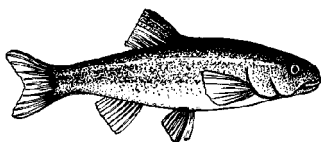
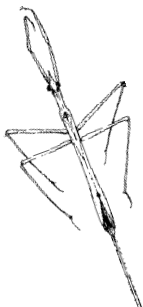


Wonderful, Wacky,



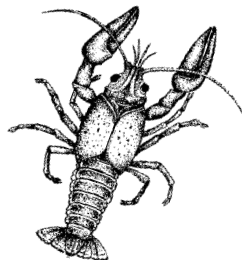
Water Critters



WONDERFUL WACKY WATER CRITTERS

HOW TO USE THIS BOOK

1. The “KEY TO MACROINVERTEBRATE LIFE IN THE RIVER” or “KEY TO LIFE IN THE POND” identification sheets will help you ‘unlock’ the name of your animal.
2. Look up the animal’s name in the index in the back of this book and turn to the appropriate page.
3. Try to find out:
 - a. What your animal eats.
 - b. What tools it has to get food.
 - c. How it is adapted to the water current or how it gets oxygen.
 - d. How it protects itself.
4. Draw your animal’s adaptations on your adaptation worksheet on the following page.



Critter Adaptation Chart

- How does it get its food?
- What is its food?
- How does it get away from enemies?
- How does it get oxygen?
- Other unique adaptations.

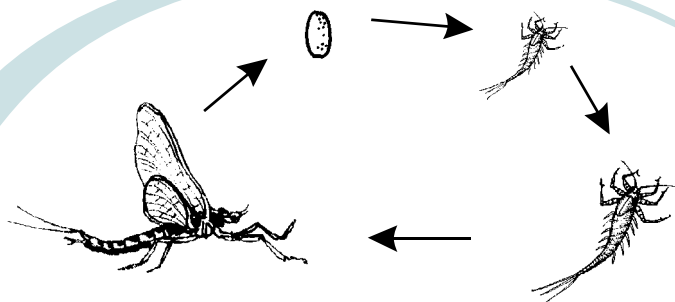
NAME OF "CRITTER" _____

Draw your critter here.



Two Common Life Cycles

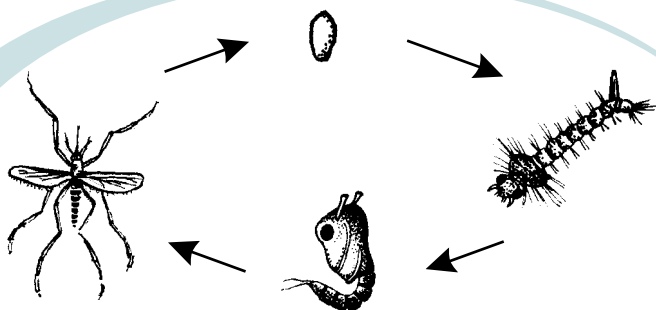
Which method of growing up does your animal have?



Without a pupal stage?

These animals grow gradually, changing only slightly as they grow up. The larvae live in water, then emerge as flying adults.

mayfly shown above



With a pupal stage?

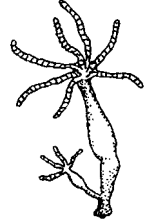
These animals go through four stages and look different in each. Beetles, flies, mosquitoes and moths grow in this way.

mosquito shown above

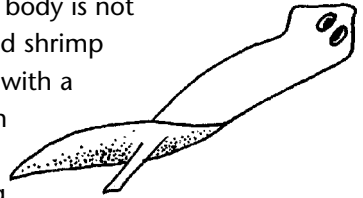
WONDERFUL WACKY WATER CRITTERS

(Note: sizes of illustrations are not proportional.)

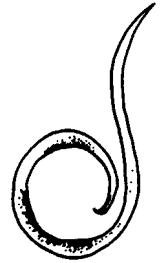
① **HYDRA:** The amazing hydra is related to the jellyfish. Living only in clean, unpolluted waters, it likes to just “hang around,” but can either move slowly on its “foot” or somersault end over end like a gymnast. Long tentacles surround an opening that is used for both eating and going to the bathroom! The hydra dines on meals of one-celled animals, water fleas, and seed or clam shrimp. It paralyzes its food by injecting poison into the prey before eating. It gets oxygen right through its skin. Its “ears” are used as both fingers to feel surroundings, and as a nose, to smell!



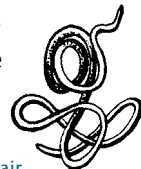
② **PLANARIA:** The planaria or flatworm looks a lot like a small flattened slug. You can tell the difference by its triangular head, two eyespots, and because its body is not segmented. It sucks up its favorite meal of seed shrimp or clam shrimp, water fleas and dead animals with a straw-like mouth. Don’t look for the mouth on its head – the mouth comes right out of the planaria’s belly. A planaria finds dead decaying animals not only a tasty meal but also a good place to crawl into and hide. It doesn’t need gills or lungs. It gets oxygen right through its skin! It is interesting that if you cut a planaria in two from head to tail, both halves will live and grow new, complete bodies.



③ **NEMATODE:** This tiny worm, also known as the threadworm or roundworm, is commonly found in bottom muck or on bottom plants throughout the world. You can tell it from other worms by its S-shaped swimming motion. Most roundworms prefer a quiet life eating tiny plants and animals, both dead and alive. Some nematodes live as parasites on clams, snails or fish. The threadworm gets oxygen right through its skin. This wiry hairlike animal finds quiet water a comforting home. Don’t confuse it with the long, tan horsehair worm.

