Go caving and get up-close-and-personal with these unique environments. Follow these guidelines to stay safe:

- Take an adult with you and let others know where you are going.
- Survey the area for potential hazards such as flooding and unstable rocks.
- Dress warmly and in layers. Caves are not only colder than the outside air, they are also damp or even wet. Stay comfortable and wear waterproof outside layers.
- Be sure to have sturdy footwear with good soles. Caves can be muddy and slippery.
- You should have at least three light sources. Small flashlights that strap to your head will allow your hands to be free to grip and feel your way around the cave. Having at least two back-up light sources ensures that you will be able to find your way out.
- A helmet with a chin strap may come in handy when there are tight places to crawl through or jagged rocks.
- If you will be crawling extensively, knee and elbow pads are a must.

Caving can be fun and exciting if the proper safety precautions are taken.

There are many caving groups across Ontario that can take you on caving expeditions. Contact your local naturalist group to find out about exciting caving opportunities in your area.

Here are a few places that you might want to visit in Ontario:

- **The Bonnechere Caves**, located in Bonnechere River Provincial Park, near Pembroke, have extensive fossils on the ceilings and walls, beautiful stalactites and a fantastic underground river system.
- **Collingwood Scenic Caves** are only a short distance from Toronto.
- **Bruce's Caves Conservation Area** is located just outside of the town of Wiarton. These caves were formed thousands of years ago by the erosional power of ancient Lake Algonquin.
- **Duncan Crevice Caves** are located near Wasaga Beach.
- Explore crevice and sea caves on **Flowerpot Island** near Tobermory at the tip of the Bruce Peninsula.
- **Bat Cave** is located just a short distance from Thunder Bay. As its name suggests, the cave is home to at least four species of bat including the rare Keen's long-eared bat and the red bat. Be especially careful not to disturb the bats as this is an important roosting and hibernation site.

A Cavernous Crossword

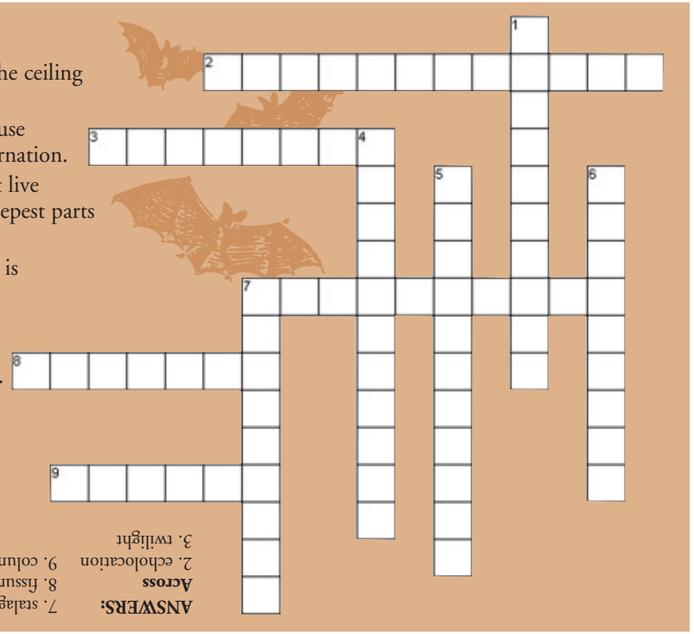
Complete the following crossword puzzle using words that are found in this Nature Note.

Across

2. Bat's specialized sense.
3. Area where some light still enters the cave.
7. Grows from the ground of a cave.
8. Cave formed by splitting of rock.
9. Formation from joining of stalactites and stalagmites.

Down

1. Grows from the ceiling of a cave.
4. Animals that use caves for hibernation.
5. Creatures that live only in the deepest parts of caves.
6. Soft rock that is dissolved by rainwater.
7. Person who explores caves.



