

Freshwater Invertebrates



Children are fascinated by water, and a pond teeming with life is ideal for exploring. Ponds are an important component of wetland habitat, supporting a diverse animal and plant population-- everything from moose to water lilies, from ducks to dragonflies. Wetlands are areas where the ground is wet at least part of the year. They support plants and animals that prefer wet soil. Marshes, rivers, lakes, ponds, streams, wet tundra, barrier islands, river deltas, tidelands, muskogs and bogs are all types of wetlands.

Critical for fish and wildlife survival, wetlands provide recreation as well as water and food for people. They act as natural storm buffers, helping to prevent flooding by soaking up heavy rains. Wetlands also filter out pollution (within limits!) and are abundant sources of such edibles as fish, birds, crabs, shrimp, clams, moose, caribou, berries, and other plants.

If ponds are not available in your area, substitute a nearby stream for your field studies. Stream animals are accustomed to a high level of oxygen because of the cool, moving water in which they live. Use an air pump if you keep them in an aquarium to ensure that they get enough oxygen.

This is an opportunity for students to use all their senses in the enjoyment of a still or running water environment. Because their natural habitat is standing water, the smaller pond critters are particularly well suited or freshwater aquariums. With care, they can be kept for a long time.

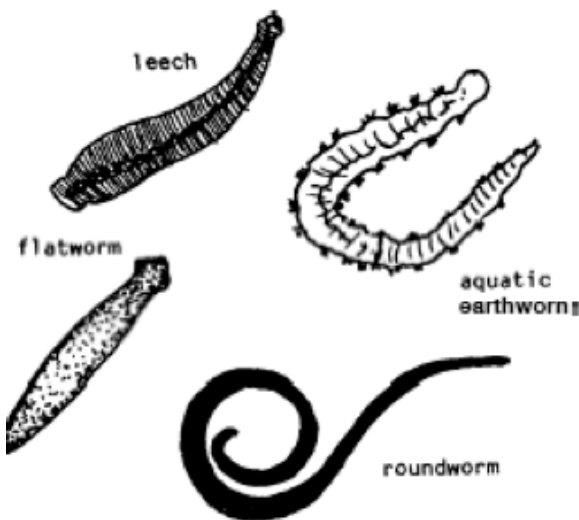
What Lives In A Pond?



Many invertebrates live in freshwater ponds. Sometimes you can even find sponges and tiny jellyfish-- but they're not very common. There are lots of worms, however.

Most freshwater **flatworms** (Platyhelminthes) are parasitic. Tapeworms and flukes inhabit the food canals of fish and animals. The free-living freshwater forms that you are likely to find in ponds are planarians. Generally about one centimeter (two and one-half inches) long, flatworms are grey or black and avoid light in the daytime. They can be found on the undersides of stones, leaves or other debris.

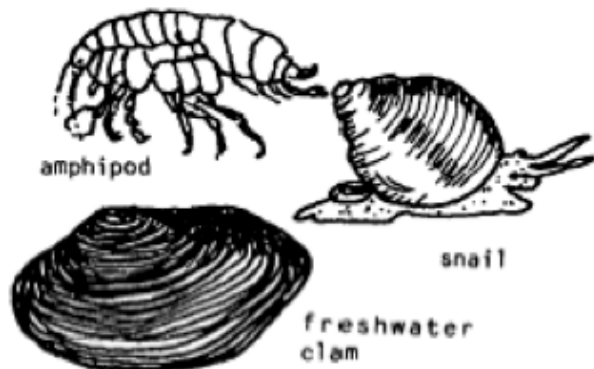
Roundworms (Nematoda) usually are abundant in bottom mud, sand or debris. Less than one-half inch long, they are noticeable because of their constant whiplike, S-shaped thrashing.



Aquatic **earthworms** and **leeches** are the two main groups of freshwater segmented worms (Annelida). These worms are common in the mud and debris of stagnant ponds, streams and lakes, and common as well in non-stagnant water. Aquatic earthworms look very similar to the land varieties. They digest bottom mud and organic material. Some varieties build little tubes and bury their heads in the mud while their tails wave above, creating a current that draws oxygen or food into the tubes.

