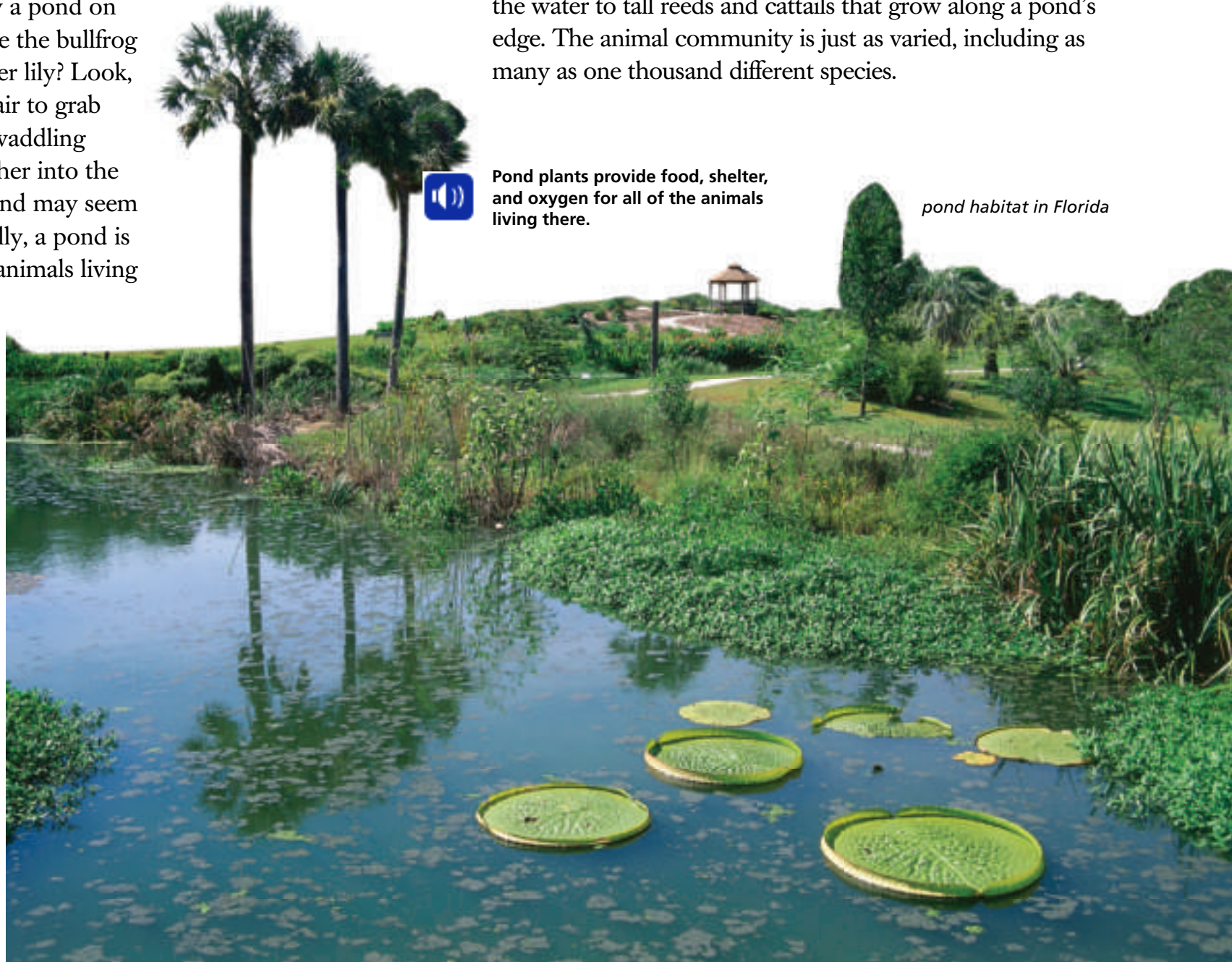


In spite of its size, a pond is home to a great variety of plants and animals. The plants range from tiny duckweed in the water to tall reeds and cattails that grow along a pond's edge. The animal community is just as varied, including as many as one thousand different species.



Pond plants provide food, shelter, and oxygen for all of the animals living there.

pond habitat in Florida





Pond Ecosystems

Plants have a very important job in a pond ecosystem. They are the producers. Producers make food for all the creatures living there. Animals are consumers. Examples of consumers that are herbivores and live in pond ecosystems are water fleas and snails. Omnivores, such as turtles, are also consumers that live in ponds. Carnivores make up a third group, including most frogs and some fish. They eat only other animals.

