Black and Yellow garden spider

"Will you walk into my parlour?," said the spider to the fly.*

A Generalized Spider

cephalothorax - *contains brain, eyes, mouth, poison glands and stomach*

all spiders have eight **eyes**

fangs - *contain the opening of the ducts from the poison glands*

pedipalps - *used as feelers, to hold down prey, and by males during mating*

abdomen - *contains heart, digestive tract, reproductive organs, respiratory organs and silk glands*

chelicerae - *pincer-type jaws*

claws

all spiders have eight **legs**

spinnerets - *silk is spun from here*

It's too bad that Little Miss Muffet was so anxious to leave her tuffet. Had she stayed around a little longer, she may have been pleasantly surprised by the fascinating skills of the visiting spider. Unfortunately, too many people share Miss Muffet's fear of spiders and miss the frequent opportunities to watch these intriguing creatures. Learning more about spiders is one way to overcome your fear and help you appreciate the special role they play in nature.

Spiders belong to a large group of animals known as arthropods which are characterized by having jointed legs and a hard outer skeleton. In addition, spiders are members of a more specialized class known as the **arachnids.** An arachnid typically has eight legs, two body regions (cephalothorax and abdomen), no wings and no antennae. From this description you can tell that arachnids, and therefore spiders, are built quite differently from insects. Insects have six legs, three body regions (head, thorax and abdomen), antennae and, often wings. Look at the illustration of a generalized spider on this page and note the different body parts.

Although a few spiders, such as the black widow, are poisonous to people, they rarely bite. All spiders, however, are capable of injecting venom into their prey or enemy using fangs at the tips of their chelicerae. The venom serves to paralyze the victim, usually an insect, to prepare it for *"dinner"*. Instead of eating the prey's tissues, the spider drinks the body fluids for nutrition. Spiders are the highest carnivore in the invertebrate food chain, playing an important role in moderating insect populations. In turn, spiders are food for other spiders, some insects and birds.

Spiders start life as tiny eggs, usually wrapped in an egg case

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*From **The Spider and the Fly** by Mary Howitt, 1844

Spiders, cont'd from pg. 1

made of silk. Many species spend their first winter as eggs and when spring arrives, hundreds of tiny spiderlings emerge. Just as you have to keep buying larger clothes as you grow to maturity, spiders must shed their outer skeleton (exoskeleton) four to twelve times before adulthood, to allow for their body expansion. Most spiders live one or two years, however some species may live as long as twenty years.

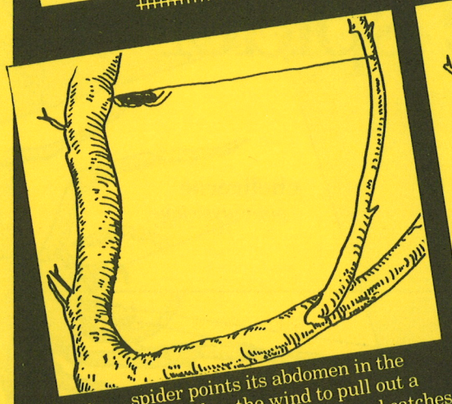
Although the most acclaimed achievement of spiders is their ability to spin webs, not all spiders exhibit this behaviour. There are basically two categories of spiders: the wanderers and the web builders. The simple chart below points out the different physical adaptations which cause these two groups to function differently. Examples of wandering species include the crab spider and the fishing spider. The crab spider, named for its crab-like appearance, hunts by lying hidden on the head of a flower. With its amazing ability to adjust its colouring to the colour of the flower, it is not surprising that visiting flies, moths and bees do not see the tiny spider until it is too late and they have been grabbed by its curved front legs. The fishing spider, like some aquatic insects, can walk on the surface of the water enabling it to hunt along banks and among aquatic vegetation. It is even capable of capturing insects and tiny fish from just below the water's surface, just like someone fishing.

