

MODULE IV

COLLECTING



Many people find collecting insects the best part of entomology. These activities will guide you as you start collecting. You will want to read and do the activities on making insect collecting equipment before doing the other activities.

MAKE A COLLECTING NET

A net is an important tool for collecting insects. This activity will show you how to make your own.

NEEDED:

Small wooden handle three to four feet long (can use one-half inch dowel or old broom handle)
Heavy, stiff wire (can use heavy clothes hanger)
Heavy cord, fine wire or friction tape
Muslin or canvas
Marquisette, scrim or very fine strong net (do not use cheesecloth)
Sewing machine, or needles and thread
Saw, drill and hammer

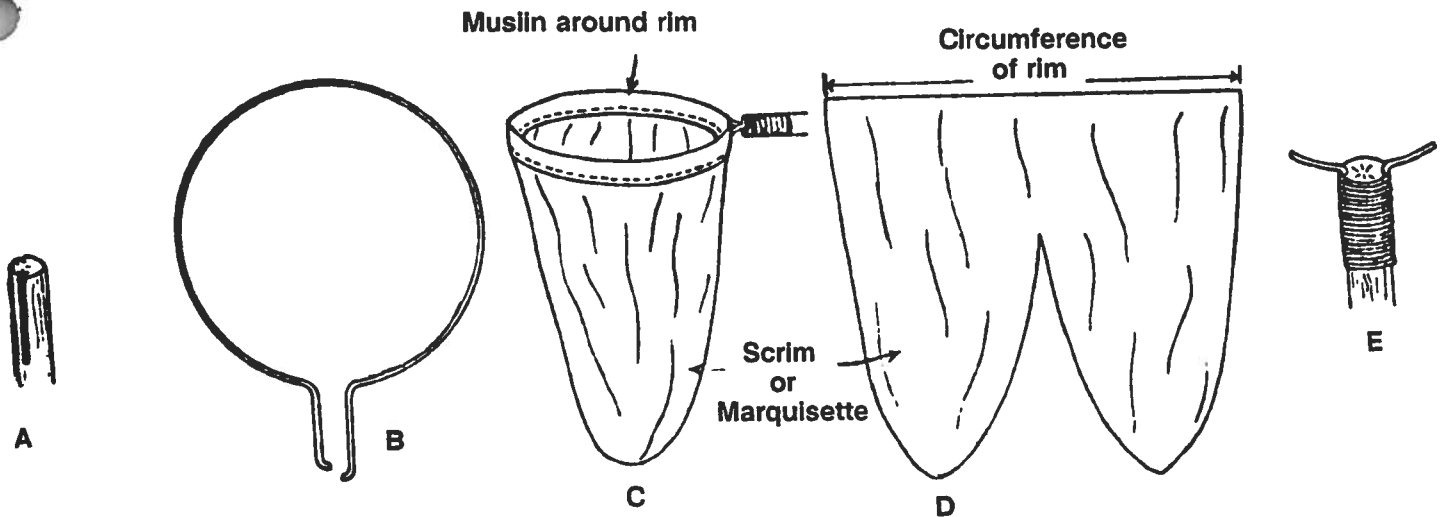
LEADER DOES:

- 1- Plan ahead. Depending on the members' ages and skill levels, you may want to cut and sew the bag part of the nets before the meeting, and/or pre-cut the grooves and holes in the handles. You may want to have members bring at least some of the materials they will need to construct their nets.
- 2- Examine the diagram and instructions in the MEMBERS DO section. Provide each member with a copy. This activity works best if you make a net before the meeting to use as a sample. If possible, have youth leader help you.
- 3- Work with youth leader to guide members in constructing their own insect collecting nets.

MEMBERS DO:

- 1- Bring any assigned materials to the meeting.
- 2- Look over the following information and follow the instructions as you make your own insect collecting net.

WHAT TO DO:



- In one end of the handle, cut about a two-inch groove and shallow holes as shown in A.
- Bend wire into a hoop 12 to 15 inches in diameter, with ends bent as shown in B.
- Cut and sew two pieces of cloth as shown in C and D. The heavier fabric should be cut about four inches deep and a little wider than the circumference of the rim. It will be folded in half to make the rim and sewn to the top of the lighter fabric bag. The lighter fabric should be cut the same width as the heavy material and about 24 inches deep.
- Slip the bag on the wire. Fit the wire into the grooves and holes in the handle, and fasten securely with the cord, wire or friction tape as shown in E.