Decomposers are organisms that eat rotting plants or remains of dead animals in the pond. As they do this, important nutrients are released from the dead matter. Plants absorb these nutrients.

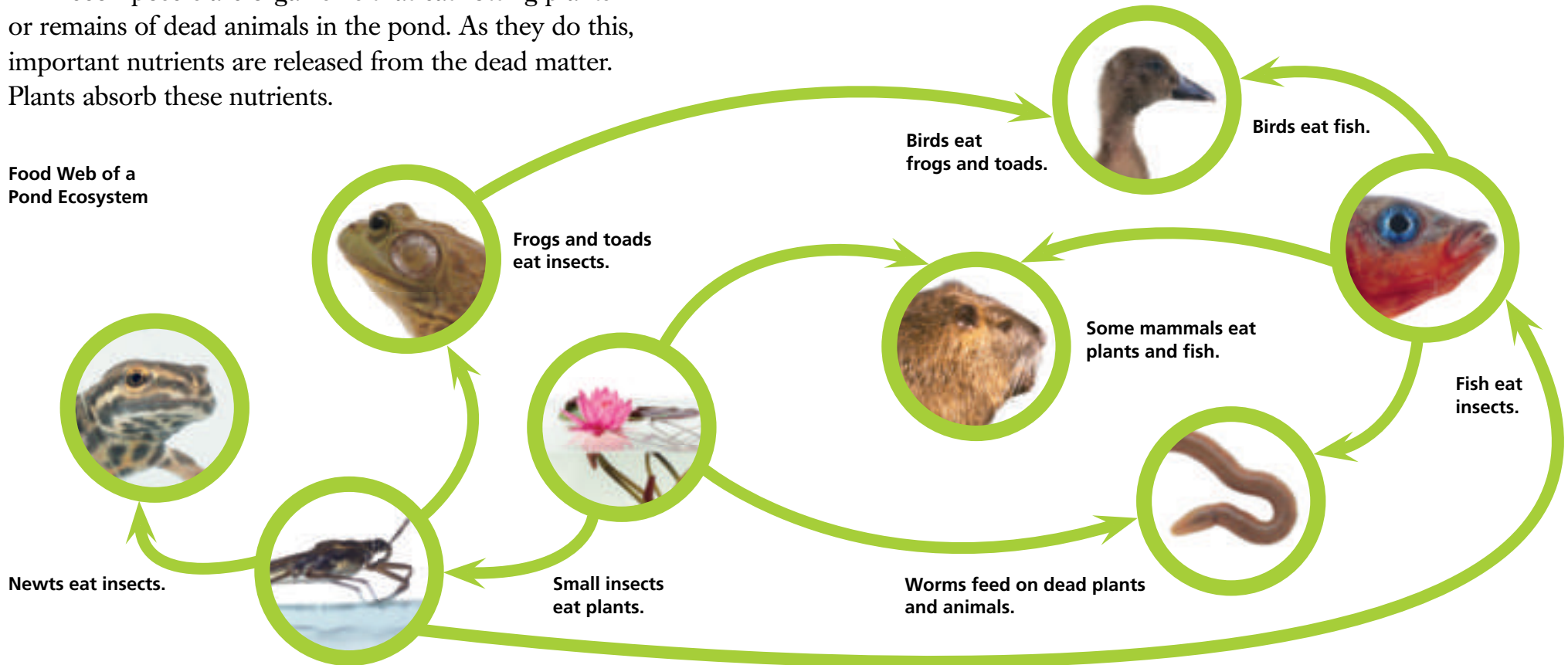


Scientists use a diagram called a food web to explain how energy passes from one living thing to another. In a food web, arrows point to the living things that *get* energy. Notice the arrows pointing from plants to small insects and small mammals. When these pond creatures eat plants, they get energy.

You can see that all the living things in the pond depend on each other. When one part of the food web changes, the whole web is affected.