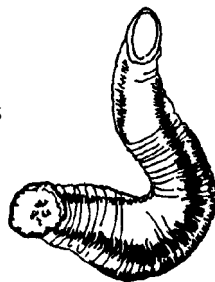


threadworm

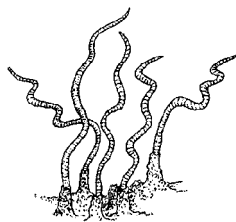


horsehair worm

- ④ **LEECH:** Can you imagine one of your friends clinging onto you, sucking your blood and increasing in weight by five times? That's what some leeches do! A leech can cling onto sticks, stones, an animal or even you by means of a suction cup. After attaching to an animal, the leech scrapes open a little hole in the skin of its host and releases an anticoagulant, which is a chemical that keeps blood from clotting. This leech's strange feeding habit puts it into a special category called a parasite. Some leeches eat a more "civilized" diet of dead plants and animal matter. The presence of a lot of leeches is a sign of mucky bottoms. The leech does not have gills or lungs. It gets oxygen through its skin. Many fishes find leeches great food – they're an important part of a pond's food web.



- ⑤ **TUBIFEX WORM:** This aquatic angeworm is right at home in mucky water. Sometimes called a sludge worm, it will even live in grossly polluted waters. It buries its head in the bottom mud, eating away while letting its tail wave in the current. Just like a land worm, an aquatic worm eats mostly dead plants. If a particularly juicy dead animal is nearby it will munch on that too, just as long as it doesn't have to travel too far. Amazingly, this worm can live where there is hardly any oxygen. It thrashes its tail wildly when this happens to help it get oxygen from the water. This worm breathes right through its skin. It is also both male and female at the same time. Thus, when two worms mate both worms are fertilized.



- ⑥ **BRISTLE WORM:** These tiny, uncommon animals can be told from midge larvae and other worms by the pairs of bristles on each segment. Like most worms the bristle worm breathes through its skin and eats dead plants. It lives quite comfortably in bottom debris and plants.



⑦ **CYCLOPS** or **COPEPOD**: The copepod is a small crustacean that looks like a swimming apostrophe mark ('). It is sometimes called a cyclops because its single eyespot reminds people of the one-eyed monster in Greek mythology. The quiet waters of ponds, lakes and rivers are its home, since faster waters would wash it away. A copepod clings onto plants and feeds on algae, bacteria and organic debris that pass its way. When a female has egg sacs on the sides of her "tail," she looks something like a teeny, tiny Mickey Mouse balloon. Copepods are part of the many microscopic plants and animals that all together are called plankton. Plankton are important links in the food chain. They eat algae and are food for insects and small fishes. Other common plankton include water fleas, seed shrimp and clam shrimp.



⑧ **SEED SHRIMP** and **CLAM SHRIMP**: These tiny, almost microscopic members of the freshwater plankton are scavengers, living on dead plants and animals. If you watch one carefully with a hand lens or microscope you can see its shell opening and closing. You might even see its legs bringing its favorite meal of dead, decaying matter into the shell. Since many insects and fish find these small animals a wonderful meal, it's a good thing there are so many of them. You might find hundreds in one teaspoon of water.



⑨ **WATER FLEA** or **DAPHNIA**: Did you ever itch to catch a water flea? The name water flea is a nickname; it is also called cladocera or daphnia. These tiny critters are part of the freshwater plankton. A daphnia swims jerkily, using branched antennae, while eating algae, microscopic animals and organic debris. Watch its legs swirl food to its mouth. Its tiny size and transparent body help it hide from hungry insects and fish. Fishhook and spiny water fleas are native to Europe. They were actually introduced to the Great Lakes in the 1980s in ballast water of ships. They are a nuisance because the sharp spines on their long tails make them difficult for small fish to eat and they tangle easily on fishing lines.



daphnia



water flea
egg mass

L. Pohlod drawing



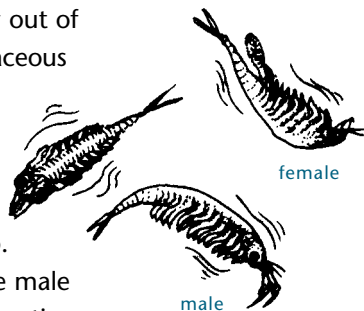
spiny
water flea



fishhook
water flea

drawings courtesy of Michigan Sea Grant

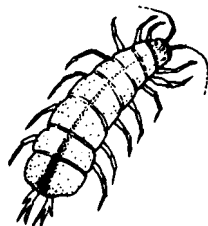
10 FAIRY SHRIMP: This graceful animal lives only in temporary ponds, never in ponds with fish. That's because it generally swims slowly and would make easy fish food. However, when it's disturbed, it can dart quickly out of the way. It still has to watch out for hungry predaceous diving beetles, young salamanders and ducks. The fairy shrimp gets its dinner of microscopic animals and bits of organic debris to its mouth by waving its gill-legs. It also swims by moving its gills in waves – looking like it's playing a harp. Check to see if you have a male or a female. The male has large mouth claspers to hold the female. Sometimes the female will have two egg sacs attached behind her gills. The eggs have to go through both drying and freezing before they can hatch!



