

Macroinvertebrate Identification Tip Sheet

Pollution-intolerant

Case-carrying and caseless caddisfly larva

Color: Yellow or brown, but usually green

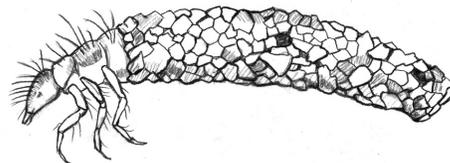
Physical Characteristics: Body shape and general appearance varies greatly from species to species. Caddisflies have a hardened head and thorax but very soft, worm-like abdomens. Caddisflies often build cases of gravel, sand and plant matter, and when collected can still be in these cases. They are often hunched over when found free of their cases. Their six legs are bunched close to their heads, and they have long, soft-tissued abdomens.

Gills: Positioning and appearance varies, but they generally have gill tufts along the underside of their abdomen

Tails: Generally none, though some caddisflies will have projections from the end of their tails that have claws, helping them grasp onto rocks and sticks

Antennae: Two small, hardly visible antennae

Cool fact: Caddisfly larvae are adapted to a wide range of habitats, and some build cases out of gravel, sand and other debris. People have been known to collect the cases of case-carrying caddisfly larvae and make jewelry out of them.



Mayfly nymph (crawling)

Color: Green, brown, gray, but usually black

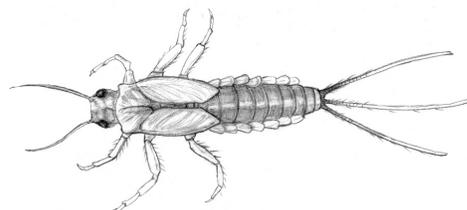
Physical Characteristics: Body shape and general appearance varies greatly from species to species, but generally mayflies have long, slender bodies with two undeveloped wing pads just behind their heads. Their abdomens are clearly segmented, and their eyes are generally spaced far apart on the sides of the head.

Gills: Gill placement varies, but are generally along the sides of the abdomen and leaf-like in appearance

Tails: Three distinct tails (cerci), though sometimes only two

Antennae: Two long antennae, one-third to two-thirds of the body's length

Cool fact: Also known as *spiny crawler mayflies*, they move by crawling along the stream substrate, using the hooks at the end of their legs to keep from being swept away in the water's current.



Stonefly nymph

Color: Brightly colored in tan, brown, gold and black

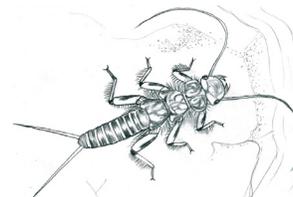
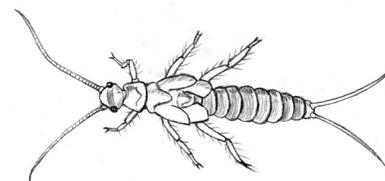
Physical Characteristics: Body size, coloration and general appearance vary greatly from species to species. Generally larger than the similar-looking mayfly nymph, the stonefly typically has three dark-colored plates covering the top of the thorax. They have long, segmented abdomens and have dual developing wing pads along the thorax.

Gills: Generally thread-like gills at the base of each leg

Tails: Two tails (cerci)

Antennae: Two long antennae ranging from one-third of its body length to a full body length

Cool fact: A specific type of stonefly nymph, the winter stonefly, pupates into an adult in the winter, meaning that the adults live and reproduce during the winter months.



