



Bugs on Land and Sea



lobster



honeybee



centipede

↑ Arthropods can be found in the sea, in the air, and on land.

Spiders, flies, centipedes, and scorpions might all be called bugs. Zoologists call them **arthropods** (AR-throw-pawds). Arthropod means “jointed foot.” All arthropods have legs that move like knights in armor. This is because they have an **exoskeleton** (EX-oh-skel-uh-ton). Your skeleton is inside your body. Theirs is on the outside. It keeps them safe. But they can only move where the exoskeleton is jointed.

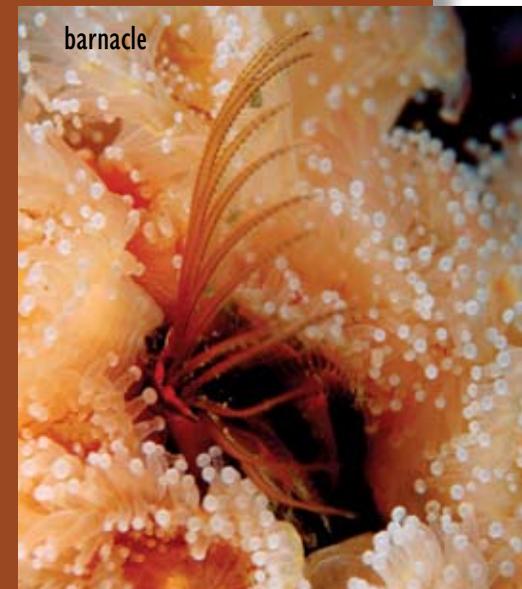
There are also other animals with jointed legs. They include lobsters, shrimp, and crabs from the ocean. In fact, these animals share a common ancestor with bugs. You can see the family resemblance if you compare their pictures.

All arthropods have many jointed limbs. Some limbs are used as legs and others for flippers. Still others are used to put food in the animal’s mouth. Some centipedes use them to poison their prey! The limbs always come in twos. That is because arthropods have bilateral symmetry. One side is the mirror image of the other side.

Arthropods share another trait. It is **segmentation**. Their bodies are divided into segments. The segments are linked together like cars in a train. The segments can be very similar or very different. Most of a millipede’s segments have two legs. A crayfish has segments for walking, for swimming, and for sensing the world around it.

Fun Fact!

Have you ever eaten soft-shell crabs? This crab’s shell has softened so that it can shed its exoskeleton when it grows larger. The chef cooks these soft-shell crabs, so you can eat the whole crab without worrying about the shell!



barnacle

What Are Barnacles?

Even though they may not look like it, barnacles are animals, too. In fact, they’re arthropods. What might look like a shell is really the barnacle’s exoskeleton. What you might think are leaves or tentacles are jointed limbs. Inside the exoskeleton is a segmented animal. It uses its limbs to sweep food into its mouth.

You Are a Chordate



The last major phylum is one you know. Reach around to the middle of your back. Can you feel your **vertebrae** (VER-teh-bray)? Vertebrae are the bones in your backbone. Inside your backbone is your spinal cord. It is a set of nerves that takes messages from your brain to the rest of your body. Your backbone and spinal cord make you a chordate. You are a member of the phylum *Chordata*.

All chordates have or had a notochord. A **notochord** is a stiff structure inside an animal. For most chordates, the notochord is replaced by a stronger backbone. A few chordates never replace the notochord. Others lose it entirely!

Backbones are very useful things to have. Other bones can branch off the backbone to support complex bodies. Muscles can attach to the backbone to move the whole skeleton. The backbone protects the spinal cord. It allows an animal to have a brain that controls the rest of the body. Animals with backbones are called **vertebrates**. Animals without backbones are called **invertebrates**.

Chordata is a phylum, so it is split into classes. There are many classes for fish. Other classes include *Aves* for birds and *Sauropsida* (SAR-op-see-dah) for reptiles. The class *Mammalia* is for mammals. It includes such animals as cats, mice, dogs, and you.



Both humans and snakes have backbones that support the rest of their skeletons.



The stegosaurus' bony plates grow off its backbone.



tunicates

Invertebrate Chordates

There are two kinds of chordates that are not vertebrates. They are called *tunicates* and *lancelets*. Tunicates look a lot like seaweed or coral. Lancelets are tiny ocean creatures. Neither animal ever develops a backbone. Tunicate larvae have notochords, but they lose them when they become adults. Lancelets keep their notochords all their lives.