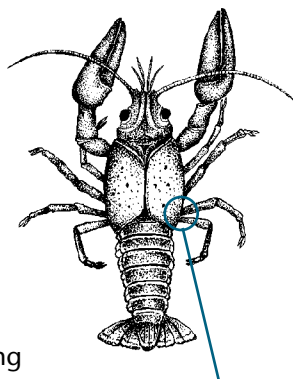
11 SCUD or AMPHIPOD: Can you tell why the scud is often called the sideswimmer? Its shape helps it cut through the river current without being washed downstream. Its shape also allows it to swim fast to get away from predators. Scuds are active mostly at night as they look for a tasty dinner of decaying plants and animals. The scud has an excellent sense of touch which helps it find food in the dark. This sideswimmer has gills for breathing. Can you find them? (Hint, look on its legs.) A young scud looks just like an adult, only smaller.



12 AQUATIC SOWBUG or ISOPOD: The isopod is a scavenger that uses its seven pairs of legs to scamper around the bottom of streams and ponds while feeding on dead plants. It breathes through gills located on its belly. The isopod's eyes are very sensitive to light; therefore, it is usually active only at night. The darkness also helps it hide from the watchful eyes of its enemies. An isopod can live in water with low oxygen, typical of water polluted with sewage or farm runoff. If you find many of these animals, what does that tell you about the quality of the water?



13 CRAYFISH: The crayfish (also known as crawfish) is one of the most interesting of the aquatic animals because of its large size and impressive pincers. These claws are important tools for catching food and for defense. Watch how it moves sideways or shoots backwards as if jet-propelled. Its periscope eyes help it hunt for food and see danger in all directions. Its gills can't be seen – they are under the hard body shell. The crayfish is an omnivore, hunting mostly at night. It prefers a meal of plants and dead animals but will catch its dinner if given a chance. In the spring look for eggs or young attached under the female's tail.



location of the spot on the rusty crayfish

If your crayfish has a rusty spot on its shell, it is an exotic. This rusty crayfish was accidentally introduced into Wisconsin. Wherever it is introduced, it causes problems. In some northern Wisconsin lakes it has eaten most of the aquatic plants, hurting the quality of the lakes. Fish that normally eat crayfish don't like the feisty, aggressive "Rusty." It takes over the homes of native crayfish and has been known to eat fish eggs. It is illegal to transport live crayfish from one waterbody to another or to use live crayfish for fishing bait.

14 FISHING SPIDER: This water spider has eight hairy legs, no wings and a body which is divided into two sections. The similar water strider (see #22) has six legs and a body with three sections. The water spider captures food by running it down. After catching it the spider bites it and injects a poison that dissolves the body. The spider then sucks out its body juices – a type of "animal slurpy."



When it takes a rare trip below water, it carries a bubble of air along like a scuba diver does. The spider's favorite foods are insects, small fish and tadpoles. Don't worry, they are too small to hurt you.

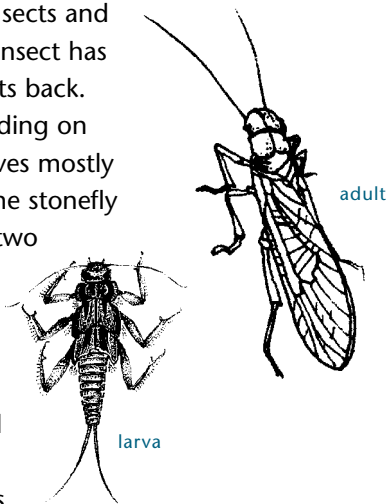
15 WATER MITE: The water mite is a round critter with eight legs and one eye. It is usually red in color, but it can be blue, green or spotted. Its small legs make it hard for it to swim. It does just fine in quiet water, but in fast water its round body makes it tumble through the current. The mite's favorite pastime is to crawl into a juicy dead animal and eat away. It also likes a dinner of tiny microscopic animals. It gets all the oxygen it needs right through its skin.



16 SPRINGTAIL: These tiny wingless critters mill around in huge numbers right on the water's surface. Although they have six legs, they are not considered insects because they have fewer than 8 body segments and other unique features insects do not have. When disturbed, the springtail will jump away quicker than your eye can follow. Under its back end it has a special trigger or spring that snaps with great force when it needs to escape an enemy. The springtail never goes into the water, preferring to live on the surface eating dead, decaying plant matter. Young springtails look just like adult springtails, only smaller.



17 STONEFLY: Stoneflies are one of the oldest insects and are a close relative to cockroaches. This large insect has transparent, brownish wings which fold over its back. The adult is a weak flyer and is often found hiding on stream bank vegetation. The young or larva lives mostly in clean, flowing water with lots of oxygen. The stonefly larva can be told from the mayfly larva by its two "tail" filaments. The stonefly larva's gills are unusual. You will find them as tufts attached to each leg. As oxygen decreases in the water, stoneflies will do "push-ups" to increase the amount of water going over their gills. A meal of algae and dead plants is relished by some stonefly larva while others feed on live animals, especially on mayfly and black fly larva. Stoneflies are one of the trout's favorite foods.