ANSWERS:
Across
2. echolocation
3. twilight
7. stalagmite
8. fissure
9. column

Down
1. stalactite
4. troglobites
5. troglobites
6. limestone
7. spelunker

Reviewer: Adrian O'Driscoll, Metro Toronto and Region Conservation Authority; *Editor:* Victoria Foote; *Printing:* MPH Graphics Inc.

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Supplement to ON NATURE, Spring 2004

little brown bats

Q: Where can you find blind fish and animals that see with their ears?
A: In caves: an underground wilderness

Written by Kerry Everitt
Design and illustrations by Judie Shore

Caves are natural underground caverns or openings that are large enough for animals or people to enter. The largest caves in the world stretch for over 100 kilometres underground, but caves in Ontario are much smaller. There are over 400 caves in this province, but most are quite small. Only a few have even one kilometre of passable area.

Many people like to explore the unique ecosystem that is found under the ground. These people are called cavers or spelunkers. Cavers enjoy the physical challenge of hiking through caves and are interested in the flora and fauna that can be found living in and around these unique geological features.

To understand caves, let's start at the beginning....

Rocks are made from a mixture of minerals. The earth is made up of many different types of rock that are found in layers. The outer layer, the layer on which we walk, dig in the sand and live, is called the crust. The crust generally varies in thickness from five to 100 kilometres. Under the crust is a layer called the mantle. Here the rocks are hot but not fully melted. The mantle is the thickest layer in the earth — nearly 3 000 kilometres thick! Within the mantle is the core. The core is divided into two sections: the outer core and the inner core. The outer core is so hot that the rocks are actually liquid! The inner core is solid and is believed to be made up of iron and nickel.

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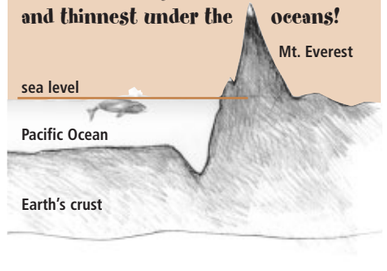
Check it out! Do this experiment to visualize the layers of the earth.

Hard boil an egg. Think of the shell as the crust of the earth. It is thin compared to the other layers and is a little bumpy — think of those bumps on a larger scale as mountains and hills. Now peel the egg and carefully cut it in half from end to end. Look at the layers. The white part of the egg represents the mantle. It is the thickest layer and, if the egg isn't too overdone, will be slightly liquid. The yolk represents the two layers of the core. The greyish part of the yolk represents the outer core and the hard yellow ball of yolk represents the solid inner core.

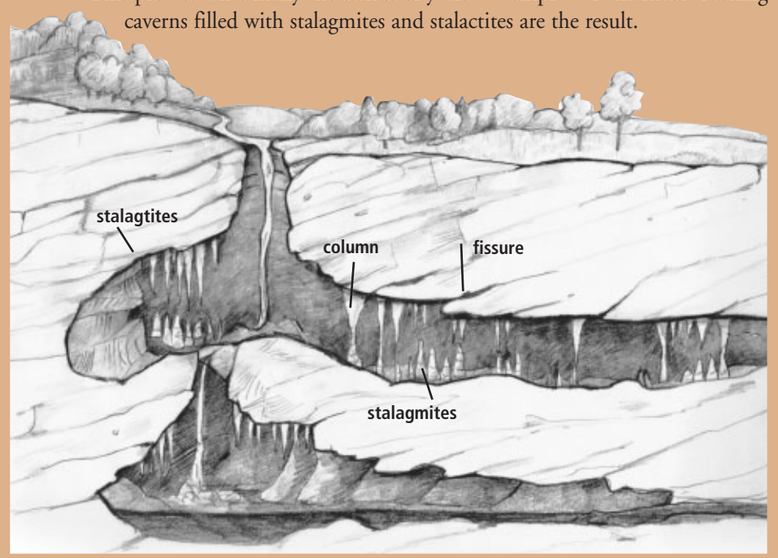
Did you know, the earth's crust is the thickest where you find mountains and thinnest under the oceans!