Ontario's great diversity of habitats provides food and shelter for many hundreds of spider species. Some of the most common ones include the black and yellow garden spider, crab spider, fishing spider, dock spider, jumping spider, wolf spider and funnel-web spider. You can look for these fascinating creatures in gardens, fields, woods, near water, under stones, logs or bark, and even in the corners and crevices of buildings. If you are lucky, you may witness the artist weaving its web or view the masterful hunt of a wandering spider. The next time you come across one of these eight-legged wonders, don't follow Miss Muffet's cue — stick around and watch as it practices its skills of survival.

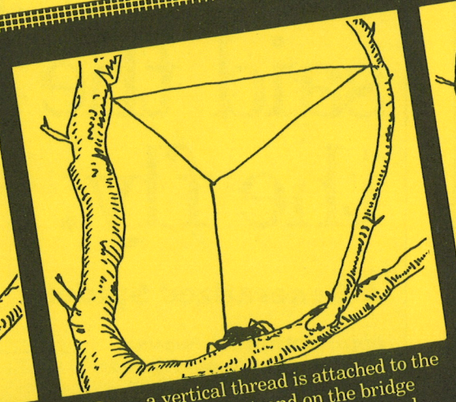
Spinning A Web

Different spiders spin different webs and it is possible to identify most species by the shape of the web. Webs include cobwebs, sheet webs, funnel webs and orb webs. The orb is the most common and the one we have chosen to illustrate.

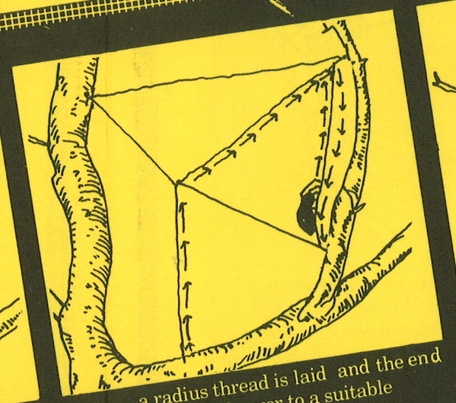
The silk used in web building comes from the spinnerets in liquid form and immediately hardens. Web silk is an amazing material. It is able to stretch as much as one quarter of its length before breaking and is said to be stronger than steel wire of the same size. Orb weavers construct their webs in a definite pattern, as illustrated, and may eat and rebuild their webs every few nights. Although the structures are not perfect, they are highly efficient at trapping insects.



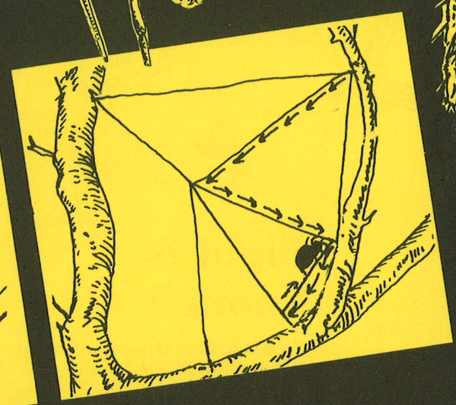
1 spider points its abdomen in the air to allow the wind to pull out a silk thread. When the thread catches on a distant object, it is used as a bridge **and reinforced** by repeatedly laying down more silk across it.



2 a vertical thread is attached to the centre of a strand on the bridge and is pulled down and secured below. The 3-way intersection, thus created, will become the centre of the web.



3 a radius thread is laid and the end is carried over to a suitable fastening spot. This is repeated several times to create the frame of the web.