18 FISHFLY, DOBSONFLY and ALDERFLY: The young of these insects are commonly called hellgrammites (hellgrammites sold as bait are usually dragonfly larvae). Trout and other fish find them a delicacy. To avoid becoming trout food, the larvae hide under rocks and come out mostly at night. Fishflies and dobsonflies have little hooks at the end of their “tails” that help them hang onto rocks and sticks in fast-moving water. Fishfly and alderfly larvae are carnivores and sometimes cannibals, feeding on other smaller insects and each other! Don’t worry about those strange spines on their side; those are gills. But do watch out for their strong jaws. Large alderflies and dobsonflies can give a painful bite.



alderfly larva



dobsonfly larvae

19 MAYFLY: At first glance, the mayfly and damselfly larvae look similar, but the damselfly is much larger and their tails are different. Damselflies swim by moving their abdomens back and forth; mayflies move their abdomens up and down. The mayfly has rows of feathery gills along its side between the legs and its three “tails.” The mayfly is one of the most common insects found in cold-water streams. Larvae feed mostly on small plants. It is sometimes considered to be the “cow” of the stream since it grazes on algae on rocks. There are many different kinds of mayflies. How many did you find? The burrowing mayfly is unique. It has a large humped back, large front legs for digging and beautiful feathery gills. It gets its name from its habit of digging into the soft mud and silt at the edges of streams. The adult mayfly doesn’t eat anything during its short life of a few hours to a few days. As an adult, it mates, lays eggs and dies. Mayflies often swarm in huge numbers near water.



adult



flathead mayfly larvae

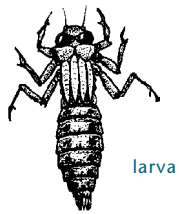


burrowing mayfly larvae

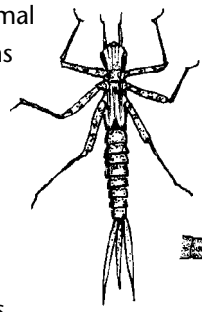
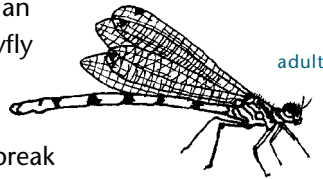


minnow mayfly larvae

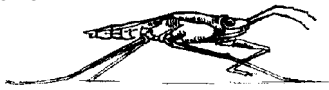
20 DRAGONFLY: It is interesting to watch a dragonfly larva catch its dinner of small insects and tadpoles. It uses a scoop-like lower lip called a labium (lay bee um) to reach out and grab its food. The larva breathes through gills located inside the tip of its abdomen. It can move as if jet-propelled with these gills. The adult is a swift, graceful insect that resembles a helicopter as it hunts for mosquitoes and other tasty, flying insects. Some adult dragonflies can eat over 100 mosquitoes a day. When it lands, it holds its wings out like an airplane. Old folk tales call them "Darning Needles," but they can't sew your mouth shut!



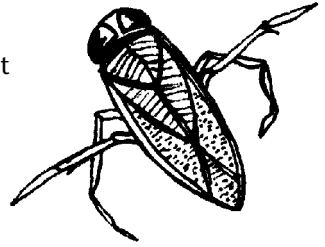
21 DAMSELFLY: The damselfly is closely related to the dragonfly. The damselfly larva is much slimmer than the dragonfly larva; in fact it looks a lot like a mayfly larva, but it is usually much larger. The larva has three platelike "tails" (which are really gills) at the tip of its abdomen. Be careful because these break off easily. The larva likes to feed on any aquatic animal it can overcome. It can be found in ponds, streams and rivers. The adult damselfly cannot fly as fast as the dragonfly, but it is more graceful. When it rests on a handy leaf, stick or rock, it folds its wings over its back. The adult feeds on flying insects and loves to be out on sunny days.



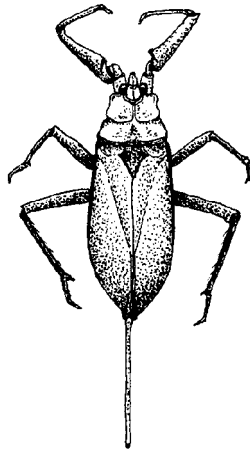
22 WATER STRIDER: The water strider is sometimes called the "Jesus Bug" because it can walk on water. Hair on the tips of its legs keeps it from breaking through the water's surface. This critter escapes its enemies by scurrying across the surface. The water strider's front legs are used for grasping its food. It is a scavenger and hunter, eating plants and insects that come up to get air. Most water striders will drown if caught under water. The marsh treader is a slimmer light brown member of the strider family.



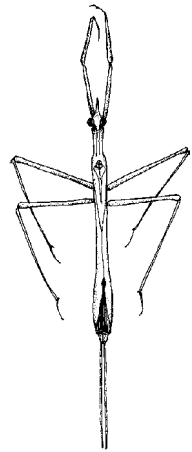
23 WATER BOATMAN: This insect's body is shaped like a boat, perfect for swimming. Its long, flattened hind legs make excellent paddles. The bug is actually dark colored, but an envelope of air used as its oxygen supply sometimes makes it appear silvery. This air also makes it hard for the insect to stay submerged. It has to grab onto plants or other objects to stay underwater. The water boatman feeds on oozy algae or dead plants and animals, which it scrapes toward its sucking beak with its front feet. The male attracts a female with a chirping sound made by rubbing his front feet against his beak and opposite leg.



24 WATER SCORPIONS: How long can you stand without moving? A water scorpion can hang upside down perfectly still for hours. When an unsuspecting tadpole, fairy shrimp, or insect comes along, the water scorpion lunges forward and grabs it with razor-sharp front legs. Its long, thin mouth is inserted into the prey, and it gradually sucks out the insides and leaves an empty shell behind. The long "tail" isn't a stinger. It is a snorkel used for breathing. Watch how the tip is held right at the water surface, allowing the water scorpion to breathe and hunt at the same time.



