When is water not just water? When it comes from a pond! A jar full of pond water is a jar full of life. From bacteria too tiny to see, to fat tadpoles wiggling their way around their miniature world, pond water teems with plants, animals, and other living things.

A variety of life
A pond is a very rich place—rich in nutrients that living things need to thrive. Water that runs into a pond when rain falls or when snow melts carries nitrogen, phosphorus, and other nutrients. Leaves and other plant parts that fall or wash in bring even more.

You’re probably familiar with some of the things at home in a pond, such as ducks, turtles, frogs, and fish. But most pond residents are smaller—some so small you can see them only with a microscope. These critters are an important source of food for each other and for bigger living things around them.
Like all living things, those in a pond can be put into categories according to how they get the energy to stay alive.

- **Producers** combine water, carbon dioxide, and energy from the sun to make sugars to nourish themselves and, eventually, other living things. Plants and some protists and monerans are producers.

- **Primary consumers** eat producers. When you eat a carrot, you are a primary consumer.

- **Secondary consumers** eat primary consumers. When you eat a hamburger, you are a secondary consumer.

- **Decomposers** break down the remnants of other living things into molecules, which can then be used once again by other life forms.

If you’re lucky, your jar of pond water will contain members of all five kingdoms of living things:

- **animals** (such as insects and tadpoles)
- **plants** (such as duckweed)
- **fungi** (such as slime molds)
- **protists** (such as amoebas, paramecia, microscopic algae)
- **monerans** (bacteria).

Many of these creatures are too small to see, but all play an important part in the cycle of life of a pond.

Five Pond Kingdoms

When you scoop up a jar of pond water, you scoop up living things too. Some might look like see-through tubes. Some might have 10 legs. Some might look like tiny, darting dots. Some might move by wiggling a whiplike tail. A pond creature’s body parts, shape, and behavior help it survive in its watery world.

Looking at Life

To get a look at life in a pond, find a grownup who can help you stay safe around water. Then put on old shoes or boots. Take your grown-up and a bucket to the edge of a pond. Scoop up some water with the bucket. Scoop through the weeds so you can catch creatures that live there too. Take your water to a well-lit place where you can study it.

Look in your bucket. Then take a closer look. Do you see little living things moving around? Use a turkey baster to transfer the ones you want to see, along with water, into a jar. Look through the sides of the jar to see what you can see. Pour the water into a thin layer in a white plastic container or in a glass pie pan on a piece of white paper. Look down at the living things with a magnifying glass.

If you have a microscope, look at a drop under the microscope. Draw a picture of what you see.

Mary Hoff, Stillwater, is a freelance science writer and the production coordinator for the Volunteer.
Big Things

Did you catch some big things in your bucket? If you were fast and lucky, you might have tadpoles, frog eggs, snails, leeches, or even a baby fish! Here are some other things big enough to see without a magnifying glass:

Backswimmers are true bugs with big eyes and long legs that look like oars. They live just below the water surface. They eat insects, snails, and other small animals. Animals that eat backswimmers include fish, diving beetles, and water scorpions.

Duckweed is a plant with tiny, flat leaves that float and roots that hang down into the water. Duckweed captures energy from the sun to grow. It is a valuable food for fish and ducks.

Dragonfly and damselfly nymphs are the young of flying insects with big wings. Dragonfly nymphs are big and stubby.

Damselney nymphs are skinnier than dragonfly nymphs and have three leafy gills on their rear end. They eat midge larvae and water boatmen. They are eaten by fish.

Fairy shrimp, or pond shrimp, have lots of legs and big eyes. They eat algae, detritus (bits of dead things), and tiny animals. Fairy shrimp can be hard to find in ponds with fish because fish gobble them up. Fairy shrimp eggs can survive for 20 years after a pond dries up. When water returns, they hatch.

Midge larvae are long and skinny. One kind, a bloodworm, is found at the bottom of a pond. It is red. Another kind, a glassworm or phantom midge larva, is see-through and has two sets of two spots, one at the front of its body and one at the back. Midge larvae eat copepods and daphnia. They are eaten by fish.

Mosquito larvae eat detritus, bacteria, and algae. They make good food for fish and ducklings.

Diving beetle larvae, known as water tigers, hang from the water surface and gobble up small creatures that swim by. Adults eat tadpoles, fish, and insect larvae. When adult beetles dive, they carry a bubble of air to breathe.
Whirligig beetles zip around in circles on the water. Their eyes can see above and below water at the same time, as they search for other insects to eat.

Water boatmen are true bugs that use their long legs like oars to move through water. They eat algae and are eaten by water scorpions, dragonfly nymphs, and fish.