Water penny larva

Color: Green, black, but usually tan or brown

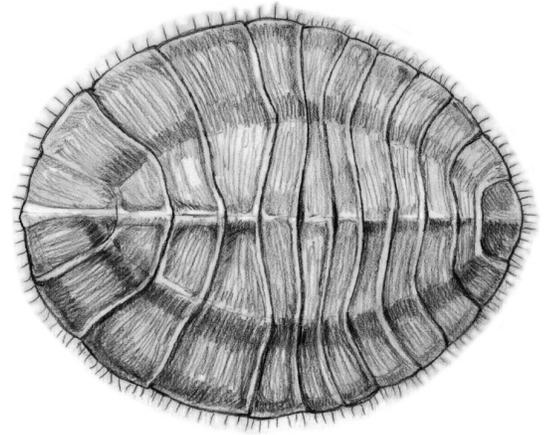
Physical Characteristics: Water pennies are beetle larvae. These small macroinvertebrates are hard to distinguish from their surroundings. They are so well camouflaged and shaped that they often appear to be part of the rock or leaf to which they are attached. True to their namesake, they are penny-like in appearance, with circular copper-colored bodies that are paper-thin. The underside is much more bug-like in appearance, with a distinct head, six legs, and a gilled abdomen.

Gills: Bush-like tufts protruding from the underside of the water penny's abdomen

Tails: None

Antennae: Two very small antennae protruding from the sides of the head

Cool fact: The flat shape of a water penny makes it very adept at living in rapidly flowing waters because it can cling so flat against rocks that the swift currents sweep over them.



Moderately Pollution-tolerant

Alderfly larva

Color: Brownish

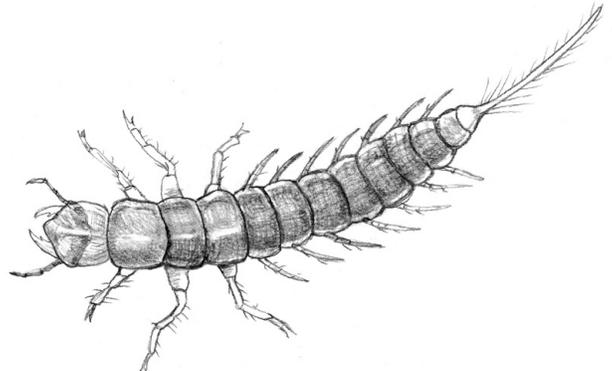
Physical Characteristics: Similar in appearance to dobsonfly larva, but smaller. Alderfly larva have huge jaws (mandibles) that protrude from the head and a long, narrow body with thick skin. Their abdomen is flanked by six to eight filaments on each side and a single tail filament extends from the alderfly's rear. Each leg has tiny pincers.

Gills: Gills are near the base of each of the abdominal filaments

Tails: Single, long tail filament with distinct hairs

Antennae: Two antennae about the length of the head and rather thick

Cool fact: Alderfly larva and dobsonfly larva are favorite baits of fishermen, who use them in rivers all across the nation to score big catches.



Blackfly larva

Color: Green, brown, gray, but usually black. Bodies are often transparent with dark insides.

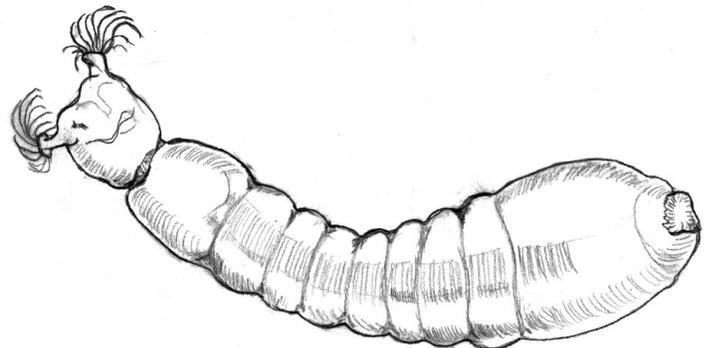
Physical Characteristics: Cylindrical in shape with a bulging rear end that has a disc used to attach the larva to rocks and other debris. Fan-shaped hairy mouthparts extend from their head.

Gills: None

Tails: None, though some have small bush-like protrusions on their rear

Antennae: Extremely small, generally not visible

Cool fact: Blackfly larvae use their fan-shaped mouthparts to filter small plant matter from the water, which they then feed on.



