

### Lesson Title and Summary

#### Insect Mouth Parts

Students will learn that different insects have different mouth parts. The type of mouth that insects have is based on the kinds of food they eat.

Students can look for evidence of insect mouth activity on plants in the garden, or in pictures.

### Learning Goals

Students will recognize what makes an insect by identifying the common characteristics of insects.

Students will be able to compare and contrast the four different mouth parts of insects.

Students will know that different insects have different mouth parts and the type of mouth that insects have is based on the kinds of food they eat.

Students will be able to recognize evidence of insect mouth activity on plants .

### Grade Level

Fourth and Fifth grade students.

### Lesson Time Needed

40 minutes:

20-30 minutes for the lesson, 10-20 minutes for the activity

### Supplies, Space, Personnel

*Provided in Garden Discovery Kit:* Pictures of insects with different kinds of mouths; pliers (or child's scissors); Sixlets or Smarties candies (candies must be peanut free); sponge piece and straw; turkey baster; sugar or baking soda on a saucer; juice box with straws or party blower; 2 cups with colored liquid (one red, and one green) and covered with plastic wrap secured with a rubber band.

*Optional items not provided in Garden Discovery Kit: **\*\*If possible, bring samples of plants with insect damage** (chewed leaves, leaves that have been 'sucked on') \*\**

Optional for garden or playground exploration: magnifying glasses; plastic containers for collecting insects and/or samples/pictures of evidence of insect mouth parts on leaves; samples/pictures of flowers or other plants butterflies would visit; insect identification books/charts/posters.

Suggested book: "Insects" by Laurence Mound

Lesson can be taught indoors or outdoors.

### Vocabulary

Abdomen	Adaptation
Antennae	
Exoskeleton	Habitat
Head	Insects
Thorax	Mandibles
Proboscis	

### Lesson

## 1. Engage the Students

Hook – What do you think there is more of on our planet? Mammals or Insects? There are roughly 4500 species of mammals and more than a MILLION known species of insects on our planet! That means 80% of the world’s animals are insects! Isn’t that crazy?!?!

## 2. Lesson

Check for Student Prior Knowledge – Go over what makes an insect an insect: They have an exoskeleton, six legs, wings, and three body parts: Head, Thorax, Abdomen.

With more than a million different types of insects on our planet, what do you think they eat? (brainstorm ideas with students)

Do you think all insects have the same type of mouths like you and I do? (allow for student answers)

Let’s look a little closer at the different types of mouths insects have!

**Show students a tray (or hold them up) of the common items that represent different insect mouthparts.** pliers (or child’s scissors); turkey baster; juice boxes with straw or party blower; sponge piece with straw inserted in middle.

What do you think each of these items has to do with an insect’s mouth?

**Form and Function of Insect Mouthparts** – Different insects possess different types of mouthparts. These mouthpart types can be compared with the functions of common objects:

Let’s look at each one of these items and see if we can figure out how they connect to an insect’s mouth. (ask for a student volunteer for each item). Show samples of insect damage.

- **Chewing Mouthparts: Pliers/Scissors** – How does this item relate to an insect’s mouth? On an insect, these would be called *mandibles*. How would it work? (chewing, cutting, tearing) What type of food would an insect eat if it had this type of mouth? (leaves, blades of grass, large items that must be broken into smaller items) Can you guess any insects that have this type of mouth? (**grasshoppers, ladybugs, caterpillars, beetles**, etc) End by showing a close up picture of a mandible mouth on an insect.

A plant damaged by an insect with chewing mouthparts usually looks as if someone took an insect-sized bite out of the edge of a leaf – like a bite from the side of a sandwich. They also use their mandibles to pick up smaller pieces and put them in their mouth.

Activity: Use pliers or scissors to pick up a Smarties candy from a bowl and bring it to your mouth. Now, pass out a few Smarties to each student and show them how to try and eat the candies with their ‘mandibles’... Make a fist on both sides of your face, and extend your first finger of each hand to form ‘mandibles.’ Have them use their mandibles to pick up a candy and bring it to their mouth.

