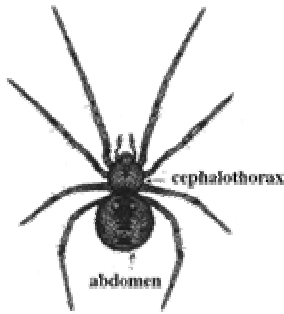


## Appendix 5

## SPIDERS

[[www.explorit.org/homepage.html](http://www.explorit.org/homepage.html), [www.tburg.k12.ny.us/mcdonald/spider.htm](http://www.tburg.k12.ny.us/mcdonald/spider.htm)]

1. Within the huge group called animals are many that have no backbones. These are called invertebrates. One major group or phylum of invertebrates is called the Arthropoda. Biologists include insects and spiders in this group. Spiders and insects share some common features: e.g. as most spiders and insects grow, they molt.



2. Amongst the vast numbers of invertebrate animals in the Phylum Arthropoda, more than a million different kinds have bodies with three main parts--head, thorax, and abdomen. The head has eyes, antennae and mouthparts. The thorax has **three pairs of legs**. The entire body is protected by a tough outer covering called an exoskeleton. Animals that share these characteristics are called insects. The group to which they belong is called the **Insecta**.

3. Another, smaller, group of invertebrate animals has only two main body parts. The body consists of a combined head and thorax called the cephalothorax, and the abdomen. The cephalothorax has the eyes, mouthparts (no antennae) and **four pairs of legs**. Animals that share these characteristics include **ticks, mites, scorpions** and **spiders**. The group is called the **Arachnida**.

4. Within the Arachnida, spiders are classified into a special group called the Araneae that separates the spiders from the ticks, mites, and scorpions. A **distinguishing characteristic of spiders** is that they have a very slender waist or pedicel separating the cephalothorax from the abdomen. The cephalothorax is covered by a tough carapace. Spiders are believed to have existed for more than 300 million years.

A spider's body consists of:

a) a cephalothorax with eyes, mouthparts - a pair of jaws and a pair of pedipalps, and **four pairs of jointed legs** and

b) an abdomen connected to the cephalothorax by a narrow pedicel. The entire body is encased by a tough protective exoskeleton and much of the body has sensory hairs growing from the skin.

5. Spiders have claws at the end of each leg. Spiders' legs are segmented and each **leg has 7 segments**: a coxa (attached to the cephalothorax), trochanter, femur, patella, tibia, metatarsus, and finally a tarsus which may end in two or three small claws. Web-building spiders typically have **three claws** on the end of **each leg**. The middle claw and a small tuft of hairs help the spider cling on to its web.

6. Below the eyes on head end of a spider's cephalothorax are **two** small **jaws** (chelicerae) that end in fangs. Venom (poison) is produced in glands behind the jaws and empties along ducts in the fangs to paralyze or kill prey. Relatively few spiders bite people because they are not able to **pierce** the skin with their fangs. The majority of those spiders that can bite people have venom that is harmless to people. Two notable exceptions in the United States are the Brown Recluse, and the Black Widow

7. Most spiders have **eight** simple **eyes**. [Insects on the other hand have large, compound eyes.] The two main eyes of a spider each have a simple lens, and a retina which is made up of light sensitive cells whose surfaces point toward the light as it enters the eye. These main eyes have a small field of vision with high resolution. They are especially well developed in jumping spiders. A spider's secondary eyes also have a lens but the light sensitive cells of these eyes point away from the light as do the similar cells in a human eye. The secondary eyes detect shadows and the difference between light and dark

8. Spider **webs** are made of continuous strands of spider silk produced from about six silk glands beneath the abdomen. A web-spinning spider first constructs a web framework attached to parts of plants or other firm supports. This framework has threads **radiating out from the centre**. Next, the spider will work from the edge of the web toward the centre laying down a **spiral** of sticky threads.

**9. Spider silk** is a protein that is formed as a liquid by silk glands and squeezed out of spinnerets like toothpaste from a tube. The liquid thread hardens as it leaves the spinneret and some types of such thread become **stronger than a steel thread** of the same diameter. Most of the silk threads in a spider web are multiple strands of fine silk lying alongside each other. Spiders produce *several types of silk* from different types of spinning glands. One type of silk formed by all spiders is the type used for wrapping prey. Another type of silk is used to make the egg sac, and yet other is a sticky type often used as part of a web.

Young spiders ride the wind on long silk threads in a process that we call ballooning.

There are now about 35,000 named species of spiders worldwide

**10. Funnel-Web Spiders** (Order Araneae, Family Agelenidae). These small to medium sized spiders - under 20mm long - spin sheet webs of non-sticky silk with a **funnel** extending from the centre to one edge and a barrier web over the top to catch insects. The spider sits in the funnel. When a flying insect hits the barrier and falls onto the sheet web the spider rushes out of the funnel, bites the victim to paralyze it, and drags it into the funnel to feed on it.

**11.** An unusual member of this family is the **water spider** (Argyroneta). This spider feeds on small water organisms and *spends its life below the surface of lakes and ponds living in a bubble of air* held in the water by a silken diving bell or thimble-like structure.

### Types of spider web

[[http://en.allexperts.com/e/s/sp/spider\\_web.htm](http://en.allexperts.com/e/s/sp/spider_web.htm), [www.washington.edu/burkemuseum/spidermyth/myths/general.html](http://www.washington.edu/burkemuseum/spidermyth/myths/general.html)]





There are numerous types of spider web found in the wild; and many spiders are classified by the webs they weave. Different types of spider webs include, but are not limited to:

- \* **Spiral** orb webs, associated primarily with the family Araneidae, Tetragnathidae and Uloboridae;
- \* **Funnel**-webs, with associations divided into [primitive](#) and [modern](#);
- \* **Tubular** webs which run up the base of trees
- \* **Sheet** webs
- \* **Tangle**-webs or **cobwebs**, associated with the family Theridiidae.

Although orb webs are the most conspicuous webs (because they tend to be large and are often suspended in mid-air) they are not at all the most common type. In temperate regions, sheet webs are by far the most common, and cobwebs are also more abundant than orb webs. In some locations, funnel webs are also more common. Only in the tropics can orb webs equal other web types in abundance, but they still are rarely in the majority. So when you notice a spider web that is not a round orb, rest assured that it's perfectly normal.

### Examples of 4 major types of spider webs

Each functions somewhat differently in prey capture. Sheet webs and funnel webs have no sticky silk.

			
<p><b>Sheet web</b> made by <i>Neriene digna</i></p> <p>(Credit to Rod Crawford) Click image to enlarge</p>	<p><b>Funnel web</b> made by <i>Tegenaria gigantea</i></p> <p>(Credit to Rod Crawford) Click image to enlarge</p>	<p><b>Cobweb</b> made by <i>Steatoda grossa</i></p> <p>(Credit to Jim Stratton) Click image to enlarge</p>	<p><b>Orb web</b> made by <i>Araneus diadematus</i></p> <p>(Credit to Rod Crawford) Click image to enlarge</p>