Crane fly larva

Color: Milky green to grayish black

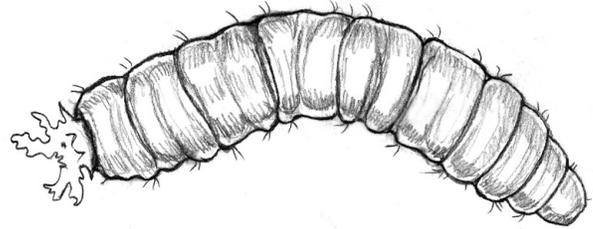
Physical Characteristics: Large, caterpillar-like larva with a distinctly segmented body and very small hairs protruding along either side. Its head, typically darker in color than the rest of the body, will often times be retracted into the body. It has four finger-like lobes protruding from the end of its body.

Gills: None

Tails: Four finger-like lobes

Antennae: None

Cool fact: Crane fly larva eat leaves that have fallen into the stream, shredding them into smaller pieces that many other aquatic macroinvertebrates then feed on.



Crayfish

Color: Brown, green, reddish or black

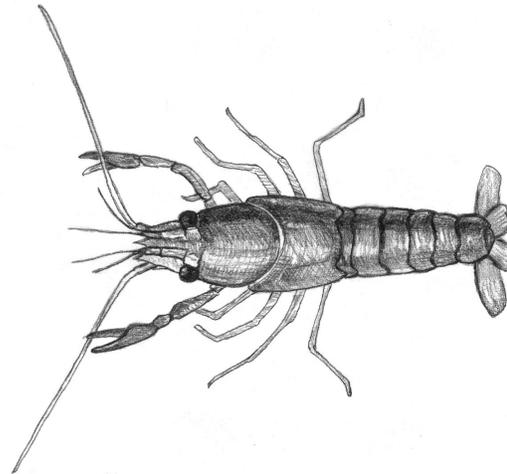
Physical Characteristics: Resemble miniature lobsters, with long bodies and two distinct body segments. The segmented abdomen ends with fan-like tail. The crayfish has eight legs that end with small pincers, and has two large claws that protrude from just behind the crayfish's head. It has a thick, hardened shell and extremely long antennae. The eyes look like beads and are on movable stalks.

Gills: Bush-like gill plumes on the underside of the crayfish

Tails: A fan-like tail with five separate segments

Antennae: Two pairs of antennae for a total of four, with one long pair being almost equal in length to the crayfish's body or longer

Cool fact: Crayfish are a major food source for not only many fish, but people too! They are a staple of Cajun cuisine.



Damselfly nymph

Color: Green, brown and black

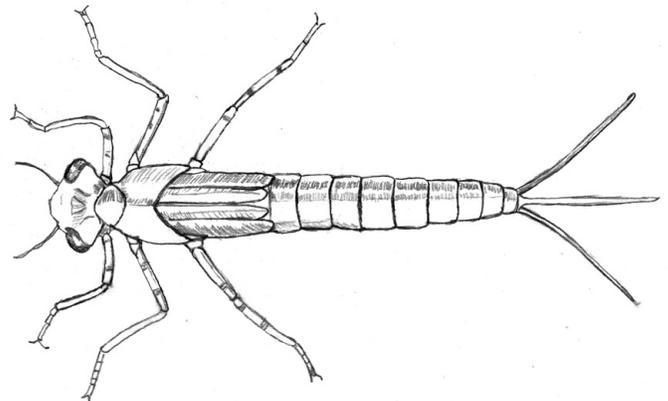
Physical Characteristics: Long, narrow abdomen with a small thorax pushing the legs very close to the damselfly's head. Elongated bodies have three large, paddle-like gills at the end of the abdomen. Large eyes are on the side of the head. All damselfly nymphs have a unique arm-like mouthpart that can extend from its lower jaw and grab prey.

Gills: Three tail-like gills extend from the end of the abdomen

Tails: None, though gills look like tails

Antennae: Short skinny antennae

Cool fact: Like the dragonfly, the damselfly's arm-like mouthpart is hinged to allow it to reach out and grab prey rapidly and from quite a distance.