Water scavenger beetles, like diving beetles, carry air when they dive. Water scavenger beetle larvae have huge jaws and eat other animals.

Copepods are tiny crustaceans that eat bacteria, algae, and detritus. Some copepods eat mosquito larvae. They are important food for fish. One kind of copepod is called a cyclops. Like the Greek mythological creature of the same name, the cyclops has one eye.

Scuds are crustaceans—relatives of crabs and shrimp. They have 14 legs and eat detritus. Fish, frogs, and birds eat scuds.

These creatures are tinier than the ones you met on the previous pages. If you can see them at all, they might look like specks in the water.

Daphnia belong to the group of crustaceans known as water fleas. Each daphnia has an eye, a pointy head, and two antennae that help it move about in jerky strides. Its 10 legs push detritus, algae, and tiny animals toward its mouth. Daphnia are good food for small fish.

Amoebas are protists, one-celled organisms. They live at the bottom of a pond. The name amoeba comes from the Greek word amoibe, which means “change.” This blobby creature can readily change shape. It eats by stretching its body around its food—bacteria, algae, and other tiny creatures.
If you use a microscope, you might be able to find some pond things that are too small to see otherwise.

Paramecia are oval-shaped protists covered with hairs, called cilia, that propel them through water. Cilia also help the paramecium push food toward its mouthlike indentation. Many paramecia form partnerships with algae, which capture energy from the sun to help them stay alive.

Bacteria are extremely tiny creatures. Many decompose dead plants, animals, and other living things, releasing nutrients that can then be used again by other life forms. Bacteria are food for mussels, daphnia, and other small creatures. A single drop of pond water can hold millions of bacteria.

When you see a desmid, you might think you're seeing double. It has two parts that are mirror images of each other. Desmids come in different shapes. Sometimes they live in colonies.

Dinoflagellates are named after their long tails, called flagella. When they wiggle their flagella they move through the water, slowly rotating. Most of the time dinoflagellates reproduce by splitting into two. They are eaten by crustaceans and other animals.

One-celled diatoms are brownish and shaped like tiny covered boxes. Their shells contain silica, a hard mineral. Most diatoms photosynthesize. That makes them an important source of energy for the pond ecosystem.

Water mites look like swimming orange or red dots. Under a microscope you can see eight legs on their fat bodies. Like their spider relatives, they eat other tiny animals.

Desmids, diatoms, dinoflagellates, euglenoids, and volvox all belong to a group called microscopic algae. They are members of the protist kingdom. Most produce food for themselves, as plants do, from sunlight, carbon dioxide, and water.
Euglenoids have a red eyespot that helps them sense light. These one-celled creatures move with the help of flagella. Some euglenoids photosynthesize. Others eat food, as animals do. Some can obtain energy both ways.

Web sites
Would you like to learn more about pond life in Minnesota and around the world? Check out these web sites:

www.dnr.state.wi.us/org/caer/ce/eek/critter/watercritter/critterindex.htm
www.nalms.org/educate/pondgame/plgame.htm
www.microscopy-uk.org.uk/pond

Volvox are photosynthetic protists. A colony forms what looks like a spherical, multicelled creature. The colony moves as its members beat their flagella.

Riddle
What do you get when your puppy helps you with your pond study?
To answer the riddle, use the clues to fill in the blanks with the name of the correct pond creature. Then read the letters in the squares from top to bottom to answer the riddle:

1. DESMID
I have two parts that are mirror images of each other.

2. ___________
I use my legs like oars to swim through the water.

3. ___________
My larvae have huge jaws.

4. ___________
I get my name because I travel in circles.

5. ___________
I have three leafy gills on one end.

6. ___________
I have flat leaves that help me float.

7. ___________
My name comes from the Greek word for change.

8. ___________
Bloodworms and glassworms are two types of these.

9. ___________
We are named after our long tails, called flagella.

10. ___________
My eggs can survive for 20 years.

Euglenoids have a red eyespot that helps them sense light. These one-celled creatures move with the help of flagella. Some euglenoids photosynthesize. Others eat food, as animals do. Some can obtain energy both ways.

Volvox are photosynthetic protists. A colony forms what looks like a spherical, multicelled creature. The colony moves as its members beat their flagella.

Would you like to learn more about pond life in Minnesota and around the world? Check out these web sites:

www.dnr.state.wi.us/org/caer/ce/eek/critter/watercritter/critterindex.htm
www.nalms.org/educate/pondgame/plgame.htm
www.microscopy-uk.org.uk/pond