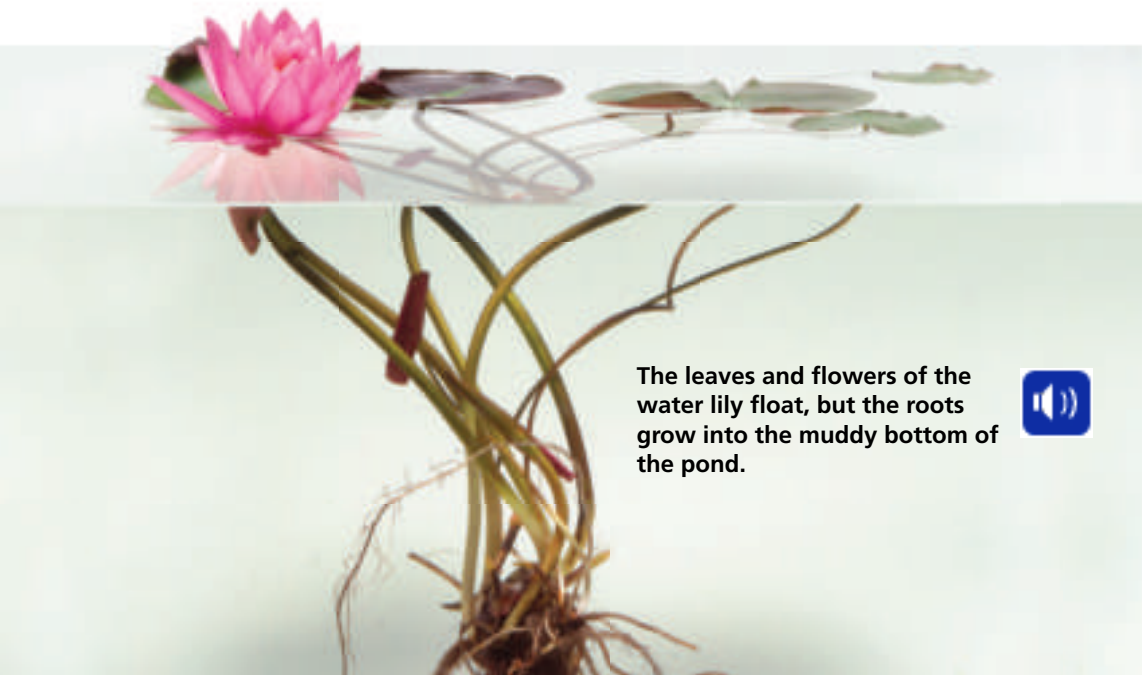
Food Web of a Pond Ecosystem



Plant Life

Plants absorb light from the Sun and carbon dioxide from air and water as part of a process called photosynthesis. During photosynthesis, plants make food and give off oxygen. Animals breathe oxygen and get energy from the food. Every pond animal gets energy from plants, either by eating them or by eating other animals that eat the plants.

Different kinds of plants grow in different parts of the pond. Animals use the plants different ways. Small animals hide and some birds make nests among the tall reeds at the pond's edge. Frogs rest on top of the water lily's flat, waxy leaves. Snails find food and lay eggs on the slimy underside of the leaves.



The leaves and flowers of the water lily float, but the roots grow into the muddy bottom of the pond.



Algae



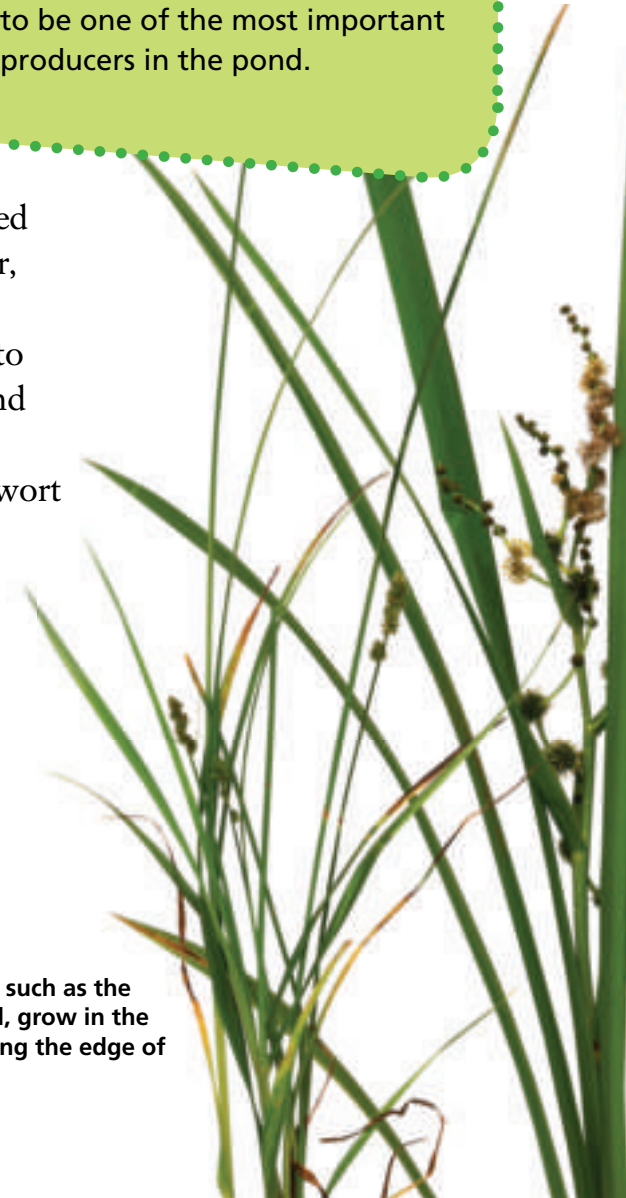
Algae are tiny but important organisms. Since all pond animals eat algae, or eat animals that eat algae, they are considered to be one of the most important producers in the pond.