Dobsonfly larva

Color: Brownish black

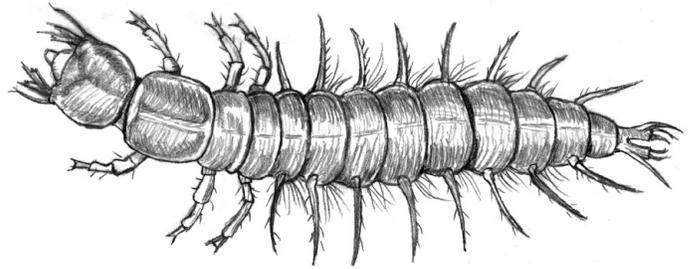
Physical Characteristics: Relative to other macroinvertebrates, the dobsonfly is enormous. It has a long, narrow body with numerous leg-like filaments extending from each of its sides. A noticeable, dark-colored plate sits right behind the dobsonfly's head. In addition, it has huge jaws (mandibles) protruding from its head.

Gills: Bush-like gills are along the underside of the dobsonfly's abdomen

Tails: Two leg-like protrusions from the end of the abdomen, each bearing two claws

Antennae: Short antennae, easily overlooked

Cool fact: The dobsonfly larva, also known as the hellgrammite because of its intimidating jaws, is notorious for a mean bite, so watch out!



Dragonfly nymph

Color: Often green but also brown and black

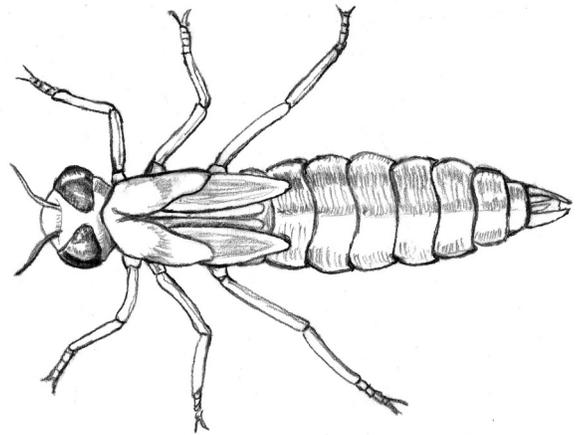
Physical Characteristics: Generally rather large macroinvertebrates with varying body shapes ranging from being rather stocky and robust, to elongate or spider-like. Legs are either along the body or close to the head on more elongated specimens. Large eyes are on the side of the head. All dragonfly nymphs (and damselfly nymphs) have a unique, arm-like mouthpart that can extend from its lower jaw and grab prey.

Gills: None, internal gills

Tails: Three short, thick, pointed structures protrude from the end of the abdomen

Antennae: Length varies, from small nubs to short chunky antennae. Antennae are generally not easily noticeable.

Cool fact: The dragonfly's arm-like mouthpart is hinged to allow it to reach out and grab prey rapidly and from quite a distance.



Freshwater clam

Color: Brown or yellowish golden, or whitish gray

Physical Characteristics: Range in size from small, fingernail-sized clams to larger, one to two inch light-colored European clams. Clams have two shells that close on one another to encase an internal, soft-tissued organism that is gray or grayish white in color. Freshwater clams will often be found buried in sand/gravel sediments or on top of such sediments. Clam shells are fan-shaped, while the soft tissue organism inside is often oval.

Gills: None. Rely on water tubes and internal gills for respiration and feeding

Tails: None. Rely on a muscular foot to move them through sediments

Antennae: None

Cool fact: Clams filter their food, sucking water in and feeding on organic debris before pushing the filtered water back out.



Freshwater mussel

Color: Dark-colored shells, often with lighter bands

Physical Characteristics: Mussels are very large (up to nine inches long), much larger than their freshwater clam cousins, and have elongated, oval-shaped shells that often have deep ridges. Mussels have two robust and often thick shells that close on one another to encase an internal soft tissue organism that is gray or grayish white in color. Freshwater mussels will often be found buried in sand/gravel sediments or on top of such sediments, though a few are adapted to more silty mucky sediments as found in river pools or ponds.

