



4-H VOLUNTEER INFORMATION SERIES

Nebraska 4-H Youth Development

Club Activity Idea: The Insect Challenge

Outcome Area: SET Healthy Lifestyles Life Skills Career Development

Curriculum Area: Entomology

Specific Project (s): *Entomology 1; Entomology 2; Entomology 3*

Age Level: 12 -15 year olds

Group Size: 20 – working in small groups

Time Involved: Preparation time: Activity time: 3 - 45 minute sessions

Description of Activity:

Students will be divided into small groups and given the opportunity to select an insect to create a habitat for illustrating its ability to camouflage itself. The groups will be allowed to use a variety of materials to create their habitat as well as their insect. Once the habitat and insect construction is complete, each group will have the opportunity to find the insect that each other group has produced. At the conclusion of this activity each group will have the opportunity to share what they were able to find in each habitat, as well as their hypothesis for why the insects appear the way they do.

Learning Objectives:

Students will:

1. learn the type of habitat that their selected insect and those of other groups live in.
2. learn the difference between camouflage and mimicry.
3. understand the benefit to insects who have these abilities.
4. learn methods to identify insects.

Scientific goals:

1. To develop a hypothesis for each habitat explaining why that habitat is appropriate for that particular insect.
2. Develop an understanding of the general structure of an insect.
3. Develop an understanding of the relationship between the insect and its habitat.

Materials Needed:

Students will have access to various materials to construct their insect and its habitat. The insect's habitat and the insects will be displayed on tri-fold display boards either standing on a table or lying flat. Some suggested materials include: varying weights and colors of paper, glue, rubber cement, paper clips, tacks, pipe cleaners, clothespins, light weight wire, paint, colored pencils and crayons. Natural materials may also be used. A few examples include: sticks, leaves, sand and feathers.

Useful Resources include but are not limited to:

1. *Peterson's Field Guide –Insects*
2. *The Study of Insects*
3. *The Science of Entomology*

Overview: Is it difficult to find insects? When we are outside for BBQ's and baseball games, it seems as though there are insects annoying us all the time. Generally, these are flies or mosquitoes, and they have found you. Is it more difficult to find other types of insects? Could you easily find a bark beetle, praying mantis or a termite? In this activity we are going to determine why it is difficult to find insects and why they like it that way.

Vocabulary: Camouflage, mimicry, (Batesian, Mullerian, Speed and Wasmannian mimicry), hypothesis, leaf litter, predators, habitat

Background

Insects, while abundant can be difficult to find. Habitats provide protection to the insect from natural predators and other natural enemies such as the weather and occasionally humans. Insects are also able to create other methods of protecting themselves. Some insects have natural armor; like beetles with hard wings (elytra), while others have to camouflage themselves for protection. Insects are able to hide themselves from predators two ways. They are able to conceal themselves by hiding among leaf litter, in grasses, flowers or other forms of vegetation. This type of protection is called camouflage. Insects are able to blend into their habitat by hiding among things that have the same colors that they have; making it difficult to locate them. Most of the time insects are able to feed upon the vegetation that they are hiding in or on. This can also be a challenge to gardeners who are experiencing crop damage, but are not able to locate the pest.

Insects are also able to hide themselves using mimicry. Mimicry is an insect's ability to look like something other than an insect. We usually see this type of disguise in butterflies, moths, flies and beetles. There are four types of mimicry: 1). Batesian mimicry, when the item being mimicked is highly defended and the mimic is not. 2). Mullerian mimicry, when the mimic is also well defended. 3). Speed mimicry, when an easy to catch species looks like one that is fast moving or difficult to catch. And, 4). Wasmannian mimicry, when the mimic looks like its host in order to live in the same nest or structure. These are a few of the methods that insects are able to use to escape predators. In this activity, students will develop an understanding of how nature and insects are able to work together or borrow from each other to survive.

In some cases, the color of an insect or plant can inform others that it will be harmful if it is eaten or touched. Bright colored organisms are usually thought of as being harmful.

K-W-L

K- recall what students **KNOW** about the subject.

W- determine what students **WANT** to learn.

L- identify what students have **LEARNED**.

K Component

1. Why are we interested in insects' habitats?
2. What insects are most likely going to use mimicry as a defense tool?
3. What are the benefits to the insects that use camouflage?
4. Can humans benefit from understanding why and how an insect protects itself from predators?