How are caves formed?

Some caves are formed through the continual heating and cooling of the earth's surface. During the time of the last ice age (about 15,000 years ago), nearly the entire continent of North America was covered by up to a kilometre of ice. Just as the ice and frost cause potholes in our highways after a cold winter, glaciers caused stress cracks and holes to form in the rock. The results are what are known as fissure or crevice caves. Most of these caves look like cracks in the ground; some are very shallow and small while others are extensive.

Limestone caves, the most spectacular of all caves, are formed when acidic rainwater dissolves calcium carbonate (also known as lime) and other soft minerals out of rock. This process takes many thousands of years to complete. Remarkable looking caverns filled with stalagmites and stalactites are the result.



Stalactites are rock formations that "grow" from the ceiling of caves. Rainwater that drips from the roof of the cave contains dissolved minerals that are deposited as the water evaporates. Stalactites grow downwards from the ceiling by only a millimetre or two each year. If left undisturbed, they can grow to be many metres long – a process that takes many hundreds or even thousands of years!

Stalagmites are formed on the ground or floor of the cave where dripping rainwater lands. This water contains dissolved minerals that are left behind when the water evaporates. Many stalagmites grow directly under a stalactite. Stalactites and stalagmites can grow until they meet and form what is known as a column or pillar.

Did you know...In areas where there is a dry and wet season, the stalactites can show annual growth rings just like in a tree!

Here's a good trick to help you distinguish stalactites from stalagmites. "Stalactites" and "ceiling" both contain the letter c. "Stalagmites" and "ground" both contain the letter g. These amazing rock formations take hundreds or even thousands of years to form. Leave them for others to enjoy and do not break them off as souvenirs.

Cave Critters

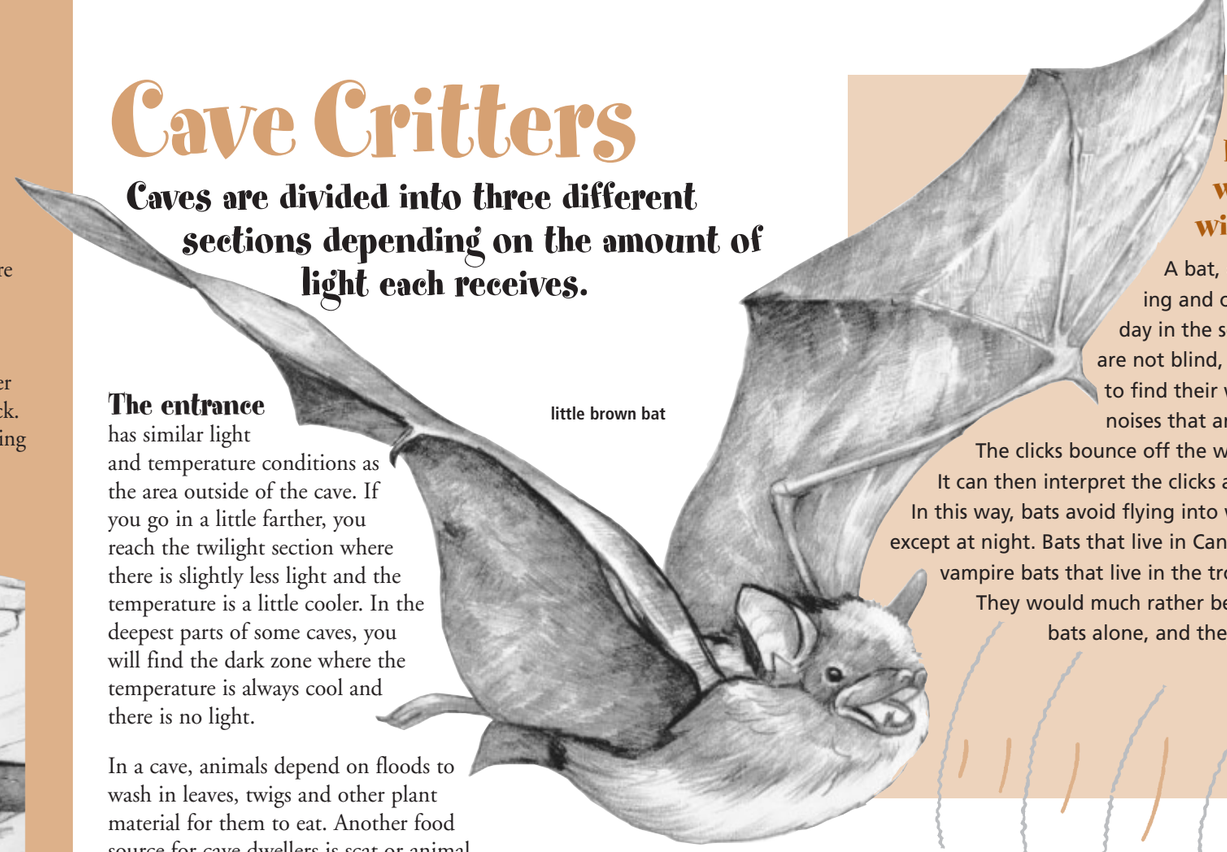
Caves are divided into three different sections depending on the amount of light each receives.