RESOURCES:

Collecting, Preserving, and Studying Insects by H. Oldroyd. Macmillan Press.

Many materials needed for an insect collection can be made. They can also be purchased from supply houses like those listed below. (Many county Extension offices have catalogs from biological supply houses you can look at or borrow.)

- American Biological Supply Co., 1330 Dillon Heights Ave., P.O. Box 3149, Baltimore, MD 21228
- Entomological Supplies, Inc., 5655 Oregon Ave., Baltimore, MD 21227
- General Biological Supply House, Inc., 8200 S. Hoyne Ave., Chicago, IL 60620
- NASCO, 901 Janesville Ave., Fort Atkinson, WI 53538
- Ward's Natural Science Establishment, Inc., P.O. Box 1712, Rochester, NY 14603

MAKE A KILLING JAR

An insect killing jar is a useful tool for entomologists. This exercise shows you how to make your own.

NEEDED:

Wide mouth glass jar (at least one pint) with tight lid
Cotton or other absorbent material
Cardboard (double-faced corrugated is best)
Ethyl acetate (found in some nail polish removers)

LEADER DOES:

- 1- You may want to have members bring their own jars and you provide the other materials.
- 2- Look over the sections, INFORMATION YOU WILL NEED and WHAT TO DO.
- 3- Work with a youth leader to guide members in making their own insect killing jars.

MEMBERS DO:

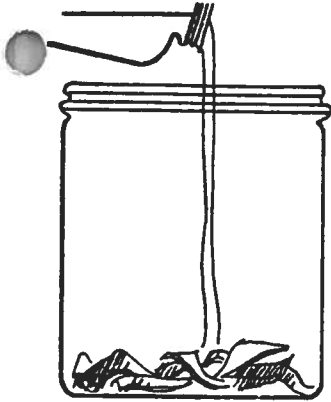
- 1- Bring any assigned materials to the meeting.
- 2- Make your own killing jars for collecting insects after reading INFORMATION YOU WILL NEED and WHAT TO DO.

INFORMATION YOU NEED:

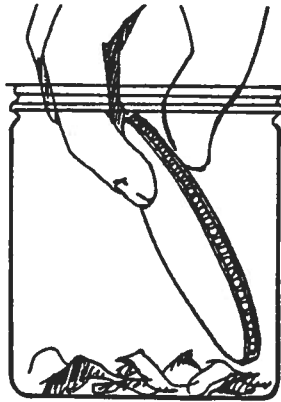
Some insects must be killed immediately after capture so they do not become damaged by trying to escape or by other insects. Larger insects like butterflies, moths and mosquitoes are particularly vulnerable to injury. These should be placed in a killing jar right away or isolated in a separate jar. Other insects like beetles are easier to carry home alive (in a container), although it's still wise to isolate them so they do not damage or eat each other.

Placing the containers in a freezer kills the insects quickly. (Don't forget to ask permission to put insects in the freezer. Otherwise, they can cause unpleasant surprises.) Specimens can be stored in the freezer until you find a convenient time to handle them. Pinning should be done immediately after thawing.

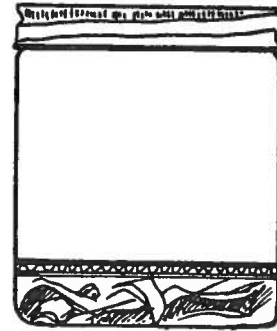
WHAT TO DO:



Ethyl Acetate



Cardboard circle



Lid on tight

- 1- Place the cotton in the bottom of the jar.
- 2- Cut the cardboard into a circle that will fit snugly into the jar.
- 3- Pour the ethyl acetate over the cotton and cover with the cardboard circle.
- 4- Keep the jar sealed tightly except when insects are being placed in it or removed from it. This will keep the chemical active longer but you will still need to recharge the jar regularly by removing the cardboard and adding more ethyl acetate.

RESOURCES:

Collecting and Preserving Plants and Animals by J. W. Knudson. Harper and Row, NY.

