Mouthparts of Insects

Biology	Microscopy / Cell Biology	Basics of Microscopy & Work Technology
Biology	Microscopy / Cell Biology	Humans & Animals
Biology	Animal Physiology / Zoology	Invertebrates
Nature & technology	From the very small & the very big	
Nature & technology	Plants & animals	

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	30 minutes

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Teacher information

Application

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Wasp (40x)

Insects come in a wide variety of species, genera, families, and forms. They are also found in almost every part of the world. The mouthparts of insects are adapted to their food and differ depending on which type of food is ingested.

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Other teacher information (1/5)

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Prior knowledge

Students should be able to recognize and name the general structure of insects. They should also be familiar with the use of a microscope.

Scientific Principle

The students look at different insects and their body parts with the magnifying glass and the microscope. They pay special attention to the mouth parts.

Other teacher information (2/5)

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Learning objective

The adaptation of the mouthparts to food intake should be made clear to the students in the course of the lesson.

Tasks

Students should examine the mouthparts of insects and explain their structure.

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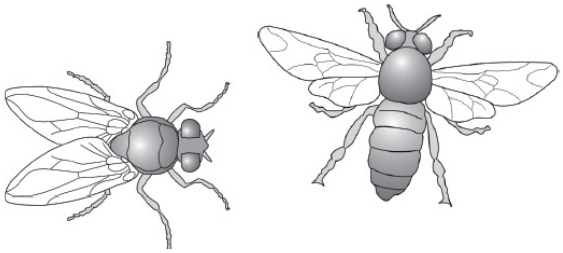
Other teacher information (3/5)

Notes on material procurement

Insects can be found abundantly in the wild during the warm season. However, they can also be stored in ethanol or dry. The wings of dried animals do not need to be soaked, as they can be microscoped directly dry. Only very common species should be killed and never animals that are specially protected. The killing of the animals can be done with acetyl acetic ester. Usually one gets along with finds of dead insects on the windowsill and bees are obtained abundantly from the beekeeper.



Other teacher information (4/5)

Notes on implementation

Different types of mouthparts should be examined where possible:

- biting and chewing, e.g. beetles, grasshoppers, cockroaches, wasps and ants
- licking-sucking, e.g. bees and bumblebees
- sucking, e.g. in butterflies - licking-touching, e.g. in houseflies
- pungent-sucking, e.g. on aphids, mosquitoes
- Aphids have piercing-sucking mouthparts. They feed on the sap of the plants.

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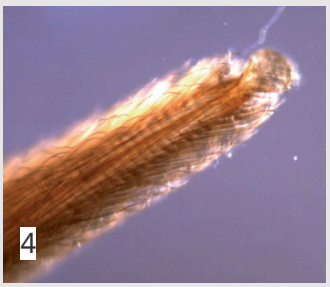
Other teacher information (5/5)

Further information

- The powerful mandibles are parts of the lower jaw of insects with biting-chewing mouthparts. They are found in herbivorous and predatory insects that need to crush their food (Fig. 1).
- In the bee, the lower jaw and lower lip form a suction tube (Fig. 2), in which the hairy tongue (Fig. 3) moves. At the end of the tongue is the spoon (Fig. 4), which takes up the food.



Safety instructions

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- Working with microscopes for too long can lead to physical discomfort (fatigue, headache, nausea), especially when students are untrained.
- Microscopes are sensitive. During transport and handling, care should be taken to ensure that everything is done carefully and without rushing.
- The general instructions for safe experimentation in science lessons to be applied to this experiment.

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Student Information

Motivation

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Wasp (40x)

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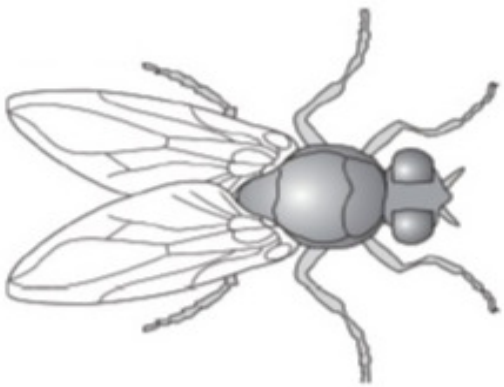
Tasks



In the course of evolution, insects have developed very different mouthparts depending on the food they eat. Examine the mouthparts and explain their structure.

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Equipment

Position	Material	Item No.	Quantity
1	PHYWE Binocular student microscope, 1000x, mechanical stage	MIC-129A	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs	64685-00	1
4	Magnifier, plastic, 5x, d=35mm	88002-01	1
5	Dissecting needle, lancet-shaped	64621-00	1
6	Scissors,straight,pointed,l 110mm	64623-00	1

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Procedure (1/2)

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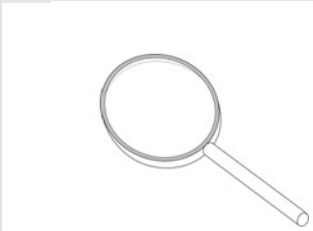
Examination of the body structure of an insect with a magnifying glass

- Compare the body structure of the insects in front of you with an illustration in your biology book.
- Look closely at the arrangement of the legs and the appearance of the chest.

Scalp examination

- Look at the compound eyes with the magnifying glass.
- The mouth opening is surrounded by mouth parts. Look at the mouth parts with the magnifying glass and inform yourself



Aphid (40x)

Procedure (2/2)

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Microscopy of the mouth parts

- Cut off the head of an insect with the scissors and place it with the front side on the slide.
- Now crush the round part of the head and expose the mouth parts with the dissecting needles. Remove the remaining parts of the head, place the mouthparts on the microscope slide and microscope at lowest magnification, first dry and later with water and cover glass. Describe and draw your observations in the protocol!

Tongue of the bee (40x)

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Report

Task 1

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Select the existing mouth tool types.

- [ ] Licking-sucking, e.g. bees and bumblebees.
- [ ] Stinging-sucking, e.g. on aphids, mosquitoes
- [ ] Biting-chewing, e.g. on beetles, grasshoppers, cockroaches, wasps and ants.
- [ ] Sucking, e.g. in butterflies - licking-touching, e.g. in houseflies.

Check

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Task 2

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Aphids have licking-sucking mouthparts. They feed on the sap of the plants.

○ True ○ Incorrect

Check

Aphids have piercing-sucking mouthparts. They feed on the sap of the plants.

○ True ○ Incorrect

Check

Task 3

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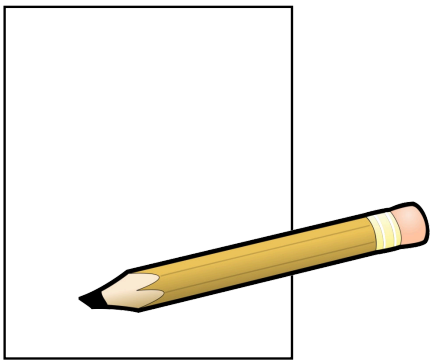
Draw and describe the mouth parts of an insect that you have observed under the microscope.



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Slide	Score/Total
Slide 16: Mouthpiece Types	0/4
Slide 17: Multiple tasks	0/2

Total 0/6

Solutions Repeat

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