The entrance has similar light and temperature conditions as the area outside of the cave. If you go in a little farther, you reach the twilight section where there is slightly less light and the temperature is a little cooler. In the deepest parts of some caves, you will find the dark zone where the temperature is always cool and there is no light.

In a cave, animals depend on floods to wash in leaves, twigs and other plant material for them to eat. Another food source for cave dwellers is scat or animal droppings. A colony of bats will generate a large amount of waste, known as guano, which is a source of nutrients for bacteria and fungus. Beetles and other insects will feed on the fungus, and salamanders, in turn, will eat the beetles. Larger cave animals will also contribute to the nutrient-rich droppings and ensure that the food chain continues.

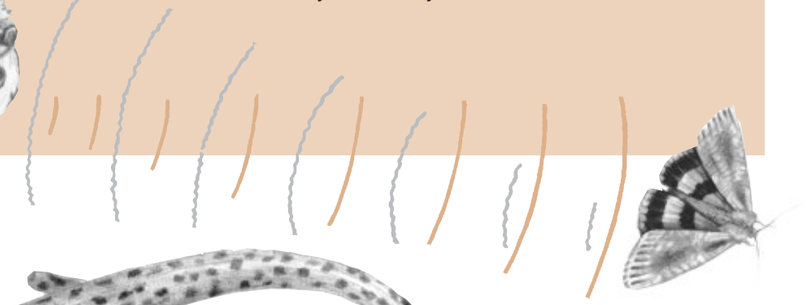
Wildlife can be found in all sections of caves. Some just go into the entrance as shelter from the rain and snow. Others venture a little farther inside to hibernate but leave again in the spring. Still other unique creatures remain year-round within the deepest and darkest areas of the cave.

Creatures that use the caves for only a short period of time are called **trogloxenes**. Although bats are likely the most common trogloxenes, bears, skunks, raccoons, porcupines, pickerel frogs and moths also use the entrance and twilight regions of the cave, mainly during the coldest parts of the year.