MOUNTING AND MORE

Insects are mounted and preserved in various ways. This exercise introduces you to the proper ways to care for and display an insect collection.

NEEDED:

Cigar boxes or any similar sized boxes with covers
Cork, heavy corrugated cardboard, or soft fiberboard
Glue
Moth balls
Insect pins (sewing pins can be used)
Matches

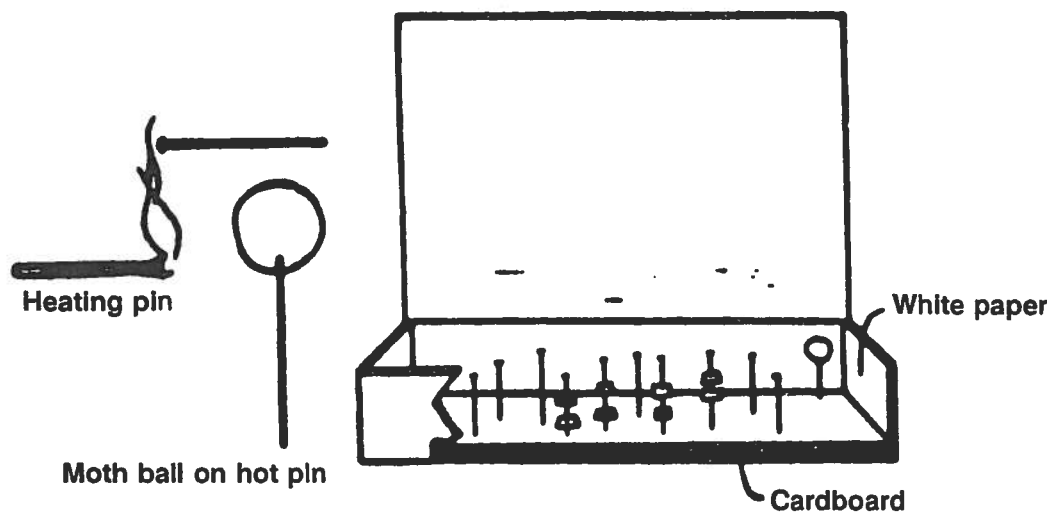
LEADER DOES:

- 1- Plan ahead. You may want to have members bring at least some materials to construct their first collection box.
- 2- Read the WHAT TO DO and GOING FURTHER sections.
- 3- Guide members in constructing collection boxes, and lead them in discussing the other equipment and procedures discussed in GOING FURTHER. Encourage them to try some of these on their own.

MEMBERS DO:

- 1- Bring any assigned materials to the meeting.
- 2- Follow the instructions in the WHAT TO DO section to make a simple collecting box.
- 3- Read GOING FURTHER to learn how to mount and display the insects you collect and how to care for them.

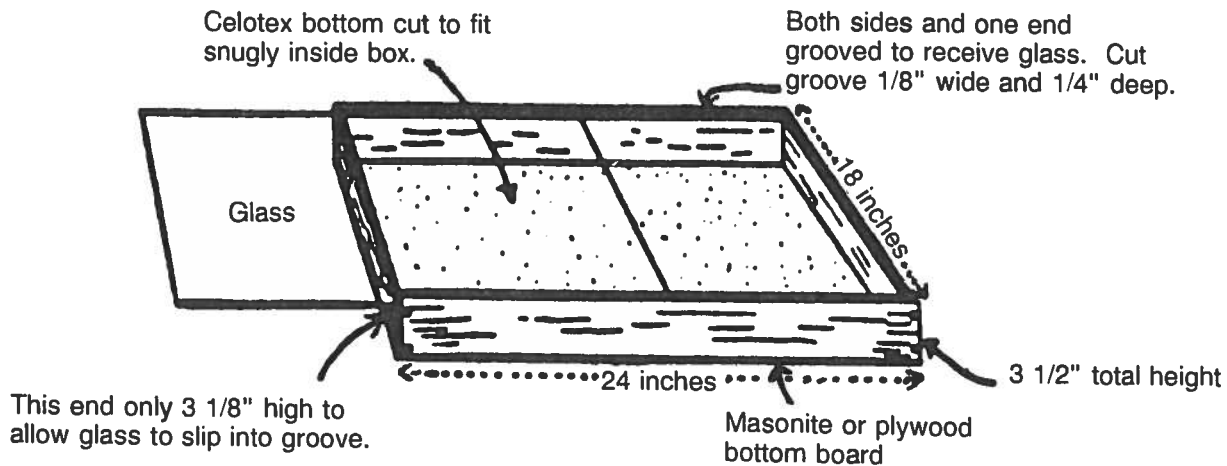
WHAT TO DO:



