

DISSECTING CRICKETS

BACKGROUND

Crickets belong to class *Insecta* (insects), which is a very diverse group of animals consisting of 4/5 of known species. Insects have adapted to life on land and it is possible to see several structures which enable living in dry environments. The surface of insects is covered with a hard **cuticula**, most insects can fly and they have efficient secretory and respiratory systems.

All insects have the same basic structures, which have differentiated in slightly different purposes in various insect orders. Most insects have three body parts and three pairs of appendages. The **appendages** (legs) may have been specialized for e.g. walking, digging or jumping. There is a lot of variation in **mouthparts** as well. In this task, you will dissect a cricket with chewing mouthparts, which can grind the food into small pieces. Some insects may also have siphoning or sucking mouthparts. Different mouthparts have enabled using various sources of food.

In this task, you will dissect a cricket. You should find all the basic structures of an insect and take a look at the entrails as well.

ESTIMATED TIME

30-40 min

QUESTIONS BEFORE THE TASK

- Insects belong to the phylum *Arthropoda*. Do you know any other arthropods?
- Think an example of an insect with siphoning or sucking mouthparts.

EQUIPMENT

- forceps
- scissors
- pins
- microscope

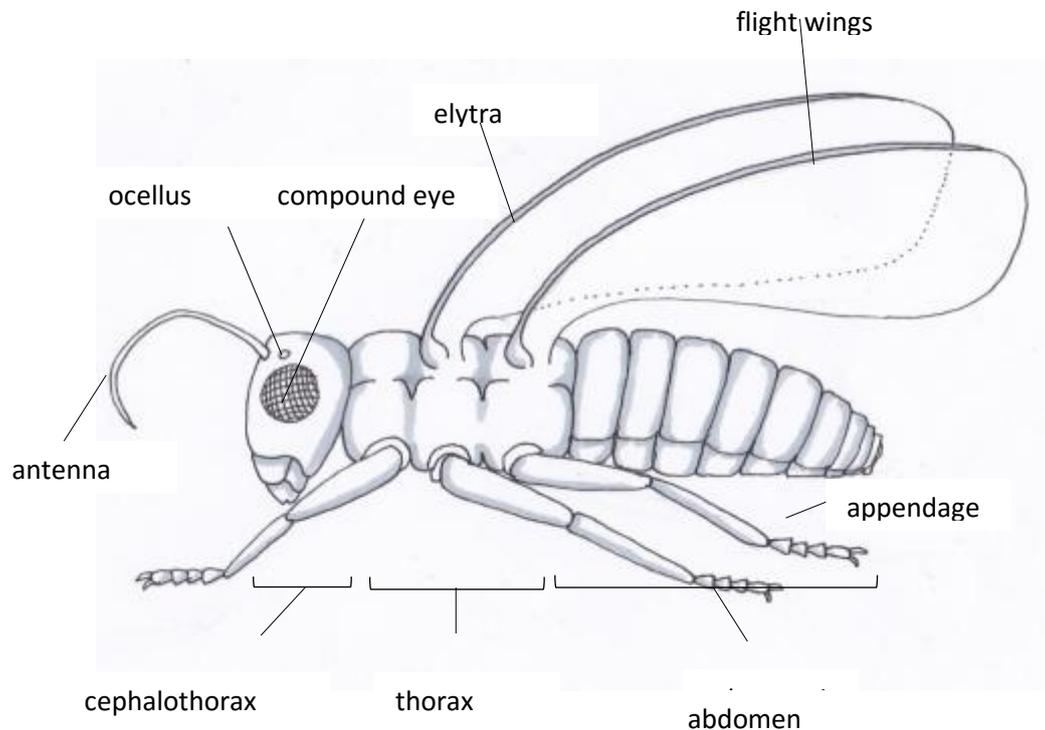


Image 1. The basic parts of an insect.