'Nepa'

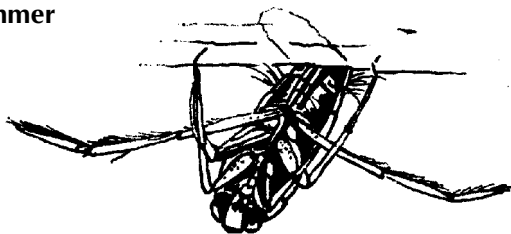


'Ranatra'

25 **GIANT WATER BUG:** This huge insect sometimes grows to be two or more inches in length. The giant water bug is a superb predator, attacking and eating animals three times larger than itself, including tadpoles, fishes, frogs, very young ducks and other insects. It uses its strong front legs to grasp its prey while its beak is used to pierce, inject a poison and suck the victim's body juices. This true bug lives among plants at the bottom of the pond. It is a strong flyer and can often be found around lights at night. It does not have gills so it must make trips to the surface to get air. It breathes through the tip of its abdomen. The giant water bug is cooked in China and is considered to be a delicacy. Hold it from behind or the giant water bug might find you a delicacy too.



26 **BACKSWIMMER:** The name of this critter describes it perfectly. The backswimmer's keel-shaped back and powerful legs help it swim after its prey of small aquatic animals and escape its enemies. Its colorful body would help it play "hide and go seek," because it is camouflaged from both directions. The white back, when seen from underneath blends into the sky; the dark bottom, when seen from the air, blends in with the color of the water. The backswimmer must return to the surface for oxygen, which it gets through the tip of its abdomen. The backswimmer's bite can hurt, so be careful. The **pygmy backswimmer** is a smaller relative.



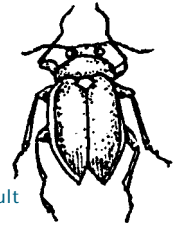
27 WATER PENNY: The water penny adult is a land-loving beetle. The young or larva stage has a streamlined body that allows it to live on rocks in very fast water, where it is protected from predators by the swift current. It looks like a suction cup, but it's alive! The slow-moving larva munches on algae that grow on the rocks. A silvery sheen on its belly is caused by air trapped in a coat of fine hairs. This is where its gills are too. The water penny can only live in streams or rivers that are clean and have lots of oxygen. The presence of water pennies indicates that the stream or river has year-round, pollution-free water.



larva
(bottom)



larva
(top)



adult

28 RIFFLE BEETLE: Guess where this small black beetle likes to live? That's right, in riffles, the part of a stream where the water flows quickly over a rocky bottom. You'll never find the riffle beetle in calm lakes or dirty rivers. It's part of the clean stream team. Amazingly, it cannot swim. Instead, it crawls through the rocks eating algae. A riffle beetle larva is small, brown, and hard. The riffle beetle adult exchanges oxygen with the water across a thin layer of air attached to its hairy underside. Larvae have gills that they stick out from a compartment on their tails and wave in the water to obtain oxygen.



adult

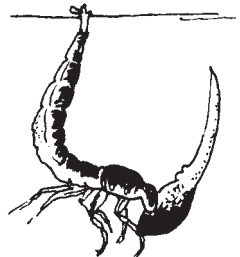


larva

29 PREDACEOUS DIVING BEETLE: This beetle is one of the most common of all aquatic beetles. The diving beetle larva is sometimes called the "water tiger" or "dragon of the pond" because of its immense appetite. It will even eat its own kind. Both the adult and the larva wait in ambush for their favorite meal of insects, leeches, snails, tadpoles and fishes. (They're not very picky!) The diving beetle has strong, sharp jaws that are used for defense and to catch prey. Its hollow jaws are like hypodermic needles. The beetle can shoot digestive enzymes into its victim, predigesting the food before sucking it up. Since the beetle does not have gills, it has to come to the surface for air.



adult

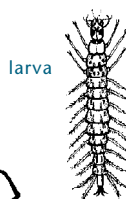


larva feeding
on tadpole

30 CRAWLING WATER BEETLE: This beetle lives among plants in shallow water. It especially likes a home made of algae, which is also its dinner. The round shape of the crawling water beetle makes it difficult for it to swim in swift water. It would be like trying to row a barrel; you would be sent spinning and bobbing downstream. (Keeping this in mind, where in the river would you look for this critter?) Can you see how it breathes? Look carefully at the tip of its abdomen and you will find a bubble of air. It carries its oxygen like a scuba diver. This animal is easily studied in an aquarium; just give it some algae to eat.



31 WHIRLIGIG BEETLE: As an adult this beetle zips in wild patterns all around the surface of quiet water. When disturbed it dives to the bottom. It also protects itself by giving off a strong smell like apple seeds. Look at its unusual eyes. It seems to have four eyes, two above the water and two below the water. It really has two eyes that are split in half. Why do you think this would be a good adaptation? This beetle is a scavenger, which means it eats dead plants and animals. Though it prefers swimming, it can fly to a new home if the old one dries up. This beetle is harmless, so don't be afraid the next time you are around it.



larva



adult



view of
"four eyes" at
water's surface

32 WATER SCAVENGER BEETLE: Unlike its "scavenger" name suggests, this beetle's larva is a predator which searches for and eats live food. The adult is an omnivore, eating both living and dead plant and animal matter. It has a special love for algae. The larva is a slow, clumsy swimmer, so it likes to lie still and wait for its prey to go by. The adult is a good swimmer. It is sometimes called the silver beetle. Hair on its body traps air, which shines silvery in the sun. It uses this layer of trapped air for breathing.



larva



adult

33 **BLACK FLY:** The black fly larva moves like an inchworm, first spinning small loops of silk with its mouth, then attaching itself to the loops with tiny hooks on its back end. It is the original Velcro®! It also uses the silk as a safety line to reel itself back if knocked off its rock. It eats whatever the river brings to it, mostly bits of dead plants. (Talk about a life of ease!) It gets its oxygen through gills located on its back end. The adult black fly has a short body with a humped back. This critter can be a real pest in the summer. Its bite is not very painful ... until later. Some black flies can only live in clean streams; other kinds are very tolerant of pollution. The female lays eggs on rocks in streams and rivers. The black fly is food for many other animals.