The Canadian waterweed lives completely underwater, but its leaves can float. The leaves get enough sunlight to produce oxygen for the pond creatures to breathe. Plants such as frogbit and bladderwort just float around the pond. Bladderwort is especially unusual because it is a carnivore. It hangs traps down into the water and catches insects to eat!



Reeds and rushes, such as the branched bur-reed, grow in the shallow water along the edge of the pond.



Insects at Work

Hundreds of different kinds of insects are adapted to life in a pond. Insects lay eggs in the water. Some young insects, such as the mayfly and dragonfly nymphs, stay underwater while they grow. When they are adults, they leave the pond and fly above the water. Other insects, such as the diving beetle, spend their lives in the water. Pond skaters have tiny bunches of hair on the ends of their legs that let them walk on the surface of the water.

The adult dragonfly carries its food as it flies.

Pond skaters glide across the water, hunting for other insects to eat.

The whirligig beetle also lives on the surface of a pond and zooms around in circles. This beetle has special features that have helped it adapt to life on the pond. Its antennae help it find prey. And its eyes are divided into two parts. This enables the beetle to look in different directions at the same time to catch an insect for its meal.

The mayfly nymph eats algae, tiny plants, and animals. The adult mayfly doesn't eat at all. That's not really a problem though, since it lives for less than a day!

Unlike the mayfly, the dragonfly will attack and eat other insects and animals. The dragonfly nymph has a pointy tip on its lower lip. It uses this tip to attack its prey. The adult uses its large jaws to grab tadpoles, fish, and other insects. The dragonfly can fly as fast as eighteen miles per hour and grab its prey while it flies!

Mayfly




A baby mayfly is called a nymph. The nymph lives and grows underwater for as long as three years. It emerges from the pond as an adult and lives for less than a day.



Fish Friends


Many species of fish are adapted to the freshwater pond habitat. One of the most common is the stickleback. Sticklebacks are an important part of the food web. They will eat baby insects, snails, water fleas, worms, other fish, and fish eggs. They use their jaws to suck in their prey. Then they grab whatever they catch with their sharp teeth. The male stickleback builds a nest where the female fish can lay eggs. The male will guard the eggs until they hatch and then watch over the babies until they are about one week old. Pond creatures such as larger fish, herons, water shrews, and otters make a meal of the stickleback.



 The male stickleback can change color. Its throat becomes bright red and its eyes turn bright blue.



 *Freshwater shrimp*

 Minnows are tiny fish that travel about in groups called schools. Pike, including pickerel and northern pike, are long, narrow fish with very sharp teeth. They often hide among the stems of underwater plants. They wait for prey, such as fish, frogs, snakes, or ducklings, to swim past, and then they attack. Freshwater shrimp provide food for other pond animals, such as newts.



Frogs and Toads

Frogs and toads are amphibians that are well adapted to pond life. Amphibians have features that enable them to live on land and in water. Frogs and toads hatch from eggs into tadpoles. Gradually, the tadpoles develop back legs, lose their tails, and develop front legs. Nostrils and lungs replace gills for breathing. Now they are ready to live on land.

Adult toads live most of their life on land. They return to the water to lay their eggs. Frogs hibernate in the mud at the bottom of the pond during the winter. During the summer, they rest on the leaves of water lilies, soaking up the sunshine and catching insects.



Small tadpoles use their tails to swim.



Frogs and toads are well adapted to the food in the pond ecosystem. They are not picky eaters. They will eat insects, snails, small animals, and even tadpoles.