Gills: None. Rely on water tubes and internal gills for respiration and feeding

Tails: None. Rely on a muscular foot to move them through sediments

Antennae: None

Cool fact: Natural fishermen, freshwater mussels will develop worm-like or insect-like tissue that is projected into the water column. Fish, attracted to the bait, are then parasitized by the mussel's offspring that attach themselves to the fish's gills. But don't worry, the fish are not harmed in the process.



Gilled snail

Color: Brown, yellowish-brown and black

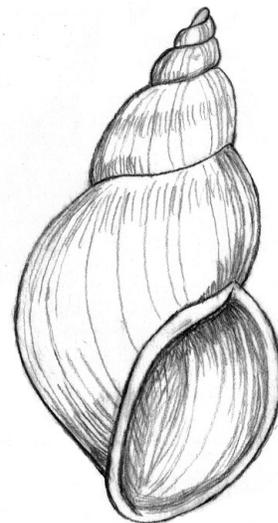
Physical Characteristics: Shell shape varies greatly, but the shell will always open to the right-hand side when the shell opening is held facing you with the pointy tip (spire) facing upward.

Gills: Not visible, internal when snail's operculum is closing the shell opening

Tails: None

Antennae: None. Two eye stalks could be mistaken for antennae

Cool fact: Gilled snails can breathe from dissolved oxygen in the water but using a gill system. This allows them to remain submerged indefinitely.



Mayfly nymph (swimming)

Color: Green, brown, gray, but usually black

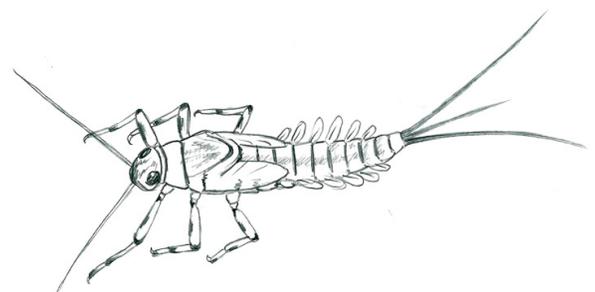
Physical Characteristics: Body shape and general appearance varies greatly from species to species, but generally mayflies have long, slender bodies with two undeveloped wing pads just behind their heads. Their abdomens are clearly segmented, and their eyes are generally spaced far apart on the sides of the head.

Gills: Gill placement varies, but are generally along the sides of the abdomen and leaf-like in appearance

Tails: Three distinct tails (cerci), though sometimes only two

Antennae: Two long antennae, one-third to two-thirds of the body's length

Cool fact: Also known as *small minnow mayflies*, they are good swimmers that move in short darts from one place to the next.



Net-spinning caddisfly larva

Color: Yellow or brown, but usually green

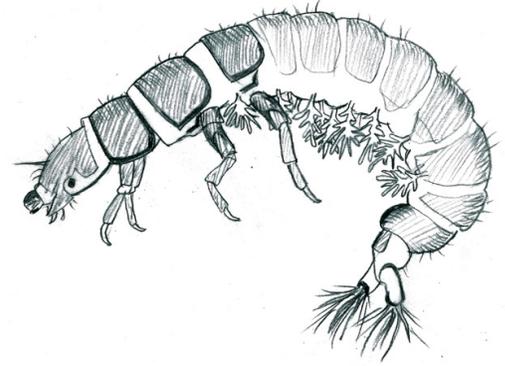
Physical Characteristics: Body shape and general appearance varies greatly from species to species. Caddisflies have a hardened head and thorax but very soft, worm-like abdomens. Net-spinning caddisfly larvae are burrowers or spin nets to collect food. They are often hunched over when found free of their cases. Their six legs are bunched close to their heads, and they have long, soft-tissued abdomens.