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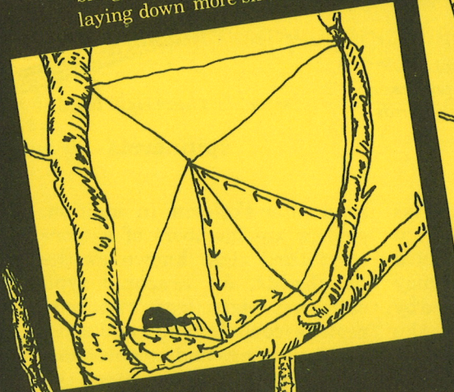

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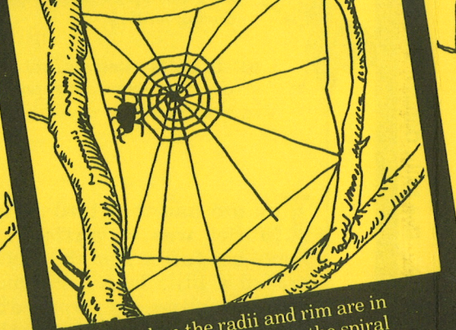
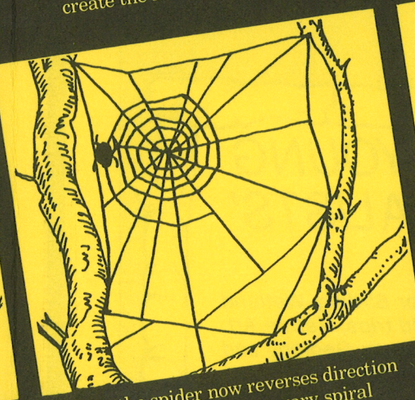
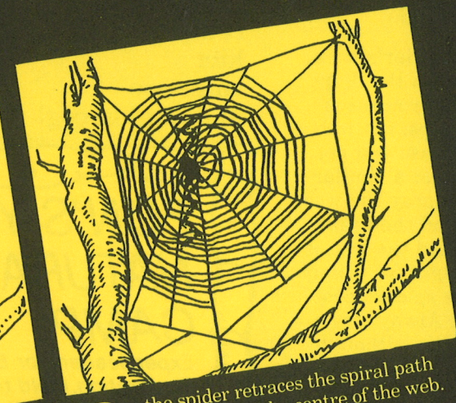


6 when the radii and rim are in place, spider begins the spiral threads. A temporary spiral is laid down first.



7 the spider now reverses direction and eats the temporary spiral while laying down more, closely space spirals complete with sticky droplets.



8 the spider retraces the spiral path right back to the centre of the web. The black and yellow garden spider adds a characteristic **zigzag** band across the centre.

Fishing spider

Wolf spider

	Wanderers	Web builders
Eyes:	• 2 large front eyes and 6 smaller eyes • good eyesight enables them to watch for predators and prey	• 8 tiny eyes • poor eyesight; they use their sense of touch, by feeling vibrations on their web, to locate prey
Jaws:	• large and powerful jaws are needed to grab and hold prey	• smaller and weaker jaws since the web helps to hold prey
Legs:	• hair on their legs (and bodies) acts as sensors to help feel the way along the ground and find prey	• long, skinny legs allow better balance and quick, agile movements on the web
Feet:	• have 2 claws separated by a hairy pad to help grip on slippery surfaces	• 3 claws • the middle claw hooks over the silken threads of the web

Garden spider

Jumping spider

Many Uses of Silk

Spiders have 3 or 4 pairs of spinnerets which are capable of producing different kinds of silk to serve different purposes. In addition to webs, silk is used for egg cases, climbing ropes (drag lines), tying up prey, lining burrows, making tunnels and for ballooning (see Up, Up and Away).