Different kinds of frogs and toads may live in a pond. The largest frog found in North America is the bullfrog. It can grow about eight inches long. The American toad is smaller.



American toad



bullfrog



A common frog leaps into the water to find a meal.





Newts

Like frogs and toads, newts are amphibians. Newts lay their eggs on underwater plant leaves. The eggs hatch into tadpoles. Newt tadpoles differ from frog and toad tadpoles in that they keep their gills even after their legs develop. Newts are carnivores. They will eat shrimp, insects, snails, worms, and tadpoles. Adult newts use their tongues to catch their prey when they are on land. In the water, they use their teeth to grab their prey. Newts are nocturnal animals. They are active at night, but they hide and sleep during the day.



Juvenile newt



Turtles

Turtles are also adapted to pond living. Like that of other reptiles, the body temperature of a turtle is just about the same as the temperature of the air or water where it lives. During the cold winter, turtles burrow deep into the muddy bottom of the pond and hibernate. They can survive underwater for long periods of time. Turtles are omnivores that eat all kinds of plants and animals. They are also scavengers and will eat dead fish and other animals. A snapping turtle like the one in the picture below has a small, fairly soft shell. Since this turtle can't hide in its shell, it uses its sharp beak to protect itself. Even a young turtle will snap at just about anything that moves near it.



Palmate newt



Snapping turtle





Birds

Many common species of birds are adapted to pond living. In a pond, birds find water to drink, fresh food to eat, and a place to bathe. The grasses and reeds along the edge of the pond provide a perfect spot for some birds to make their nests.

Wading birds, such as the heron, will stand in the shallow water for hours at a time, waiting to catch a meal. The heron stands on one foot and then dips its long beak into the water to grab its prey. The heron will eat insects, fish, frogs, turtles, and snakes. While the adult heron doesn't have many enemies, other birds will steal and eat its eggs.



The great blue heron has a wingspan of almost six feet.



mallard duckling



Swallows



The swallow is a small bird. Its tail resembles streamers in the air. Swallows visit the pond as they migrate south each winter.



Water birds, such as ducks and swans, are suited to life on the water. Their webbed feet and the structure of their legs make them good swimmers. A special type of oil causes water to slide off their wings. Ducklings that hatch along the edge of the pond can swim right into the water. They may stay at the pond all year long. Swans leave the pond in winter and fly to a warmer climate. Canada geese fly south in winter and use the pond as a rest stop on their way. Other bird visitors include kingfishers, hawks, and osprey.



Life on the Water's Edge

Several different mammals live near the pond and feed on the plants and animals that live there. The muskrat is a member of many pond communities. Muskrats use leaves, cattail stems, branches, and mud to build lodges on the banks of ponds. A muskrat's lodge is quite complex. It has tunnels, an underwater entrance, and even a different sleeping area for each family member. Muskrats eat mostly plants, such as cattails, but they will also eat small pond animals. The name *muskrat* comes from the musk glands that are located under their tails.



Muskrats are excellent swimmers and can stay underwater as long as fifteen minutes.



Water shrews are actually black and white but appear to be silver when underwater.



Minks are adapted to pond life in several ways. They have webbed feet that help them swim. They will eat just about any pond animal, including larger muskrats.