adult

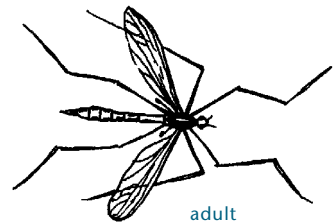


larva

34 **CRANE FLY:** The big, wormlike, crane fly larva has tentacles around its back end. It shoves the tentacles through the surface of the water for breathing. The crane fly larva is very important to life in the river. It chews on large leaves that fall from trees into the water. Since it's a sloppy eater, tiny bits of leaves float away and become dinner for many other insects. Each type of crane fly is very specific about where it lives. Some species will only live in clean, flowing waters, others in wet meadows, and others in mud flats. The adult looks like a gigantic, long-legged mosquito. But it doesn't bite – it doesn't even have a mouth. It flies slowly and awkwardly. Keep an eye out for the delicate adults the next time you're around a light at night.



larva



adult

35 MIDGE or BLOODWORM: Young midges can be found in all sorts of water; some live in hot springs at temperatures of 124°F! The larva likes to snack on tiny bits of dead plants floating in the water and tiny microscopic animals. It eats by straining its food through brushes surrounding its mouth. Some midge larvae are bright red and are called bloodworms. The chemical that makes them red helps them get oxygen when levels are low. The chemical is hemoglobin, just like in our blood. The midge larva may seem pretty tiny to us but it is an important food source for fish, even the largest fish in Wisconsin – the sturgeon. So, indirectly, that little larva may be part of your dinner some day.



adult



larva

Most adult midges are harmless even though they look like a miniature mosquito. Some, the “no-see-ums,” are nasty biters. They dance over the water in great flocks or swarm around making a humming sound. Even the non-biting midges can be annoying at certain times of the year because of their huge numbers. Swarms of midges and mayflies near Lake Winnebago and the Mississippi River can completely cover houses, bridges and roads. They can create traffic problems by making roads slippery.

36 PHANTOM MIDGE: The phantom midge larva is so clear it’s nearly invisible. What a great disguise for playing “hide and go seek!” It hunts tiny crustaceans by grabbing them with its antennae. The phantom midge breathes right through its body. The pupa of a phantom midge can swim with jerky movements. The adult looks similar to a mosquito but does not bite; it probably doesn’t eat anything in its short adult life.

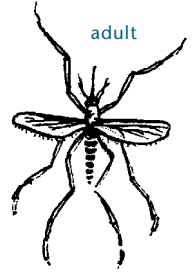


larva

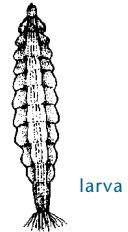


phantom midge
adult

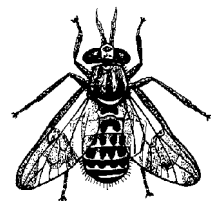
37 MOSQUITO: This interesting insect goes through four distinct stages: an egg stage which can spend the winter in dry soil and hatch when spring rains fill the puddles and small ponds; a larva stage which spends its life upside down breathing through a tube on its rear end; a pupa stage which swims but does not eat; and an adult stage that we are all too familiar with. Watch the larva move; when it is disturbed it races to the bottom of the pond. The mosquito larva eats microscopic plants, animals or organic debris with brushes surrounding its mouth. The pupal stage is called a “tumbler” and is almost all head. The adult female requires a blood meal to develop her eggs. No large animal is free from these pests. Some females make life miserable for animals such as deer, people or squirrels, while others torment frogs and turtles. The adult male lives on plant juices and flower nectar. Next time you swat at them remember, these critters are important food for fishes, frogs and birds.



38 SOLDIER FLY: It is ALIVE! The soldier fly larva may look dead but it eats, breathes, grows and moves (although rarely). Talk about the ultimate couch potato. You don't have to move much when you eat tiny plants floating right past your mouth. The tuft of bristles on its back end is where it breathes. What do you think would happen if oil was spilled on the pond? Would it cover the soldier fly's breathing disc?



39 HORSE FLY and DEER FLY: The seldom found larvae of these flies hunt for worms and snails to eat. They don't look like ferocious predators, being almost headless, legless, wormlike animals, but that doesn't seem to stop them. They're usually found in swamps, small ponds and weedy places away from big carnivores like fish. These flies breathe through a small disc on their “tails” which they push up through the water's surface into the air.



40 WATER SNIPE FLY or **ATHERIX**: This small fly larva looks like a cross between a maggot and a caterpillar. It doesn't look like it could hunt down and eat other small critters, but it does. It breathes through a small opening near its two "tails" called a spiracle. The adult snipefly feeds mostly on blood – maybe yours, but usually other animals! The presence of water snipe fly larva is a sign of clean, fast water.



larva

41 RAT-TAILED MAGGOT or **"MOUSIE"**: You might find the type of home that this larva likes very yucky. It prefers very mucky, smelly, highly polluted waterways where it munches away at the organic matter in the sediment. In fact, it can even live in manure storage pits! The larva breathes through the end of its long breathing tube. It can extend this several inches through the sediment right up to the surface of the water. The adult is one of the common 'flower flies' that mimic bees and feed on nectar and pollen.



