



Outdoor Biology Instructional Strategies

MYSTERY MARAUDERS

CHALLENGE

Discover which plants in your activity site are being attacked by insects. Locate “suspect” insects that might be responsible for the damage.

BACKGROUND

Mystery Marauders is a very good spring or summer activity.

Many animals eat plants. Large animals such as sheep, cows, and deer eat large amounts of plant material, frequently devouring plants right down to the earth. Small animals such as grubs, beetles, and grasshoppers eat much smaller quantities of plant materials as individuals, but their combined effect on plants is much greater due to their tremendous numbers.

Multitudes of different kinds of insects attack almost every part of every kind of plant. The part of the plant insects most frequently nibble on is the leaf. Evidence left in the wake of feeding insects is quite varied. Some leave only twigs behind, consuming entire leaves. Some chew small round holes in leaves, and others make worm-shaped channels. Some work from the edge inward while others prefer to scrape away one surface of the leaf. To the trained observer, the method of attack on a leaf can be a clue to the type of animal feeding on the plant.

In *Mystery Marauders* students assume the role of detectives and gather evidence of animals feeding on the plants in a vacant lot, meadow, or vegetable garden. After the evidence has been gathered, the students return to the site to round up the “suspects” at the “scene of the crime.” Finally, the students attempt to catch some of the suspect’s associates by organizing a “shake down” in the damaged area.

MATERIALS

For each youngster or team of two:

- 1 Action Assignment Card, duplicated from master (optional)
- 2 medium-sized plastic bags
- 1 magnifier or bug box

- 1 sweepnet, OR
- 1 Shake-It Container (see Equipment Card 3)

For the group:

- 1 master of Action Assignment Cards
- 1 “Sweepnet” Equipment Card 3, OR
- 1 “Shake-It Container” Equipment Card 3

PREPARATION

1. Select a site with “holey” plants. Check several different plants for holes in leaves or missing leaf edges.
2. If you are going to use the Action Assignment Cards, duplicate them in advance.
3. If you are going to make nets or Shake-It Containers, do so in advance. (See the “Sweepnet” and “Shake-It Container” Equipment cards in the OBIS Toolbox folio.) Nets work best in areas of grassland or low shrubs. The Shake-It Containers work well with bushes, shrubs, and trees.

ACTION

You can introduce the activity either verbally or with Action Assignments, which are more specific and usually work better with older students.

1. **Introducing the activity:**
 - a. Verbally: At the activity site, say: “It has been reported that a mysterious animal has been eating plants in this area. (You may want to show them one leaf with holes) Your assignment is to take a plastic bag and gather some leaf samples as evidence that this is true.” Tell the students to take five to ten minutes to complete the assignment and bring in the evidence.
 - b. Written: Distribute one Action Assignment Card and plastic bag to each participant or team. Tell the students to take five to ten minutes to locate and bring in the evidence.
2. **Look at the evidence:** Spread it out for all eyes to see. How many different kinds of damaged plants were gathered as evidence? Which plant is most popular as a food source?
3. Challenge the students to find out which animal was responsible for the damage. Send them back into the site with a lens or bug box to look closely for suspects at the scene of the crime. Tell the students to look for animals in the act of eating leaves or at the site of the plant damage. Suggest looking in buds, on the tips of branches, on the undersides of leaves, and in curled leaves. Ask the students to retain suspects in their plastic bags and share results with the other investigators. Did they identify any culprits?

4. The suspects now under surveillance may have undiscovered accomplices in the field. Organize a shake-down operation with your sweepnets or Shake-It technique. (See the “Shake-It Container” Equipment Card.) Demonstrate the technique(s) and send the students out with plastic bags to bring in the suspects for observation.
5. **Informal line-up:** Call the group together to share discoveries. Have everyone put their “bagged” suspects in a line and look for interactions. Introduce leaves into some bags. Do any insects go to them? Eat them? Are any suspects attacking other insects (acting as predators)?

CHEWING THE RAGWEED

Wrap the investigation with a brief discussion:

- Who did the dirty work? On what evidence do you make your judgment?
- What was the crime? Getting something to eat? Aren't we all guilty of that? What should the sentence be?
- Were you able to associate certain animals with certain kinds of damage?
- Did the shake down produce any animals (predators) that help keep the plant eaters under control? (Spiders, mantids, ladybugs, or others?)
- If no culprit was identified, why do you think you couldn't find one? Too hot? Too cold? Too light? Too early? Moved on?

FOLLOW THROUGH

- Plant-eating animals are known as “pests” when they dine on your vegetable garden. Set up a pair of similar gardens. Have the students try to keep pests away from one garden (screening, hand picking, garlic spray, chickens, ashes) and let nature take its course in the other. Compare the results
- Are some pests associated with only certain plants? Have the students search garden plants to find out what is causing damage to various crops.
- Are there some plants that show no insect damage? Why might that be? Have the students check leaf surfaces (tough, hairy) and the odors of such plants.
- Do animals attack parts of plants other than leaves? Suggest that the students check fruits, limbs, bark, flowers, buds, and roots.
- What animals come out to eat plants at night? Bring the group back with flashlights and do the activity at night.
- Have the students make sun prints (*Habitat Sun Prints, Set 1*) of damaged leaves. The students can use these for a record or to create a work of art.

WHAT TO DO NEXT

<i>Shake It!</i>	Set III
<i>Swell Homes</i>	Set III
<i>Web It</i>	Set III
<i>Animals in a Grassland!</i>	Set I
<i>Invent a Plant</i>	Set I
<i>Food Chain Game</i>	Set II

MYSTERY MARAUDERS
Action Assignment Card

It has been reported that some mysterious animals are eating the plants in this area. Your Action Assignment, if you choose to accept it, is to gather some leaf samples as evidence that this is true. Look for leaves with holes in the middle.

MYSTERY MARAUDERS
Action Assignment Card

It has been reported that some mysterious animals are eating the plants in this area. Your Action Assignment, if you choose to accept it, is to gather some leaf samples as evidence that this is true. Look for curled, browning, or shriveled leaves.

MYSTERY MARAUDERS
Action Assignment Card

It has been reported that some mysterious animals are eating the plants in this area. Your Action Assignment, if you choose to accept it, is to gather some leaf samples as evidence that this is true. Look for leaves that have the edges chewed away.

MYSTERY MARAUDERS
Action Assignment Card

It has been reported that some mysterious animals are eating the plants in this area. Your Action Assignment, if you choose to accept it, is to gather some leaf samples as evidence that this is true. Look for surface scraping on the leaves.