W Component

1. What do we want to learn about the relationship between what an insect looks like and where it lives?
2. Why is this relationship important to humans?
3. What do we want to learn about an insect's structure that will help us to properly identify insects?
4. What is the difference between camouflage and mimicry?

Hypothesis:

Insects that are able to mimic usually mimic other insects; while insects that use camouflage as their defense tend to resemble plants.

Procedure:

Step #1: *Insect and habitat research.* Before the groups begin to create their habitat, they will be asked to select an insect: Walking Stick, Praying Mantis, any beetle, butterfly, moth, wasp, bee or grasshopper. Once an insect has been selected, each group will need to research both their insect and the habitat that it lives in.

Observing insects in their natural habitat can also be a useful tool for re-creating an insect's environment. Observation can also give the students an indication as to whether the insects show any signs of camouflage or mimicry. Students who are able to locate their insect in its natural habitat will need to keep a record of the observation that they make. Allow students at least an hour to complete their research before they begin constructing their insect and habitat.

Variables:

1. Time of the year. Depending on the time of the year, you would find different insects in the same habitat. Students will need to make sure that the habitat that they have created matches the time of the year that their insect would be there.
2. Location of the habitat. If the habitat that the students are trying to recreate is a tree, a portion of a tree or something that is too large to recreate in the space they have been given, they may consider only creating a section of it.
3. Colors found in the habitat. Often times there are a great deal of variation in the colors found in an insect's habitat. Students will be given a variety of materials, however if specific color variations are not available, get as close as you can.
4. Wing function. Understanding the differences in the types of wings that insects have will make it simpler for students to construct their insects. Creating an insect with the appropriate wing structure will also illustrate whether or not they can be used for protection, camouflage, mimicry or a combination.
5. Observed or researched camouflage or mimicry. Students may create slightly differing insects or habitats if they were able to observe insects in their natural habitat compared to textbook research.

Step #2: *Insect construction.* Similar to the methods used to construct the habitat, each group will need to create the insect that they have chosen. The insect needs to be correctly constructed. Student should have researched the body structure of their insect before they started to create it. There are some variables that the students might want to take into consideration when they are constructing their habitat and insect. The habitat and insect stage will need to represent the same time of the year. For this activity only adult insects should be used.

Step #3: *Habitat construction.* Each group will need to construct a habitat that is appropriate for the insect that they have chosen. The habitat may be three-dimensional, but will need to include the insect in a natural representation. Using a combination of a variety of materials provided: varying weights and colors of paper, glue, rubber cement, paper clips, tacks, pipe cleaners, clothespins, light weight wire, paint, colored pencils and crayons, students should have everything necessary to build their habitat.

Step #4: *Placing the insect in its habitat.* Once each group has completed both their insect and habitat construction, they will need to place their insect in the habitat. Again, insects should be placed in a realistic location of the habitat. Remember that the activity is to illustrate that insects are capable of camouflaging or mimicking other insects or plants to hide from predators.

Step #5: Observing and recording data on created habitats and insects. Each group should rotate through the habitats that the other groups have created. At each habitat the students should record specific items in the habitat that help the insect hide. Students will also need to observe if the insect is showing signs of camouflage or mimicry. If the insect is a mimic, have the students determine what type of mimicry it is displaying. Allow students time to go to each display, locate the insect within the habitat, and determine what method of defense it is using.

Step #6: Share data. Once each group has had the opportunity to make observations of each habitat, have the groups share what they have found. What differences were noticeable? How many of the insects were displaying mimicry, and how many were using camouflage as their method of defense? If students were not able to locate an insect, have the group that created that habitat show where the insect was located and what type of defense it is using.

Questions for further discussion

L – identify what students have **LEARNED**.

1. What variables have the greatest affect on an insect's ability to protect itself?
2. What is the difference in mimicry and camouflage?
3. Are there more insects that are able to camouflage themselves or that mimic other organisms?
4. Was it difficult to locate the insects in the other habitats?
5. What are the benefits to insects that are able to use camouflage themselves or mimic other organism?

Lesson Developed by: Kerry John, University of Nebraska-Lincoln Extension

Resources:

Cool Camouflage

http://scienceforfamilies.allinfo_about.com/features/coolcamouflage.html

Mimicry in Nature

http://ag.arizona.edu/pubs/insects/ahb/inf1_1.html