INSTRUCTIONS

1. Take a look at the external parts of the cricket. Can you find the basic structures of an insect? Find the cephalothorax and thorax, which are clearly separated from each other. The cricket has a hard eksoskeleton consisting of different parts. In the **cephalothorax**, there are **antennae**, **compound eyes** and small **ocelli** close to the antennae. The compound eyes consist of small **ommatidia**, which can be seen through a microscope. In the end of the abdomen you can also find **cerci** (bristles).
2. Take a look at the mouthparts of the cricket. On the front side of the head you can first see the **upper lip** (labrum). Below the upper lip there are the **upper jaws** (mandibles) that are strong structures which cut and chew food. You can remove the labrum and mandibels with forceps and look at them trough microscope. Below upper jaws are the **lower jaws** (maxilla) that are thread-like structures which move the food towards the other mouthparts. Finally below the lower jaw there is the **lower lip** (labium) with **labial pulps**.



Image 2. The mouthparts of a cricket.

3. After investigating the mouthparts, you can take a look at the thorax. There are three segments, each with a pair of appendages. The first segment of the thorax forms a small

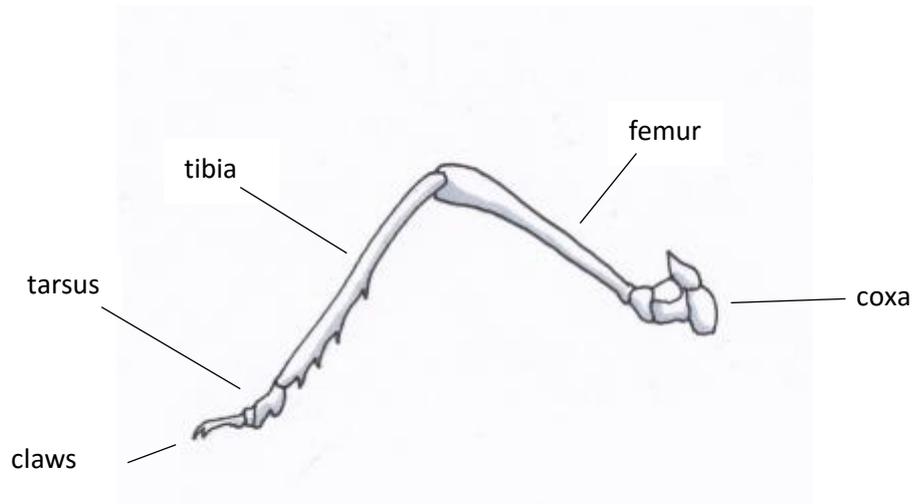


Image 3. The leg (appendage) of a cricket

carapace (shell). The second segment contain elytra (covering wings) and the third segment contain flight wings. Can you see any difference between them? Insects have three pairs of appendages (legs). An appendage consists of hips (**coxa**), a **trochanter**, a thigh (**femur**), a shin (**tibia**), and an ankle (**tarsus**) with two claws. A cricket has one pair of jumping legs and two pairs of walking legs. How can you tell which pair is the jumping legs?

4. Finally, take a look at the internal parts. Place the cricket to the surface dorsal side up. Attach the cricket to the surface with pins from the crickets head and the end of abdomen.



Remove the small carapage and cut through the cuticula starting from head to the end of abdomen.

5. Remove the hard cuticula with forceps. Below the cuticula you can see the **trachea** (thin tubes attached to the cuticula). The trachea are the respiratory organs which transfer oxygen to the internal organs and muscles. The tubular heart is on the dorsal side near the cricket's neck. The heart pumps blood when the surrounding muscles constrict. The blood flows into **coelom**, where it is mixed with interstitial fluid (an open circulatory system).
6. Next try to find the **digestive tract** which goes through the cricket. It consists of crop, stomach, intestine, colon and anus. If your cricket is a female, you must first remove its **ovaries** that are filled with **eggs**, because the digestive tract is below that. You can break down the ovaries with forceps to see the banana-shaped eggs.
7. Finally try to find the ventral nervous cord below the digestive tract.

QUESTIONS AFTER THE TASK

- What prevents the insects from growing longer than 20 cm?
- How the ecology of a cricket can be seen in the cricket's structure?
- What is the reason that there are so many species in Insecta?
- Why crickets (and other insects) have to shed the skeleton periodically and then secrete a new one?

