



Insects

**What have 6 jointed legs, 2 antennae
3 body parts and an exoskeleton?**

Insects!

Insects can be considered the most successful animals on Earth. The fossil record shows that insects have been around for about 350 million years. Cockroaches appeared about 310 million years ago. By contrast, humans have only been on Earth for 10,000 years. There are over 1 million species of insects that have been identified and named. They make up about 80% of all known animals. Insects play essential roles in the environment including predators, parasites, scavengers, decomposers and as prey for other animals. Some reasons they are so successful are their exoskeleton, small size, ability to fly and ability to reproduce quickly.

Insects are arthropods (Phylum: Arthropoda). The word arthropod comes from the Greek, meaning “jointed foot”. In addition to jointed legs, all arthropods are covered with a hard shell called an

Scientific Classification

The naming system that we use for naming organisms was developed by Linnaeus over 200 years ago.

Category	House Fly	Humans
Kingdom	Animalia	Animalia
Phylum	Arthropoda	Chordata
Class	Insecta	Mammalia
Order	Diptera	Primates
Family	Muscidae	Hominidae
Genus	Musca	Homo
Species	domestica	sapiens

About Exoskeletons

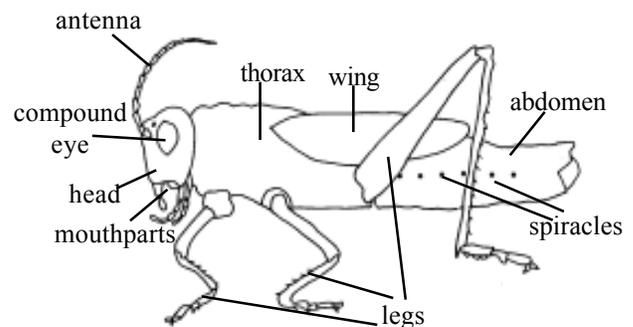
Exoskeletons do not grow with an animal like the endoskeletons in vertebrates. The exoskeleton gives the arthropod support and protection. As the animal grows, it sheds the exoskeleton and creates a new one underneath. This process is called molting. Students may think that this is the same as snakes and other reptiles shedding their “skin”. While it is somewhat similar, reptiles shed their scales (which do not grow), but they are vertebrates and have skeletons inside their bodies.

Trick to remember: You can tell which skeleton is which by looking at the first two letters in the words. “Ex” reminds us of “exit”, or to go outside. “En” reminds us of “enter”, or to go inside.

exoskeleton. Arthropods that are not insects include spiders, ticks, mites, centipedes, millipedes, lobsters, crayfish, shrimp and crabs.

In addition to the exoskeleton and jointed legs, insects have three body divisions (head, thorax, and abdomen), six legs, two antennae, and usually wings.

Insect Anatomy



Head- The head is for eating, sensing things, and gathering information. The antennae, eyes and mouthparts are located here. Sensory hairs may also be located on the head.

Thorax- All wings and legs are attached to this middle body part. This makes the thorax full of muscle.

Abdomen- The third body part contains all the organs for breathing, digestion and excretion, and reproduction. Containing the “guts” of the insect, this is usually the “squishy” part of an insect. Although insects have a heart, the blood flows around freely in the body.

Compound Eye-Compound eyes can have several thousand lenses.

Legs-All insects have three pairs of legs (six). Legs look different depending on their purpose (grasping, capturing, jumping, digging, swimming, climbing).

Antennae-This pair of sensory appendages is located on the head. Antennae come in many forms and are used to feel, smell and even taste.

Mouthparts- There are many different types of mouthparts including chewing, piercing-sucking, sponging, siphoning, cutting and more. This grasshopper has chewing mouthparts.

Wings-Most adult insects have two pairs of wings (four). True flies (order: Diptera) only have one pair of wings (two).

Spiracles- Air enters the insect through these holes in the abdomen. From here the oxygen is transported throughout the insect through tracheae. When disturbed, Madagascar hissing cockroaches make a loud noise by forcing air through the spiracles.

Reproduction

Insects have an incredible capacity to reproduce. Large queen termites in Africa can lay as many as 36,000 eggs in 24 hours! This ability to reproduce is one reason why some insects can become pests. Most insects have males and females that mate and reproduce sexually. However, in many cases the males do not need to be there all the time. In cockroaches, the male leaves a sperm sack in the female’s body after they mate. In some species she just uses the sperm from the sack when she needs it for several batches of eggs. In some aphids the female can reproduce without mating at all, producing clones of herself that are all female and also able to reproduce without mating!

Insect Growth and Development

As part of their life cycles, insects go through a process called metamorphosis. Metamorphosis means a change from one form to another. Complete metamorphosis has four life stages: egg, larva, pupa and adult. In complete metamorphosis each life stage looks very different. The larvae and adults usually eat different foods and often have different mouthparts. This allows a large number of adults and larvae to live in an area and not compete with each other for resources. Insects that go through complete metamorphosis include beetles, butterflies and moths, flies, fleas, wasps, bees and ants.

Incomplete metamorphosis has three life stages: egg, nymph, and adult. The nymphs look similar to the adults. Nymphs are not reproductively mature and do not have fully developed wings. Insects that go through incomplete metamorphosis include cockroaches, earwigs, head lice, grasshoppers and crickets.