larva



adult

42 CADDISFLY: The caddisfly lives only a short time as an adult but may spend several years as a larva. Many larvae can do something few aquatic insects can – they build their own shelter. Different kinds of caddisflies build different types of homes. Some species build homes of leaves or twigs; others use tiny stones, while others are free-living. A few types of caddisflies build a pebble house attached to a larger rock. Some caddisflies like to live in temporary stagnant ponds while other types will only live in swift streams. All caddisflies eat plants but some catch tiny bits of plants by building a net to trap food as it drifts past. The caddisflies are very important food for fish, especially trout.



adult



free-living larva



larva with houses

43 CATERPILLAR or PYRALID MOTH: A few species of moths have caterpillars or larvae that live in the water. These aquatic caterpillars look similar to land-loving caterpillars. They hide from enemies by either building a silk-lined case sandwiched between two pieces of leaves, or by weaving a thick web of silk over small pits in rocks. Aquatic caterpillars feed on a variety of plants and breathe through their skin and with gills. A young caterpillar changes into a pupa and then into a small, brownish-gray moth.



adult



caterpillar

44 SNAIL: Think how hard it would be to carry your house on your back! That's what a snail does. Each kind of snail has a unique shape or color to its shell. How many kinds did you find? There are two major types of snails. The lunged and the gilled snails. The pouch snail, one of the lunged snails, lives in ponds and pools where oxygen is low. It can be found in slow, polluted rivers too. The orb snail, also one of the lunged snails, lives in clean, quiet waters. Gilled snails have a shell "door" (operculum) which they can close. This type of snail is typically found in clean rivers. They need more oxygen than the pouch snails. The snail's shell provides protection from enemies. It also is a handy oxygen container. When a snail is seen crawling upside down on the surface of the pond it is gathering fresh air into its shell. When a snail is threatened it pulls its "foot" into its shell and is safe from most predators. A snail has both its eyes and mouth on its "foot!" Watch how it uses its eyes like periscopes as it moves along, scraping and feeding on algae. The snail is very sensitive to acid in the water which can dissolve its limey shell. Where do you think the acid might come from?



orb snail



snail upside-down underwater on the pond surface



right opening gilled snail

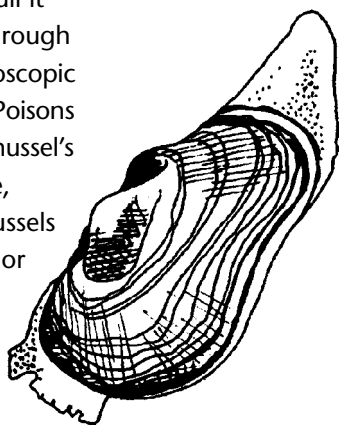


left opening pouch snail

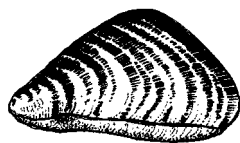
45 LIMPET: The limpet is a special type of snail. Its tiny shell is shaped like a flattened cone or tent. When a limpet is disturbed it clamps firmly to an object. It is almost impossible to remove without damage. It breathes with gills. The limpet is a harmless plant eater, so be kind the next time you see one.



46 FRESHWATER MUSSEL: How would you like to have a shell, no eyes and catch your food with your nose? No? Well, that's what a mussel does. Freshwater mussels have a hard and strong shell that helps protect them from predators such as birds, raccoons, and turtles. Between its shell halves is a tongue-shaped "foot" used to pull it along the bottom of rivers and lakes. It breathes through gills. A mussel depends on the river to bring it microscopic plants and animals, which it filters out of the water. Poisons in the water are also filtered out and stored in the mussel's body. Some mussels can be a tasty treat for people, although tough and chewy. Would you eat any mussels from areas where waste and chemicals from farms or towns wash into the water? Interestingly, old-time buttons were cut from mussel shells. One of the first important fishing industries in Wisconsin was mussel fishing to make mother-of-pearl buttons. The mussel trade is still important in Wisconsin. Small pieces of freshwater mussel shells are sent overseas where they are inserted into oysters as the 'seeds' that will become cultured pearls.



In the Mississippi River, native mussel populations have declined greatly due to harvesting, loss of habitat, and the introduction of exotic zebra mussels. The zebra mussel is fingernail-size, and has black, white and tan stripes. They usually live in clusters called "colonies." If you think you have found a zebra mussel in inland waters other than the Mississippi River, contact your local Department of Natural Resources office.

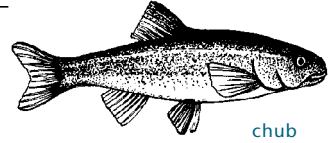
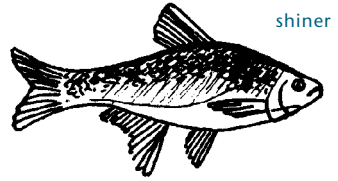


zebra mussel

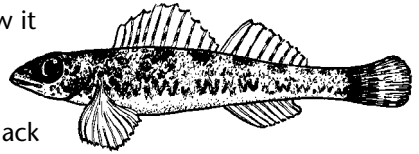
47 PILL CLAM: This pale tiny clam never gets bigger than a fingernail. It's even commonly called a fingernail clam. It likes to live on the bottom of many watery homes: ponds, brooks, rivers or lakes. Just like its bigger cousin, the pill clam filters bits of plants and organic debris out of water. All clams have two tubes on the top of the "foot." One sucks in water containing food and oxygen. The other shoots out the clam's waste.