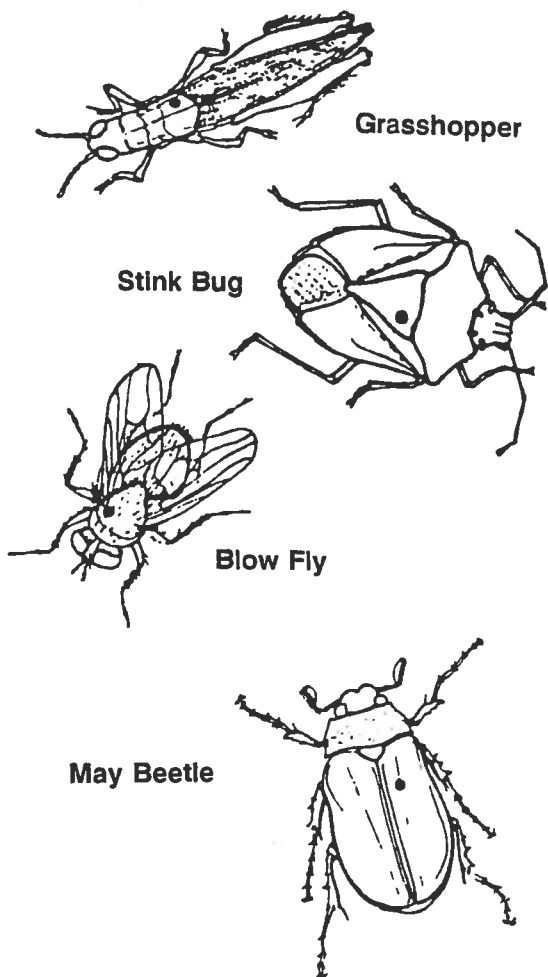
- 1- Cut the cardboard to fit snugly in the bottom of the box and glue to make a mounting box.
- 2- Heat a pin, stick through a mothball, and insert in one corner of the box to protect your collection.

GOING FURTHER:

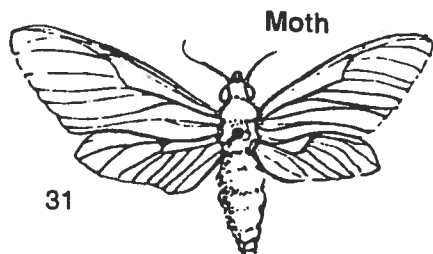
Housing Your Collection: To remain in good condition, most insects need to be pinned and kept in boxes that protect them from dust and pests which feed on dried specimens. If you plan to use your collection for study purposes only, then boxes like cigar boxes are fine. If you want to display insects, or to maintain your collection for many years, a more elaborate box is desired. You can buy boxes from supply houses or make your own as in the illustration.



Preparing Insects for a Pinned Mount Display: Each insect group has its own characteristics of shape and body balance, making it necessary to learn how to correctly pin the different orders of insects. In the following drawings, the black dot on the insect's back marks the spot for pinning.



- 1- Grasshoppers, crickets, katydids, etc.: Pin through thorax to the right of the middle line.
- 2- Stink bugs, box elder bugs, water striders, etc: Pin through scutellum or V-shaped shield to the right of the middle line.
- 3- Bees, wasps, flies: Pin through thorax a little behind the base of the forewings and to the right of the middle line.
- 4- Beetles: Pin through right wing cover near the base.
- 5- Moths, butterflies, dragonflies, etc.: Pin through middle line of thorax at the thickest point or a little behind the base of the forewings.
- 6- Small insects: Mount with glue on a cardpoint. Cardpoints are 3/8-inch long triangles of light cardboard. A drop of glue put on the point will hold the insect. Put pin through wide end of point. Insects mounted this way should be on the left side of the pin facing forward.