- **Piercing/Sucking Mouthparts: Turkey baster** – What about this? Usually I just think about using a turkey baster at Thanksgiving. Do any of you know how this works? (sucks up liquid) An insect with piercing/sucking mouthparts has a long, thin *proboscis* that it inserts into a juicy leaf (or a juicy arm, in the case of the **mosquito**). Then it sucks up the nutritious plant sap from the leaf (or blood from an arm). Many plant pests have piercing/sucking mouthparts. Instead of holes along the edge of the leaf, like from the chewing insects, plants damaged by piercing/sucking insects have small spots or speckles across entire leaf surfaces. Show the enlarged photo of the Mosquito's mouth. Ask which other insects do students think have piercing/sucking mouthparts? (**aphids, stinkbugs**, and many others)  
Activity: Use 2 clear plastic cups containing water colored with food coloring (one green for plant food and one red for blood) to show the different types of foods piercing insects eat. Place clear plastic wrap over each cup and secure with a rubber band. Then, with the tip of the turkey baster, have a student volunteer steady the cup while another student volunteer pierces the plastic wrap surface and sucks some of the liquid into the stem of the baster.
- **Siphoning Mouthparts: Juice Box with straw or party blower** - Show the students the juice box with bendy straw. These items are similar to how a **butterfly or moth's** mouth work. Adult butterflies and moths have siphoning mouthparts that are simply a flexible tube that they slip into fluids, like nectar. They are somewhat similar to the last mouthpart that we looked at, but these guys don't pierce their foods. When they are not using their mouthpart, a butterfly or moth will coil up their mouthparts and tuck them away! Lastly, show students close up images of a butterfly's mouthparts  
Activity: This type of mouthpart is very easy to mimic with juice boxes and straws. You can also simulate the coiled up proboscis using a party favor that unrolls when you blow in it. Let a volunteer show the class how a butterfly coils its mouthparts (could use their finger to unroll the party blower so it can be reused or if allowed to blow on it, leave with the class).
- **Sponging Mouthparts: Sponge with small straw inserted in the middle** – Here is our last item, a sponge. How do you think an insect uses this type of mouthpart? (allow for answers) An insect we see most often, the **fly**, has sponging mouthparts. Show the close up mouth picture of the fly. If you've ever watched a fly crawling on a cabinet, you may have noticed that it continually presses its proboscis against the counter sponging up food. The end of the proboscis is blunt and rough looking, as opposed to the tubular-shaped proboscis of a mosquito or butterfly.  
Activity: However, there is another component to the story – one that will disgust and fascinate you! A sponge can't pick up the crumbs and sticky messes unless it is

wet. The fly's mouthparts work the same way. If a fly lands on a bowl of sugar, it can't sponge up dry sugar. (Have student volunteer attempt to pick up sugar with dry sponge.) To wet the food, the fly spits fluid (vomiting) on it to moisten and soften it. The liquid dissolves some of the food, and the fly can sponge it up. Disgusting, right? This is part of the reason flies are considered such pests and germ spreaders in homes. (Wet a sponge and allow another student volunteer try and pick up some of the sugar or baking soda off of the plate) But, don't think too badly of flies! In spite of their poor table manners, they are vital as pollinators – second only to bees.

- **Beneficial insects vs. pests-** Does anyone remember what percent of the world's animals are insects? 80% And how many species of insects? Over a million! Do you think that all of these insects are pests, that they eat our food crops? NO only 1 or 2% of insects are pests, the other 98% are beneficial in our gardens and in growing food crops. Some of the insects that we discussed today are helpful in the garden. Ask students which insects we talked about today are helpful/beneficial in the garden: **ladybugs (eat aphids), most beetles (eat pests), butterflies (pollinate), and even flies (pollinate)**. Some insects are beneficial in one stage of their lifecycle but not another (caterpillars verses butterflies).
- **So when you see an insect, what should you do?** Leave it alone so it can do its job!
- **Activity:** If time allows, go outside to the playground or school garden and look for insects eating or evidence that insects have been eating recently. Can you determine/guess what type of insect was there or the mouthpart used to eat the plant?

### 3. Review

(5 minutes) What are the different mouthparts that can be found on insects? Why is there so much variety in mouthparts? Can you name an insect and its mouthpart?

Let the children know that their family can rent a garden raised bed for growing their own produce.

#### Adaptations for other ages/grade levels

Other lessons developed for the Garden Discovery program are for grades K-1 and 2-3.

#### Follow-up Activities (optional)

Have students draw pictures of the insects they observed along with the evidence of mouth parts used (For example, a chewed leaf; or a butterfly with an uncoiled tongue in a flower)

**Lesson developed by WSU Clark County Master Gardeners with information from the Jr. Master Gardener curriculum.**

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