Gills: Positioning and appearance varies, but they generally have gill tufts along the underside of their abdomen

Tails: Generally none, though some caddisflies will have projections from the end of their tails that have claws, helping them grasp onto rocks and sticks

Antennae: Two small, hardly visible antennae

Cool fact: Net-spinning caddisfly larvae have special mouthparts that produce the silk they use to create their nets.



Riffle beetle larva

Color: Usually grayish

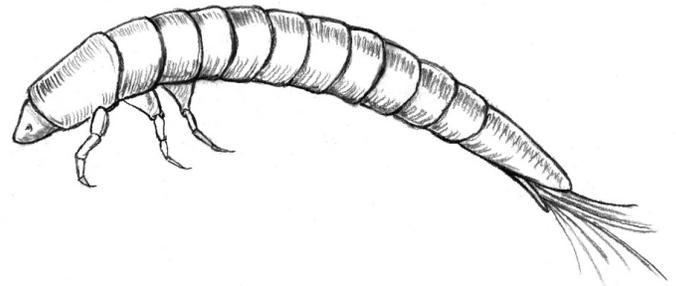
Physical Characteristics: Though caddisfly-like in appearance, riffle beetle larvae pupate into beetles, not flies. Their torpedo-like bodies have distinct rings or circles around the body's entire length. Their six legs are quite close to their small heads, and they have long, segmented abdomens. They have almost an armored appearance but, like many macroinvertebrates, are quite delicate.

Gills: Located at the end of the abdomen in an enclosed pocket, the gills are generally not visible. When visible, the gills are hair-like.

Tails: Two tiny hooks with protruding hairs, though sometimes difficult to see

Antennae: Two small thick antennae, roughly the length of their heads.

Cool fact: When riffle beetle larvae pupate, the adult riffle beetle remains aquatic, living, feeding and reproducing in the riffles of cold-water streams.



Scud

Color: Generally gray but can also be white or brown and are semitransparent

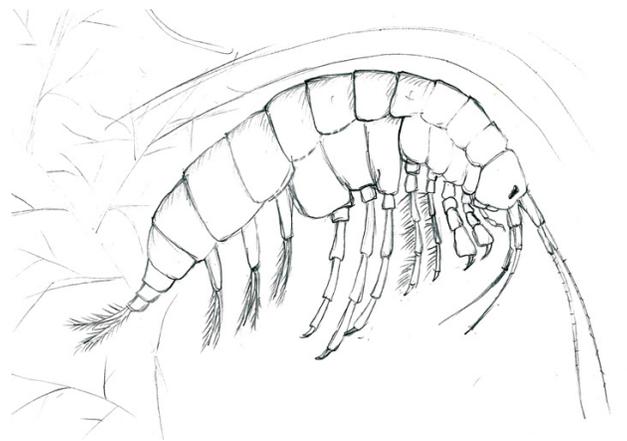
Physical Characteristics: These flea-like organisms are the hunchbacks of the aquatic world. They are very small, though can get up to one-half inch long and are very flat when observed from above. They have seven pairs of legs that generally hang straight down from their hunched bodies. Three pairs of appendages hang from the abdomen that help them swim, and the tail has a pair of leg-like appendages that help it feed when curled up. Each of the seven leg pairings and hanging appendages give rise to an individual body segment, for 11 segments in all.

Gills: Gills are along the underside between the scud's legs

Tails: Two leg-like appendages that aid with feeding

Antennae: Four, two long antennae and a pair of shorter antennae

Cool fact: A scud's color largely depends on what it eats and on its surroundings because of its semitransparent body. This chameleon-like characteristic helps scuds avoid predation.



Pollution-tolerant

Aquatic worm

Color: Clear whitish, gray, pink, reddish or brown.