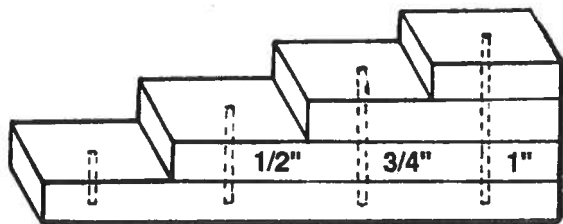


Cardpoint

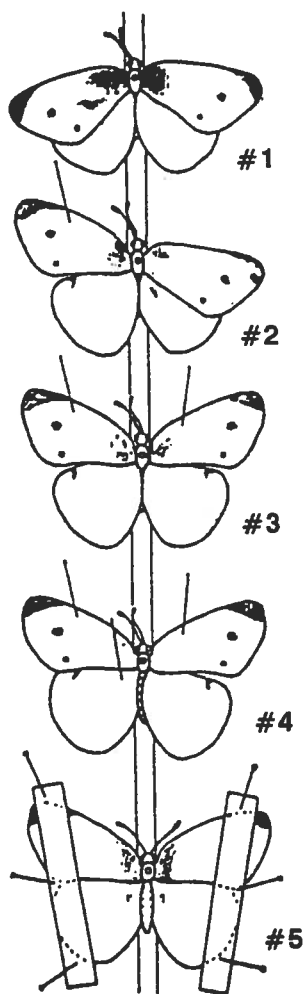
More about Pinning: To make a pinned insect collection appear neat and orderly, insects should all be at the same height on the pin. For best results, this should be done while the specimen is fresh and still soft.

It is easiest to do this with the help of a pinning block. The illustration shows you how to make a simple one.

A Pinning Block

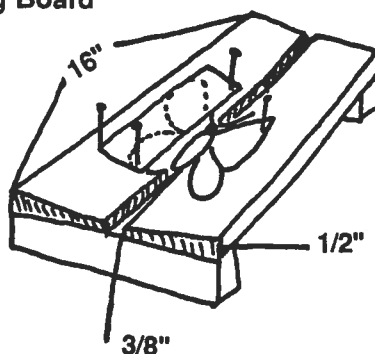


Moths and Butterflies are Special: Moths and butterflies are mounted as follows:



- 1- Pin them through the thorax as other insects. Be careful not to handle them roughly as this removes some of the delicate scales on the wings which form the colored pattern.
- 2- Push the pin through the center slot of a spreading board until wings are even with the side pieces.
- 3- Use an insect pin to bring the front wings forward. Pull the wings forward until the rear margin of the first pair of wings is perpendicular to the body.
- 4- Pull the second pair of wings forward until the front margin is just beneath the first pair of wings.
- 5- If the wings do not lie flat on the board, they can be anchored with a strip of paper.
- 6- The insect should remain on the spreading board for a week of drying.

Spreading Board



Steps in the proper spreading of the wings of moths and butterflies.

Make a Riker Mount: A Riker Mount is a cotton-filled cardboard box with most of the lid removed and replaced with glass or acetate (clear plastic). The glass top holds the insects in place on the cotton. Such mounts are easy to construct and make a nice display for many kinds of insects.



- 1- You will probably want a box that is no larger than 12 by 16 inches. Choose one with a lid (or you can make a lid). If the box is deeper than a few inches, carefully cut it down. (You can also use two tops from gift boxes.)
- 2- Place the cotton in the box. It should be thick enough to extend just above the sides of the box before the lid is put on. Be sure to enclose a moth ball to protect specimens.
- 3- Cut a window in the top of the box. Cut the glass or acetate a little larger than the window and secure with masking tape. When your display is prepared, you will probably want to bind the box and lid securely together with cellophane or masking tape.

Preparing Insects for a Riker Mount Display: When preparing insects for a Riker Mount, keep in mind the insect's outstanding features and allow the specimens to dry in a position that will not hide those features. Remember that in Riker Mounts, specimens should be displayed right side up.