Leeches often are abundant in calm, shallow, warm bodies of water whose bottoms are cluttered with debris. Most are predators and scavengers, although only a few species suck blood from warm-blooded animals. Leeches have head and tail suckers, are often brightly colored, and change shape rapidly by stretching or shortening their muscles. Historically, leeches were used by doctors to heal the sick by removing "bad blood."

Like their saltwater relatives, freshwater **mollusks** are soft-bodied invertebrates covered by a hard shell including univalves, such as snails, and bivalves, such as mussels.



Snails are most frequently found in ponds and streams, but are also present in lakes and rivers. Freshwater snails are herbaceous, grazing on plant stems to scrape off the algae. Some snails have gills, which are protected by a lid-like structure called the “operculum;” others breathe with a lung sac.

Although they are sometimes referred to as "clams," all **freshwater bivalves** are true **mussels**. In Alaska, you may find tiny fingernail “clams” as well as larger ones up to six inches long.

Alaska’s ponds and streams are rich in freshwater **crustaceans**. Members of the crustacean group have many legs and a hardened outer shell. Small tundra ponds or spring breakup puddles are often packed with tiny fairy shrimp or tadpole shrimp. Amphipods like the sand flea, which have one set of feet for walking or jumping and one set for swimming, are quite common.

Insects inhabit fresh water both as adults and as young nymphs or larvae. Among the most successful life forms on earth, insects live even in arctic snow and ice. They are extremely rare in the oceans, however; so we have no saltwater examples with which we can compare our freshwater species.



Each adult insect has a body segmented in three parts, six legs, a hard outer covering and (as adults) wings. Immature insects are more variable. Some resemble worms; others look much like adult insects.

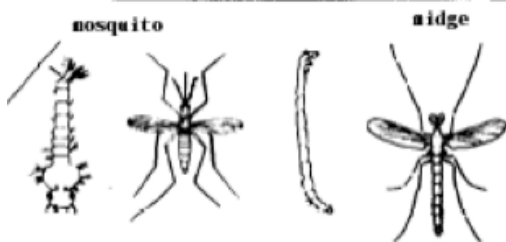


The **water boatman** is a great swimmer. It dives down; its body wrapped in a blanket of air, and anchors one claw of its middle leg onto a plant stem. There it can feed upon diatoms and algae.



Dragonflies and **predaceous diving beetles**, both adults and young, are ferocious predators, eating anything they can catch!

Mayflies are excellent fish food both as nymphs and as adults. They spend most of their lives as nymphs and only a few hours or, at most, a few days, as adults. The ephemeral adults don’t eat. They mate and lay their eggs, then die on the water’s surface becoming food for eager fishes.



Mosquitoes are all too well known to Alaskans. Adult midges are similar in appearance to mosquito adults, but most of them don’t bite. Mosquito larvae (wigglers) float on the water’s surface; and midge larvae (bright red worms) are found in bottom mud.

Caddis fly larvae are interesting because most build homes out of sand grains, bark or vegetation. Caddis fly adults look like moths because their wings are folded similarly--like a tent over their backs.



Amphibians



Amphibians are vertebrate animals that are dependent upon water for survival for parts of their lives. They lay their eggs in water, and when the eggs hatch the young, or larval, stages live in the water, acquiring lungs only as adults. Some amphibians depend on moist skin for respiration. In Alaska, all amphibians hibernate during the winter. Salamanders, frogs and boreal toads inhabit Southeast Alaska. The toad and possibly one species of newt (a family of salamanders) are found in Southcentral Alaska. The wood frog, *Rana sylvatica*, is found in most parts of the state.

Reptiles are similar to amphibians, but they have no aquatic larval stage. Reptiles generally need more sunlight and warmth than amphibians.

