

Bug Bites

Age Level: Elementary / Middle (6-13 years)

Special Considerations: *Bug Bites* is best used in conjunction with hiking to or from a specific location or with other activities such as *Digital Decomposition*.

Skills/Subject Areas: Science, Observation

Eco-Concepts:

Diversity- differences in living things allow for the success of all life

Interrelationships- all things are connected to and depend on other living things

Community- all living things interact with other living things in areas that meet their special needs

Adaptation- everything is designed to fit how and where it lives

Required Materials: print out of different insect feeding guilds (attached)

Prep Time: Low- less than 10 minutes

Classroom Adaptations/Variations: While in the classroom design your own type of insect feeding pattern and see if you can match it to a leaf outside.

Goals:

Sharpen students' observation skills

Alert students to the diversity of life and the different types of feeding strategies that insects use to obtain food.

Observe insect adaptations to obtain food.

Vocabulary (see definitions below):

Pit feeder, skeletonizer, leaf miner, adaptation, diversity, habitat

Description:

Do all people eat the same?

No, some people use chopsticks others use a fork and spoon while still others use their hands. Insects are like that too. Many different types of insects eat differently.

Some insects stick a long mouth shaped like a needle into a leaf and suck out the juice much like humans drink through a straw. Other insects chew their way in between the layers of a leaf like digging a tunnel while others eat big holes all the way from top to bottom.

Every species has a different way of getting the food they need!

We can tell this by noticing the marks they leave on the leaves they eat.

Conducting the lesson in the field:

While hiking, the teacher points out the different types of feeding that insects use and points it out to students. The teacher then challenges students to find them too and even discover new ones!

Teacher asks (possible answers):

Why do different insects have different strategies for getting food?

Because if all insects ate the same way OR ate the same food then they would run out of food really fast! So they have adapted different strategies to get the food they need so they are not all competing for the same food source.

What adaptations have insects made in order to get the food they need?

Some have adapted mouth parts like straws for sucking juices out of plants and even other insects and animals (like Hemipterans (assassin bugs))- which stab their food with a sharp proboscis (nose) and suck out juices from their prey! Or butterflies, which have a long straw-like proboscis or sucking nectar from flower parts. Others have evolved chewing mouth parts like grasshoppers and caterpillars which chew off the parts of leaves from trees and other plants. While others have biting mouth parts for attacking their prey, like dragonfly nymphs that have actually been seen eating small fish in a cool reversal of roles since usually fish eat insects but in the case it's the insect eating the fish!

Do the leaves also serve as a habitat for the insects while they eat, grow and develop? How? *Yes, some insects like the insects that eat tunnels and leaf miners in between the different layers of leaves hide inside their tunnel and use it as a home and protection while they grow and develop!*

Follow up discussion

Insects are very interesting because they have adapted to their environment in so many different ways. They are easy to find and kids LOVE to explore and catch insects and learn about them. There are a lot of great resources on the Internet to learn more about insects and insect collections are a great way to get students interested in nature.

There are a lot more different feeding guilds (categories of how insects feed) that can be discovered on a hike. But more importantly, once students are tuned in to observe the evidence of insect herbivory they will run around and find a lot of different types and can even invent their own guild if they are creative and enthusiastic!

Kids may also find: leaf rollers (insects that roll themselves up inside a leaf), borers (insects that drill holes into the woody parts of a plant), and galls (scars left on a leaf from insect damage).

With a bit of research students will also find that insects have inspired Hollywood aliens and horror films for many decades! (research on the recent movie District 9 will reveal the inspiration for aliens in that film!)

Vocabulary:

Pit feeder – an insect that eats a ‘pit’ into a leaf by making a while through the entire leaf.

Skeletonizer – an insect that eats all of the soft tissue of the leaf while leaving the veins of the leaf. This makes it appear like ribs of a human or a skeleton.

Leaf miner – a leaf that tunnels its way through a leaf while it grows and develops. As it makes its tunnel it also eats the nutritious part of the leaf between the layers. Once it is fully developed it emerges from the leaf and flies away. Often leaf miners are tine wasp species.

Adaptation – When an organism changes its behavior and/or physical structure to allow it to successfully live in its surrounding environment.

Diversity – (Biodiversity)- many different types of living things

Habitat – an organisms home

A leaf miner

Leaf miners are called that because they appear to 'mine' a tunnel through a leaf. They do this by eating their way through the layers of the leaf and leaving a trail behind them!

It's kind of like how humans mine through the earth and make a tunnel



Notice how the 'tunnel' that the insect has created is getting bigger.

Why do you think this happens?

(because it's growing while it eats and needs a bigger tunnel!)

Finally the insect eats enough that it grows into an adult.

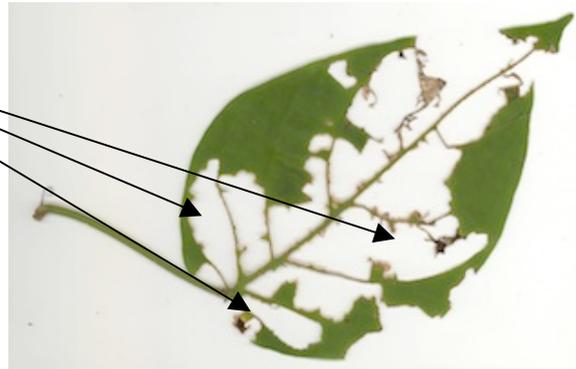
When this happens, it grows wings, eats a big hole in the leaf and flies away!

Skeletonizer

Why do you think this type of insect feeding is called a skeletonizer?

When you see this type of insect feeding in the forest you'll notice that all that's left of the leaf are its ribs and veins!

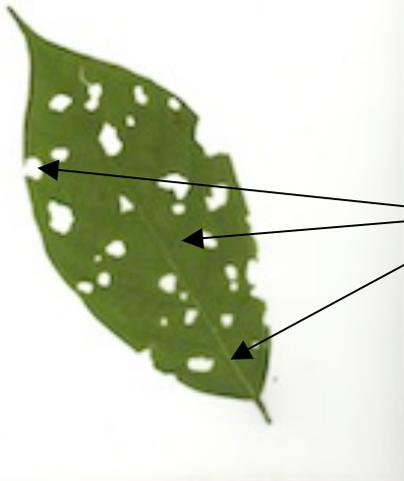
Insects that eat like this are called skeletonizers because they eat all the nutritious good green leaf and leave the bare leaf skeleton behind.



Pit Feeder

You'll probably see a lot of this type of feeding in the forest. It's very common.

What do you think it's called?



See all the different 'pits' that give this type of feeding its name?

Insects that eat this way essentially eat small little holes through out the leaf.

That's why they're called pit feeders.