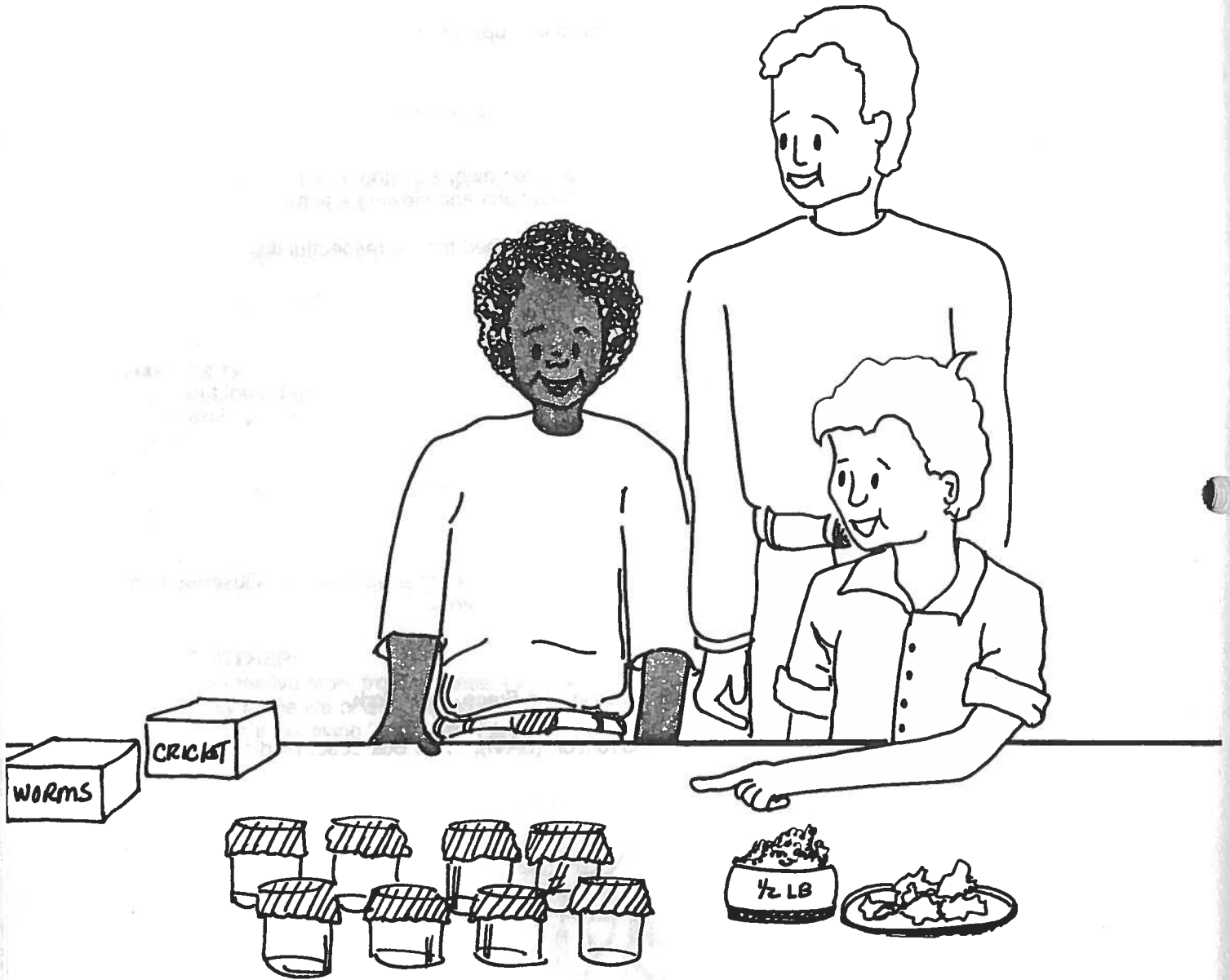


Module III

EXPERIMENTING AND OTHER RESEARCH



Entomologists (people who study insects) use experiments to learn more about a particular insect. An insect's life cycle and survival is very dependent on things beyond the insect's control, such as temperature, light and food sources. In this unit are some experiments and library research activities to help you understand what insects need to live.

TESTING THE WATER

Insects are cold-blooded animals that develop best in warm temperatures. This activity will demonstrate how water temperature affects the time it takes for mosquitoes to develop.