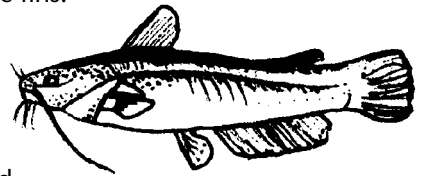
48) **SHINERS** and **CHUBS**: These small fish are common in streams and rivers. They are an important link in the food chain. A tasty meal for a shiner would consist of plankton, crustaceans and insects. It could become dinner for a giant water bug or a bass. All bodies of water – from swift, cool, trout streams, to warm, quiet lakes – are its playground. When it's time to mate, the male shiner builds a nest out of gravel. Many females will lay eggs in a single nest. The eggs are protected by the male but when they hatch, the young have to flee or the male will eat them. I'm glad he's not my father!



49) **JOHNNY DARTER**: Watch how this tiny member of the perch family moves and you can see how it got its name. The Johnny darter likes to sit quietly in one place and then zip with great speed after a dinner of small insects. Small black "W"-like markings on their sides make identifying Johnny darters easy. A male that is ready to mate will only build his nest under rocks in clear, unpolluted streams, so we must be careful to keep his home clean.

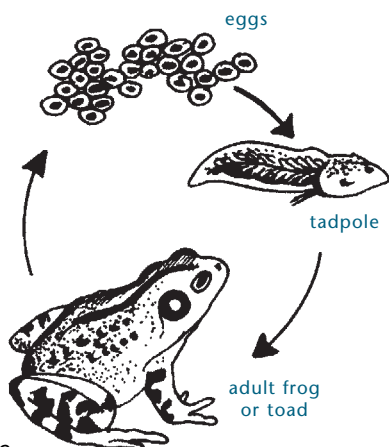


50) **BULLHEAD**: The bullhead is an interesting, smooth-skinned fish. It has a large mouth, and whiskers known as barbels. Watch how the barbels let the fish know what is nearby. The barbels, along with thousands of taste buds covering the entire body, help the fish locate food in muddy water and at night. Many people think that the barbels can sting, but that's false! The bullhead has another defense; a spine concealed in its top and side fins. The stinging sensation sometimes felt when jabbed by the spine of the "Mad Tom," (a cousin of the bullhead) is caused by an irritating chemical produced in glands at the base of the spine. The bullhead can be found

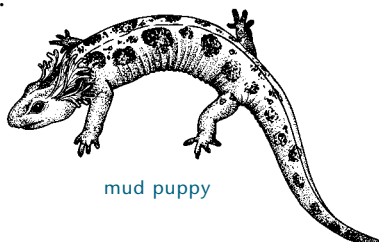
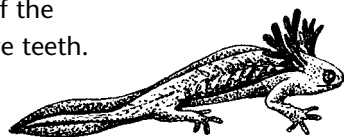


scavenging the bottom of quiet, warm waters throughout North America looking for yummy dead stuff as well as insects, fish eggs and even young fish. Being a hardy animal, it can withstand polluted waters and very low oxygen levels. It gulps air at the surface if there's no oxygen in the water. A bullhead without the head and spines makes a fine dinner if you remove the skin before cooking.

51 TADPOLE: Baby frogs or toads are called tadpoles. Many different kinds are found in Wisconsin. Some kinds turn into adults in two weeks, while others take two to three years. If you find a large tadpole in the pond it is probably a young green frog. Small black tadpoles found swimming in large groups could be called "toadpoles," as they'll turn into toads. Only the bullfrog tadpole is found in rivers; other tadpoles are not strong enough swimmers to survive the river currents. A tadpole eats only plants, especially algae, while a frog eats insects and small animals, even tadpoles.



52 SALAMANDER: A tadpole with gills? No, it's not a mutant; it's a salamander larva. In a few weeks, it will lose the gills, get flecks and spots and crawl out of the pond. Unlike frogs and tadpoles, salamanders have teeth. They're hungry carnivores so teeth help them catch their prey of fairy shrimp, mosquitoes and other insects. The adult salamander can be found under damp logs, in leaves and even deep underground where it feeds on worms and other soil invertebrates. Salamanders are active at night. Watch for them in early spring when they mate with much tail thrashing and rolling in the water. A type of salamander called the "mud puppy" is fully aquatic – it spends its entire life in the water and is occasionally caught by people fishing.



Glossary

ABDOMEN – The third or rear section of an insect where digestion, reproduction and sometimes air exchange occur.

CAMOUFLAGE – A plant or animal's ability to hide itself by appearing similar to its surroundings.

CARNIVORE – An animal that gets its energy by eating other animals.

CRUSTACEAN – Segmented animals that have an exoskeleton (or shell-like covering), two pairs of antennae and breathe by means of gills. Most are microscopic, occurring in huge numbers in lakes, streams and especially the ocean. Others are large, such as lobsters, shrimp or crayfish.

EXOTIC – A plant or animal that is not native. People have introduced many exotics into places where they are causing problems by growing virtually uncontrollably by successfully outcompeting native organisms.

FOOD WEB – The overall sharing of energy between plants and animals that produce food, are eaten by others, or receive food by eating others.

HERBIVORE – An animal that gets its energy by eating plants.

LARVA – The immature form of an insect.

INVERTEBRATE – An animal that does not have a backbone.

MICROSCOPIC – Something very small in size – so small that people need tools, such as a microscope, to make it appear larger to see it.

OMNIVORE – An animal that gets its energy by eating both plants and animals.

ORGANIC DEBRIS – Dead plants and animals usually already partially broken up.

PARASITE – An animal that lives on or in other living organisms (plants or animals) and obtains its food from them.

PLANKTON – Microscopic, or nearly so, plants and animals that float or swim in water in vast numbers.

PREY – Animals that are eaten by other animals.

VERTEBRATE – An animal with a backbone.

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