A few garter snakes have been reported along the British Columbia border and a leatherback sea turtle was caught at the mouth of the Copper River Delta (and is now on

display in the Cordova Historical Museum), but reptiles are extremely rare in Alaska.

Life in the north is difficult for amphibians. They are cold-blooded, which means that their body temperature is close to that of the environment around them. They need enough summer warmth to enable them to go through metamorphosis. They also need suitable spots for hibernation.

Wood frogs hibernate in shallow, bowl-shaped depressions that they excavate in the upper layer of the previous year's vegetation. The winter snow acts as an insulator. Light snow years result in high frog mortality. Frogs use their own body energy for fuel, losing weight during the cold winter months. Spring warmth finds frogs calling, mating, and laying eggs in ponds. The eggs hatch into gilled tadpoles. If all goes well, these metamorphose into lunged, air breathing adults by the end of the summer.

Besides breathing through their lungs, amphibians can absorb oxygen through their moist skin. In the winter, when they hibernate in the bottom of ponds or in the ground, they take in enough oxygen through their skin to stay alive.

Frogs and Toads



Frogs and toads spend the first portion of their lives in ponds, as eggs and then as tadpoles. They absorb dissolved oxygen through fish-like gills. Then, as adults, they breathe air with lungs.

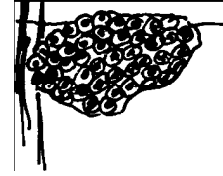
Each spring, after mating, female amphibians lay soft, jelly-like eggs in ponds. Frogs lay large masses of floating eggs; toads lay strings of eggs that stick to vegetation in the bottom of the pond. After a few days, the eggs hatch into tadpoles (polliwogs).

The fishlike tadpole eats small water plants, especially algae. It grows hind legs followed by front legs. Then it stops eating as its small body undergoes drastic changes: eyeballs move from the side to the top of the head; gills make way for legs and lungs; and the digestive system transforms to accommodate an insect diet. During this time, its body is supplied with nutrients from the storehouse in its shrinking tail.



Toad eggs-- long strings attached to bottom vegetation in ponds or puddles.

Frog eggs-- clusters floating on ponds or attached to vegetation beneath the surface



Freshwater Mammals

The mammals making their homes in Alaska's freshwater environment are much like their saltwater relatives. They all breathe air, give birth to live young, which they nurse, have fur or hair and are supported by a backbone. However, freshwater mammals differ from their saltwater counterparts in that they are more amphibious (at home both in the water and on land).

The **river otter** has a long, slender body, short legs, and scent glands that it uses to mark a territory or to repel enemies. The otter may travel on land between bodies of water. By running and sliding on the snow in winter it can move as fast as 15 miles per hour. In water, it propels itself by flexing its body and using its webbed feet. The river otter eats snails, clams, mussels, sea urchins, insects, crab, octopus, frogs, fish and plants. It is found as far north as the Brooks Range and Point Hope.

River Otter



Mink are smaller than otters and the hind feet are only slightly webbed. Their fur is dark chocolate brown and they have fuzzy tails. They eat many of the same foods as river otters and are found throughout the state except in the Arctic Slope, Kodiak, and the Aleutian and Bering Sea islands. Mink are equally at home on land or in the water when hunting for food. Their rapid movements contrast with the otter's easy lope.



Mink

Muskrats and beavers are related; both are members of the rodent family. The muskrat looks something like a large, plump, furry common rat and is found throughout most of Alaska. Its tail is about 11 inches long and is adapted to an aquatic habitat by being flattened on each side. The muskrat eats lilies, sedges, roots, grasses and other vegetation.

Beavers are the largest rodents in Alaska and range throughout the state's wooded areas. Animal engineers, they are known for their mud and stick dams, which create ponds in which the beavers build their lodges. Beavers eat small twigs and bark of trees and shrubs, and roots and stems of aquatic plants. They are well adapted to their watery environment with their thick, dark brown fur, large webbed feet, nose and ear valves to shut out water, and broad, flat tails.



Muskrat



Beaver