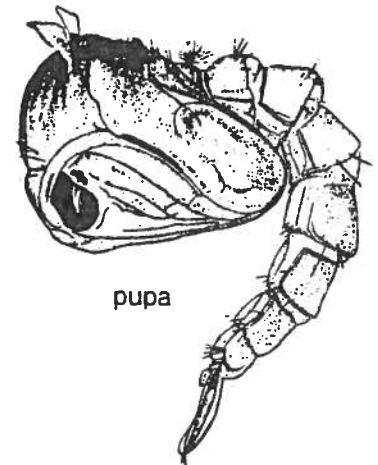
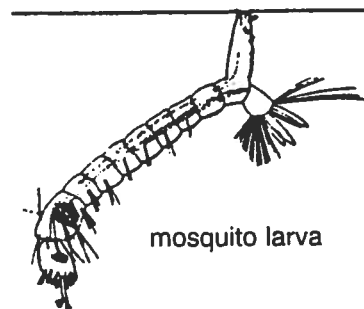
NEEDED:

- 50 mosquito larvae
- Two shallow pans of water
- A dipper or cup

LEADER DOES:

- 1- Locate a pond or pool of water with a large number of mosquito larvae (see illustration). If possible collect larvae when members can help. You may want to ask them to wear wading clothes.
- 2- Using a dipper or cup, capture about 50 larvae. Have Youth Leader help members set up the experiment (see MEMBERS DO). Encourage them to try the same experiment on their own.
- 3- Involve members in discussing what they should expect to happen.

MEMBERS DO:



- 1- Help collect larvae.
- 2- To set up experiment, put about two inches of pond water in the two pans. Put about 25 larvae in each pan. Place one pan in direct sunlight and the other in a shaded, cool area like a basement.
- 3- Observe both pans everyday, recording any changes you notice, such as:
 - When was the first pupa formed (see illustration)?
 - When did the first adult emerge?
 - Did they all emerge at the same time?

RESOURCES:

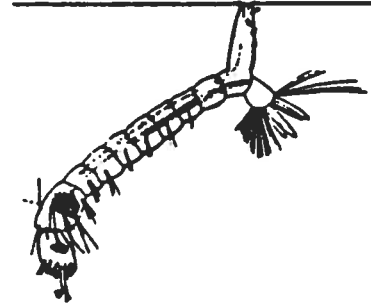
- Films available from Bureau of Audio Visual Instruction (BAVI), P. O. Box 2093, Madison, WI 53701-2093:
- "Insects as Carriers of Disease"
 - "Insect Enemies and their Control"

INSECT ACTIVITY AND WATER TEMPERATURE

Insects are very sensitive to weather, especially during their larval stage. Here, you will learn how mosquitoes react to the cold.

NEEDED:

- 10 mosquito larvae
- One quart jar filled with water
- Ice cubes



LEADER DOES:

- 1- Collect larvae and place in jar with water at room temperature.
- 2- Have youth leader explain experiment to members (see MEMBERS DO).
- 3- Involve members in discussing the results of the experiment. Are there any advantages to being a cold-water sensitive insect? Disadvantages?

MEMBERS DO:

- 1- For about 15 minutes, observe the insects' activity at room temperature. Record how they react when touched with a pencil.
- 2- Place four to five ice cubes in the jar and wait five minutes. How do they react now when touched with a pencil?

GOING FURTHER:

- Write a report about the experiment to share with fellow 4-H'ers at a club meeting.

RESOURCES:

- 101 Simple Experiments with Insects by H. Kalmus. Doubleday, Garden City, NY.

INSECT DIETS

Some insects will eat just about anything. Others have favorite foods and may eat nothing else. In this summertime activity, you will learn something about the varied diets insects have, and begin to understand why they can be difficult to raise in captivity.

NEEDED:

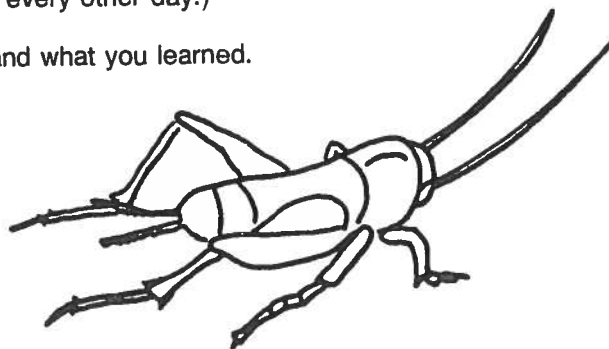
- Eight quart jars covered with tight-fitting mesh or gauze
- Four small vials of water with cotton wicks
- One-half pound of grain
- A small amount of dog or cat food
- Some leaf lettuce
- 40 insects of the same kind (crickets, or what you can find or purchase at a pet or bait store)
- 40 cabbage worms or other available larvae (these may also be purchased)

LEADER DOES:

- 1- This experiment takes one to two weeks to complete. It can be set up at a central location, where members can observe it frequently. Or, it can be assembled at a meeting. Then members can "adopt" one or more jars to watch at home, keeping a record of their observations and sharing the results at the next meeting.
- 2- Collect the insects and worms. You may want to have members assist.
- 3- Have Youth Leader help set up the experiment (see MEMBERS DO).

