



**Parks and Open Space
Education and Outreach Activity**

Insect Mouthparts: “Eating Like a Bug”

Ages 3-8 (can be expanded for older ages)

Theme: Insects have very different ways of eating and chewing their food than we do, but some of the adaptations they use to eat may seem familiar to you.

Materials:

Pliers
Pieces of sponge
Small plastic trays or bowls
Small paper cups
Red food coloring
Straws
Syringes
Water
Photos of grasshoppers, flies, butterflies, and mosquitoes
Diagrams of mouthparts

Note: for young children, simply learning that insects have different mouthparts and seeing how they work may be enough. Older children can explore more about different mouthparts and the names of those mouthparts. The lesson can be carried further by investigating other insects with similar mouthparts, or examining other adaptations (such as sight, smell, and taste).

Intro:

Insects eat all kinds of things—not stuff that is normally on our dinner plate. To do this, they have some special tools, or adaptations, to help them eat their food.

How do people eat? What do we use to chew our food before it goes to our stomach for digestion? (we chew with our teeth; sometimes we tear or cut meat or other food items by using our teeth to bite.) Insect mouths are very different—they don’t have teeth like we do.

Body:

This can be done in four stations, or with smaller groups one at a time.

Grasshoppers—Chewing Insects

A grasshopper’s mouth works like a pair of pliers to tear and chew plants. Their jaws move sideways, not up and down like ours. *Show photos and diagram of grasshopper mouthparts.*

- The labrum holds food in place while chewing.
- The mandibles cut, tear, crush and chew food.
- The maxilla and palps manipulate food during chewing. They can have hairs and “teeth” along the inner margins
- The labium is the floor of the mouth. It also assists the chewing of food.

Demonstrate with a pair of pliers how the grasshopper chews sideways, using its mandibles. Children can take a turn trying out the pliers.

Grasshoppers eat all kinds of plants—they are herbivores. Some of their favorites are barley, wheat, corn, and alfalfa.

Some of the other insects that also chew their food this way are dragonflies and beetles. When moths and butterflies are in the larvae stage, they also have chewing mouthparts.

Flies—Sponging Insects

Flies can only eat liquids. When they find something they want to eat, they put saliva on their food (like spitting on it), which helps turn it into liquid. Then they absorb it like a sponge. *Show photos and diagram of fly mouthparts.*

- The labellum is the sponge-like part of the mouth that acts like a sponge to absorb the food.
- The labium channels the food inside the fly for digestion.

Students can take small pieces of dry sponge and touch them lightly to a shallow lid filled with water. Watching the sponge absorb the water gives an idea of how a fly absorbs its food through its labellum.

Flies eat just about anything, from rotting food, fruit and vegetables to feces. They also drink nectar. They are often pests, but they are the second most important pollinator of plants after bees and wasps.

Butterflies—Siphoning Insects

Butterflies take in food by sucking it up through their proboscis (or galea). They keep this long straw-like tube coiled up under their head when not in use. When they are ready to eat, they extend it deep inside flowers to reach the nectar. *Show photos and diagram of butterfly mouthparts.*

Most butterflies and moths have proboscis, but some moths (like the luna moth) have no mouths at all. They don't eat anything—they emerge from their cocoon, live for a short while, lay eggs to make more caterpillars, and die. *You can demonstrate how a proboscis works with the party blowtoy—children shouldn't blow on this to prevent the spread of germs, but you can just unroll it.*

Fill small paper cups with a little water and give each child a straw. Have them suck up the water—they are basically eating like a butterfly!

Butterflies and moths only have a proboscis in the adult stage. When they are larvae, they have chewing mouthparts like grasshoppers.

Mosquitoes—Piercing and Sucking Insects

Only female mosquitoes are equipped with a piercing proboscis to draw blood. If you are bitten by a mosquito, it was a girl! The male mosquitoes just help pollinate plants by eating nectar and spreading pollen. The female uses her sharply pointed proboscis to pierce the skin of an animal, and then sucks up blood like a syringe.

Fill several paper cups with a little water. Put a drop or two of red food coloring in each to represent blood. Use syringes to draw the blood up from the cup. Students can try this themselves to see how the mosquito draws blood.

Many bats like to eat mosquitoes—if you have bats in your neighborhood, you will have less mosquitoes!

Conclusion:

Insect mouthparts are very different from ours, but they have adaptations that help them eat the food they need so they can survive.

--Deborah Price, Education Liaison, Boulder County Parks and Open Space, March 2015