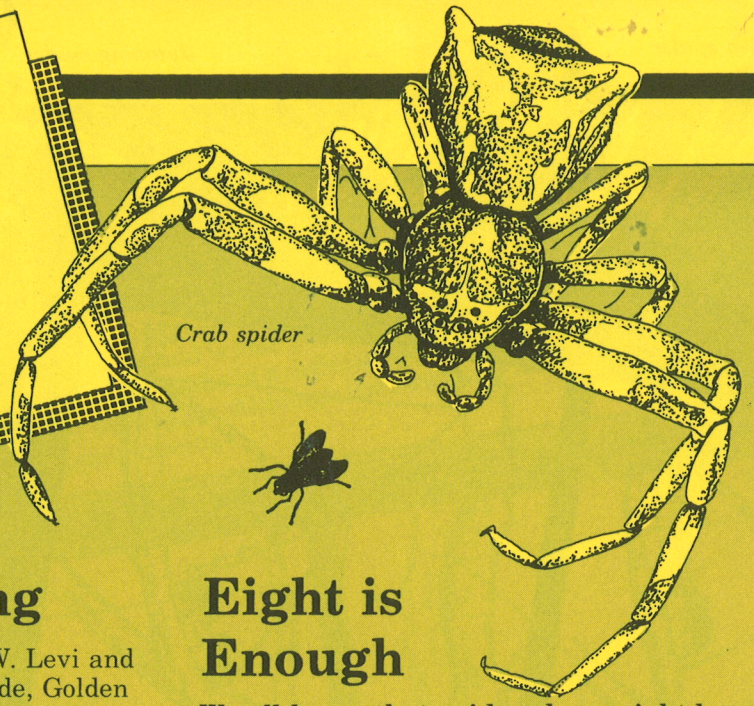
Up, Up and Away

In order to spread out and inhabit new territories, the spiderlings of various species partake in ballooning. Young spiders climb to "high" places, such as the tops of fence posts or weed stalks, point their abdomens in the air and release long filaments of silk. The breeze catches the silk strands and gently raises the spiderlings into the air and carries them off to new areas. Some may travel hundreds of miles!

Other Spinners

Although spiders may be the most famous of silk spinners, other invertebrates (animals without backbones) share this skill, including pseudoscorpions, spider mites, most centipedes, some millipedes and the caterpillars of many moth species.

Things to Do



Crab spider

Suggested Reading

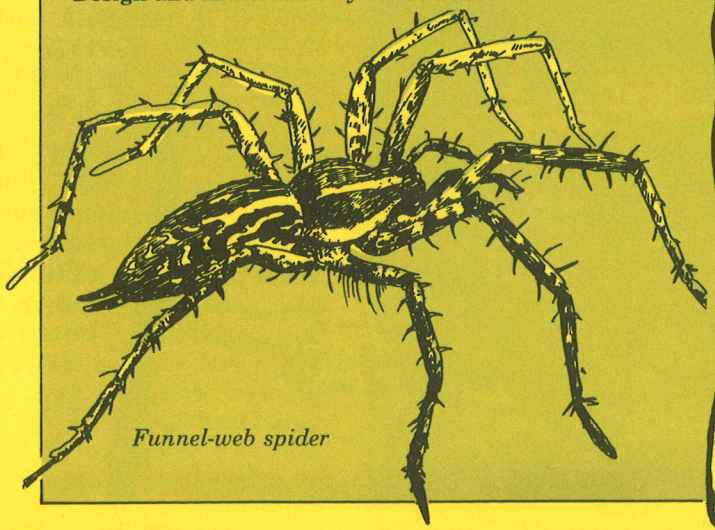
Spiders and their Kin by Herbert W. Levi and Lorna R. Levi. A Golden Nature Guide, Golden Press, New York. 1985.

Spiders — Zoobooks 2, Vol 1, No. 12. Wildlife Education Ltd., San Diego. September, 1985.

Photography Tips

If you'd like to photograph a spider's web, the best time is early morning when the drops of dew still cling to the web. When you catch the sun glistening through the drops, the web appears bedecked with jewels. In case you get up later, you may still be able to get a similar effect using a little trick. Gently spray the web with water from a plant mister and then take your picture. If you are patient, and the web is active, wait until an insect is caught (or supply one yourself) and watch what the spider does. Try to capture the event on film. Always try not to disturb the spider, and remember, although most spiders are harmless, **never** touch one unless you are **positive** of its identity.

Written by Pamela Hickman
Design and Illustration by Judie Shore



Funnel-web spider

Eight is Enough

We all know that spiders have eight legs, but they're not the only ones. Unscramble the following words to discover five more creatures that have eight legs. Answers at the bottom of this page.

spotuco
redips item
kict
sniprooc
ayddd-glon-esgl

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Answers: octopus, spider mite, tick, scorpion, daddy-long-legs