MEMBERS DO:

- 1- Number the jars 1 through 8.
- 2- Fill jars as follows:
 - Jars 1 and 2, water vial in each jar;
 - Jars 3 and 4, one-fourth pound of grain in each jar;
 - Jars 5 and 6, one tablespoon of dog/cat food and water vial in each jar;
 - Jars 7 and 8, one leaf lettuce in each jar.
- 3- Place 10 crickets in each odd-numbered jar.
- 4- Place 10 cabbage worms (or other larvae) in each even-numbered jar.
- 5- Store jars in a dry, warm place with low humidity.
- 6- Check jars daily for insect survival, to determine which food is best for which insects. (Change the dog/cat food and lettuce every other day.)
- 7- Write a short report of your findings and what you learned.



PICKY INSECT EATERS

By examining the food preferences of cabbage worms or loopers, this summertime activity will help you understand the disadvantages of being a "specialized" feeder.

NEEDED:

- Cabbage worms or loopers
- Grass and as many other plants as you want to test
- Small jars with tight-fitting mesh tops (one for each plant you choose)

LEADER DOES:

- 1- This activity takes at least five hours to complete. It may be possible to schedule the experiment along with a picnic or other event. If not, plan to complete parts one to three of MEMBERS DO at the meeting, and have members complete the rest on their own, recording the results to share at the next meeting.
- 2- Locate some worms on a cabbage plant or other garden plant. If possible, collect when members can help.
- 3- Have youth leader explain and help set up the experiment.
- 4- Involve members in discussing what they should expect to happen. Remind members that cabbage worms are larvae. What will the mature insect be like? Talk about how information about an insect's diet can be used to help control its population.

MEMBERS DO:

- 1- Help collect worms.
- 2- To set up experiment, place the worms on plants other than cabbage and observe them regularly over an hour.
- 3- List the plants they do and don't feed on.
- 4- Next, place the worms in containers with no food for about four hours. Then put the worms back on the same plants to see if they behave differently after going without food.

GOING FURTHER:

Find information on mosquitoes, aphids, roaches and cabbage worms. Do the adults eat the same foods as the young? What are the advantages of young and adults having the same diet? Do food requirements vary between males and females of the same species?

RESOURCES:

Everyday Doings of Insects by Evelyn Cheesman. McBride Publishing.

COUNTY INSECT CAMPAIGN

Many states have insect mascots. Learn these state representatives and then select a candidate as an official insect for your county. Become more aware of local government by planning a campaign to convince county officials to adopt an insect mascot.

NEEDED:

Library or other informational resources
Paper and drawing materials

LEADER DOES:

- 1- Ask your local librarian for help finding information on various state insects. Check out information or ask if the 4-H group can hold its meeting at the library.
- 2- Guide members in discovering which states have insect mascots, choosing a county insect and planning a county insect campaign.

MEMBERS DO:

- 1- Find out the insect mascots of various states. Does Wisconsin have a state insect? If so, what is it?
- 2- If you were to choose an insect mascot for your county, what would it be? Why?
- 3- Discuss how you would conduct a campaign to get the insect you've selected adopted as your county's mascot. Write down the steps in outline form.

GOING FURTHER:

Draw a United States map, indicating which states have insect mascots, and what the insects are, or design a logo that could be used in a campaign for a county insect.

Carry out your planned campaign for a county insect, keeping a scrapbook that could be displayed at the fair.

ENDANGERED INSECTS

Endangered animals are those which face extinction. In this activity, you will find out if any insects are endangered.

NEEDED:

One or more federal endangered species lists
Library or other informational resources
Paper and pencil

LEADER DOES:

- 1- Locate a federal endangered species list at the library, local Extension office, or Department of Natural Resources office.
- 2- Plan meeting location so members can research endangered insects in books or encyclopedias. If that is not practical, have them do research on their own, and report back to the group at the next meeting.
- 3- Guide members in discussing what it means when animals are "endangered" and "threatened."

MEMBERS DO:

- 1- Use the federal endangered species list to discover whether any insects are listed as endangered. What does such a listing mean? Are any insects listed as "threatened"? What does threatened mean? Is threatened different than endangered?
- 2- Choose one of the insects and answer the following questions about it:
 - Where does it live?
 - What does it eat?
 - How many are left?
 - Why is it endangered or threatened?
 - How (if known) is the insect valuable?
- 3- Prepare a short oral report to let others in your group know what you have found.

GOING FURTHER:

Give a talk about endangered species at a meeting of your 4-H club or other community organization. Focus on endangered insects.