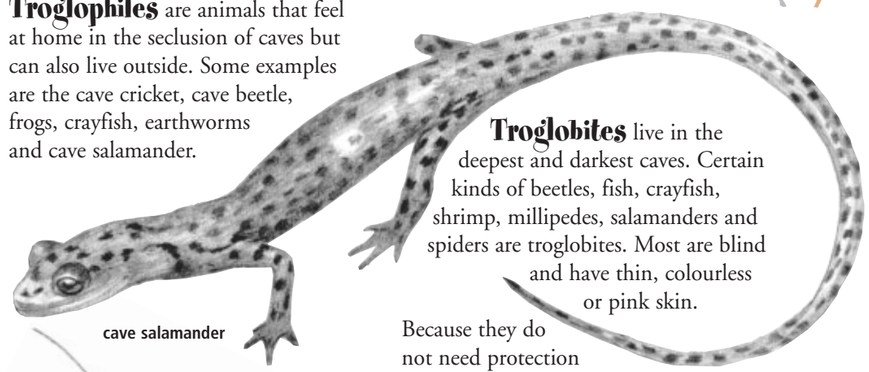

little brown bat

What mammal sleeps while hanging upside down, can fly with its hands and can "see" with its ears?

A bat, of course! Bats hang upside down when resting and can often be found sleeping away the bright day in the seclusion of a warm, dark cave. Although bats are not blind, they have poor eyesight and use echolocation to find their way around. Bats make a series of clicking noises that are used to navigate through the darkness. The clicks bounce off the walls of the cave and back to the bat's ears. It can then interpret the clicks and transform them into images in its head. In this way, bats avoid flying into walls or other objects. Bats rarely come out except at night. Bats that live in Canada never suck blood — only vampire bats that live in the tropics do that. Nor will bats fly into your hair. They would much rather be left alone to sleep away the day. Leave the bats alone, and they will leave you alone, too.



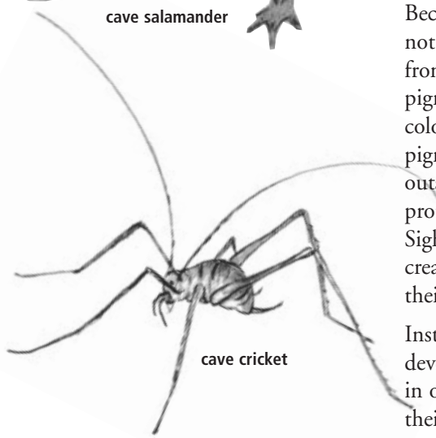
Troglophiles are animals that feel at home in the seclusion of caves but can also live outside. Some examples are the cave cricket, cave beetle, frogs, crayfish, earthworms and cave salamander.

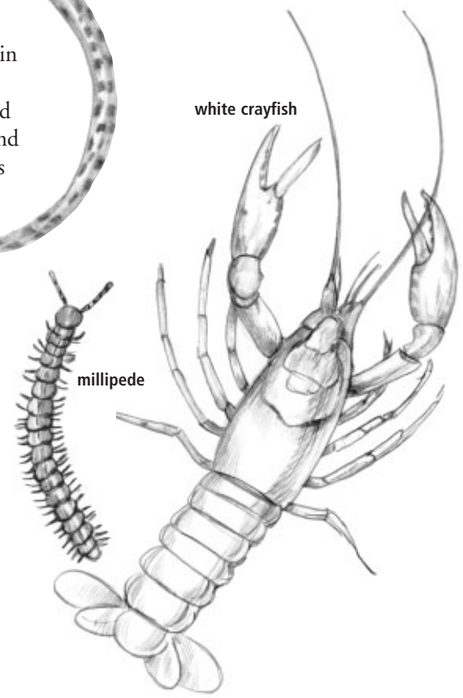

cave salamander

Troglobites live in the deepest and darkest caves. Certain kinds of beetles, fish, crayfish, shrimp, millipedes, salamanders and spiders are troglobites. Most are blind and have thin, colourless or pink skin.

Because they do not need protection from the sun, they do not have any pigment (pigment gives your skin its colour). Because of their lack of pigmentation, troglobites cannot live outside of caves, as they have no protection from the strong sun. Sight is also unimportant to these creatures as there is no light in their habitat.

Instead, they use their highly developed sense of smell and touch in order to hunt for food and find their way around in the dark.


cave cricket


white crayfish

millipede