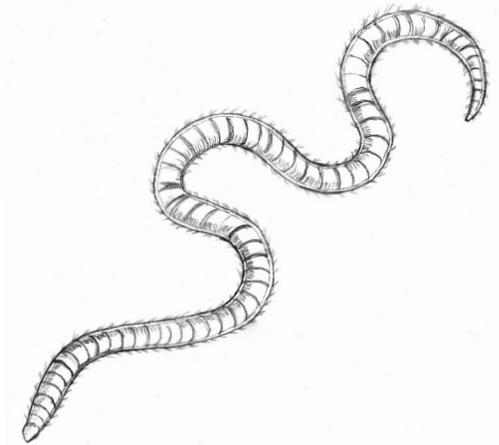
Physical Characteristics: Round or flat-segmented bodies with no clear partitioning of body parts (i.e., no head, thorax or abdomen). Body segments are often bristled or hairy, but no legs.

Gills: None

Tails: None

Antennae: None

Cool fact: They breathe through their skin and can lengthen and flatten their bodies to improve respiration.



Back-swimmer

Color: Green, brown or yellowish

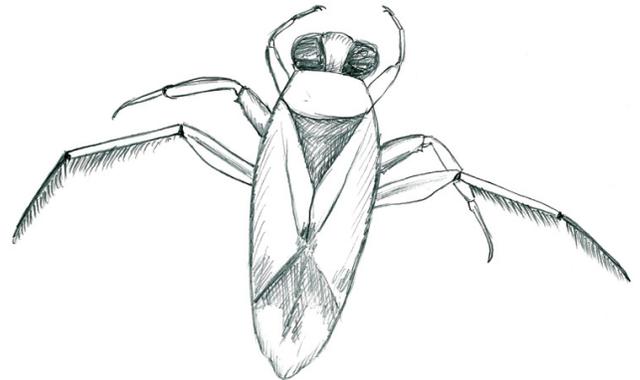
Physical Characteristics: They have long and slender streamlined bodies and have very clear dark markings on their back typically forming a distinct v-shape. Their front legs are much shorter than their relatively long back legs, which have numerous hairs to aid with swimming. Also, the back-swimmer's eyes are on the top of its head, very close together.

Gills: None

Tails: None

Antennae: None

Cool fact: They are called back-swimmers because they swim upside down through the water.



Flatworm

Color: Various colorations and distinct pigmentations, ranging from olive brown to rusty colors

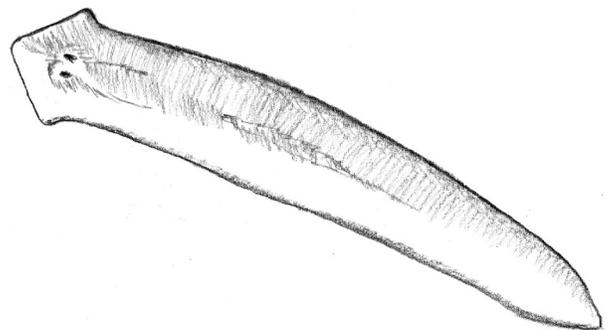
Physical Characteristics: The flatworm, true to its name, is a flat worm-like organism with a distinctly triangular head. Depending on the species, body shapes can vary widely, from an oval shape to a much more elongated one. Its eyes are typically very close to one another, centrally located on the top of the flatworm's head.

Gills: None

Tails: None

Antennae: None

Cool fact: The flatworm had a wide distribution, inhabiting both freshwater and saltwater environments all over the world, and some flatworms have adapted to be parasitic of other organisms.



Leech

Color: Green, brown, gray, but usually black. Some leeches have bright color patterns of yellow and red.

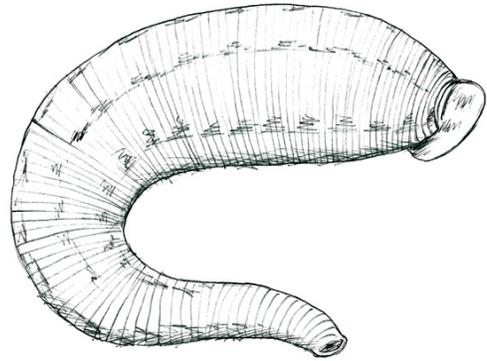
Physical Characteristics: Worm-like, but vertically flattened and typically much larger and significantly wider than aquatic worms. The body is either smooth or has ridges. Leeches have suckers on both ends used to grasp onto things and feed.