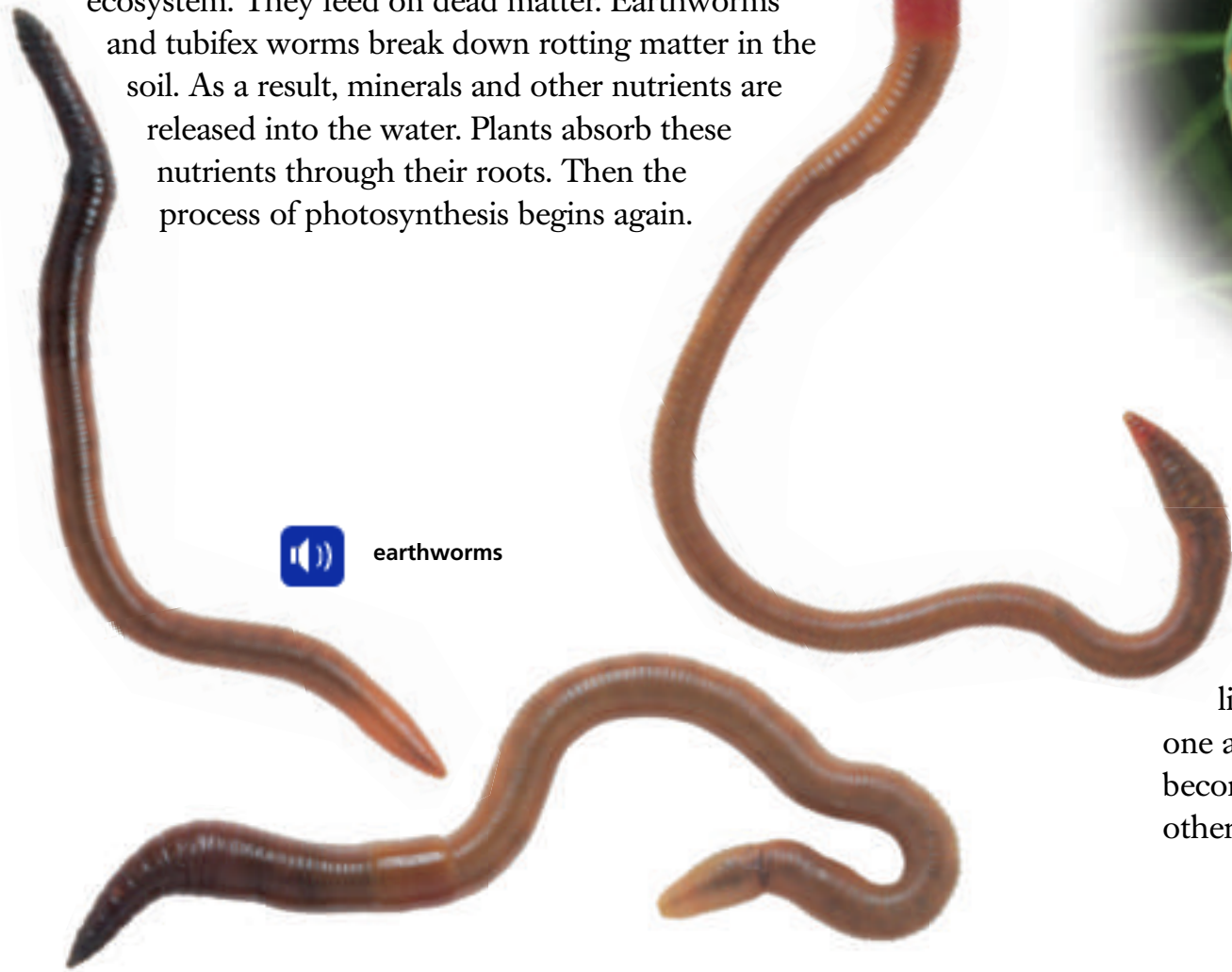
Water shrews are tiny animals that spend their entire lives in one pond. They hunt for tadpoles, insects, and worms underwater during the day and at night. Beavers make their own ponds. They use branches, sticks, stones, and mud to build a dam. This stops the flow of water from a river or stream.





Decomposers

When plants and animals die, their remains decay on the pond floor. Decomposers are the pond organisms that eat the remains of dead plants and animals. Bacteria and fungi are tiny, but they are the most important decomposers in the pond ecosystem. They feed on dead matter. Earthworms and tubifex worms break down rotting matter in the soil. As a result, minerals and other nutrients are released into the water. Plants absorb these nutrients through their roots. Then the process of photosynthesis begins again.



earthworms



tubifex worms



Many different types of organisms live in ponds all over the world. Some live in a pond community for their whole lives, while others stop by for a visit. You can see how important each pond organism is to the life of every other organism. Pond organisms depend on one another for oxygen, food, and shelter. If one living thing becomes endangered and is removed from the food web, the others organisms are also affected.





Glossary

| | |
|-------------------|---|
| carnivore | a living thing that only eats other animals |
| decomposer | a living thing that eats the remains of plants and animals |
| herbivore | a living thing that only eats plants |
| nocturnal | active at night |
| nymph | the form of certain young insects |
| omnivore | a living thing that eats both plants and animals |
| organism | a living thing formed of separate parts which work together to carry on the processes of life |

What did you learn?

1. What happens if one part of a food web disappears?
2. How has the whirligig beetle adapted to pond life?
3. How are newt tadpoles different from frog and toad tadpoles?
4. **Writing in Science** Describe an experience you had at a pond. Include details that help your reader picture the experience.
5. **Predict** What might happen to a muskrat if there were no cattails at the pond?