Gills: None

Tails: None

Antennae: None

Cool fact: Some leeches will attach themselves to other organisms and feed on their blood, and leeches have long been used by doctors to treat ailments.



Lunged snail

Color: Brown, gray or black

Physical Characteristics: Shell opens to the left-hand side when the point of the snail's shell (spire) is facing upward and the shell's opening is facing you. Algae often grow on the snail's shell.

Gills: None, internal lung sac

Tails: None

Antennae: None

Cool fact: The pouch snail will fill its sac-like lung with air from the water's surface, allowing it to breathe while submerged for up to several hours.



Midge Larva

Color: Color is highly variable, from gold, brown, green and tan to black or deep red.

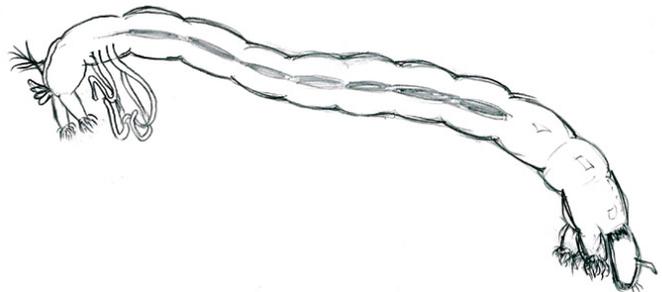
Physical Characteristics: Worm-like rounded organisms that are very small and thin with slightly curved bodies. Midges will have two small legs extending from their bodies just below their heads.

Gills: None

Tails: None, though some have leg-like or bushy appendages on their rear

Antennae: Very small, hardly visible with the naked eye

Cool fact: One type of midge has hemoglobin that absorbs oxygen for later use, making it extremely adept at living in low-oxygen conditions. Oxygenated hemoglobin makes the midge bright red in color.



Sowbug

Color: Generally gray, sometimes brownish

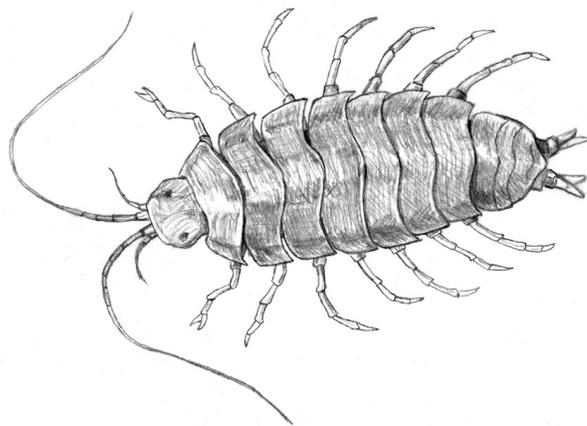
Physical Characteristics: Small organisms with seven pairs of legs that greatly resemble their land-based cousins (i.e., roly polly). Sowbugs are skinny, and their front legs have claws for grasping.

Gills: Gills are along the underside of their abdomen

Tails: Two claw-like appendages extend from the rear of sowbugs

Antennae: Four total, two long easily seen antennae, and two very short antennae

Cool fact: Sensitive to light, the sowbug is usually active only at night.



Water-boatman

Color: Green, brown or black with yellowish markings

Physical Characteristics: Elongate oval shaped bodies that are flattened vertically. Bodies are wider and more robust looking than back-swimmers, and eyes are farther apart and more forward on the head. Also, the head and abdomen appear to be joined. Like back-swimmers, their front legs are much shorter than their relatively long back legs, which have numerous hairs to aid with swimming.

Gills: None

Tails: None

Antennae: None

Cool fact: Water-boatmen swim right-side-up, making long rowing motions with their large, oar-like rear legs to propel them through the water.