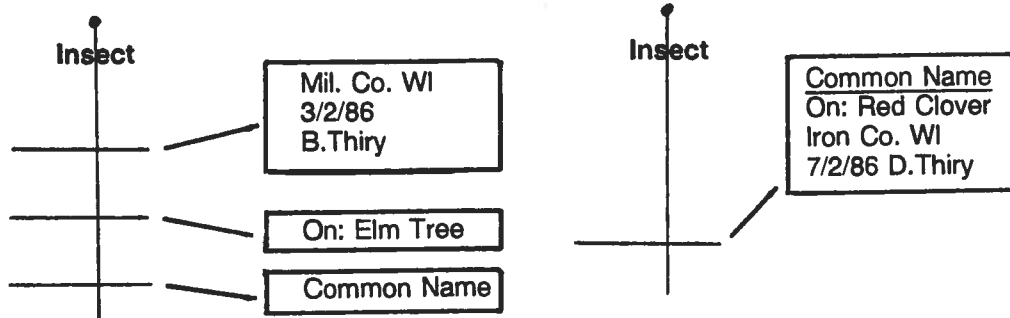
Preserving Immature Forms: It is not possible to mount caterpillars or other larvae on pins or in Riker Mounts. A number of different methods are used for these. The simplest method is to put the live larva into boiling water for about five minutes. The boiling water instantly kills and hardens the specimen. Take the larva from the water and place it in a small vial of rubbing alcohol. The same information should be placed in the vial with the larva as you put on the other labels. Use waterproof ink or pencil to write the label that goes inside the bottle.

Protecting Your Insect Collection: Several types of small beetles, book lice and red ants readily feed on dried insect specimens and may ruin an entire collection unless properly protected.

Common naphthalene flakes from which moth balls are made is a good repellent. They may be used either in the flake or ball form. Flakes can be spread on the bottom of the board or placed in small containers which are in turn fastened to the box. If moth balls are used, they can be fastened to the head of a common stick pin. These moth balls or flakes will then prevent insects from entering your collection and destroying it. Remember to periodically check the collection; you will need from time to time to add moth balls or flakes.

How to Label Your Insects: The most important thing with labeling your insects is to make sure you include all the required information. It is better to give too much information than not enough. Required information: (1) insect's common name (scientific name, order is optional); (2) where you collected it (plus the county and state); (3) date you collected it; and (4) your name or initials.

For pinned collections there are two methods. Choose one:



For Riker Mount collections there is only one method:



Common Name
On: Cabbage
Clark Co. WI
7/1/86 M.Thiry

Note: All labels should be on cardstock (index card paper) if at all possible. Also, all labels in a collection should be of the same size. Try to conserve space; do not make your labels too large.

RESOURCES:

An Introduction to the Study of Insects by Donald J. Borror and D.M. DeLong. Rinehart, New York.

Field Book of Nature Activities by W. Hillcourt. G. P. Putnam and Sons, New York.

WHO LIVES WHERE - PART A

Where an insect lives determines many of its characteristics. This activity involves making and comparing collections from a field and a garden.

NEEDED:

Information on collecting in Module IV -- Activities 1, 2 and 3
Collecting and mounting equipment

LEADER DOES:

- 1- Plan ahead. You may need two meetings to complete this activity in which members will collect insects from two locations -- a field area and a garden (alternate locations could be a park, open yard or basement). Read MEMBERS DO.
- 2- Work with youth leader to help members collect and mount insects according to the directions in the first three activities in Module IV. Have members keep four to six insects found in each location. Help identify and label as many specimens as possible by order and/or common name.
- 3- Guide members in answering the questions in MEMBERS DO.

MEMBERS DO:

- 1- Bring the necessary equipment to collect and mount the insects you find in the different locations.
- 2- After preparing, mounting, identifying and labeling each specimen, answer these questions:
 - In which location did you find the most kinds of insects?
 - Where did you find the most colorful insects?
 - Did you find any of the same insects in the two locations?
 - Would the insects to be found in a certain spot be different during another month or season?

GOING FURTHER:

Collect insects from the same locations on three additional dates -- try to do your collecting in May, June, July, and August or September.

RESOURCES:

The Gardener's Bugbook by C. Wescott. The American Garden Guild and Doubleday & Co., New York.

Film available from Bureau of Audio Visual Instruction (BAVI), P. O. Box 2093, Madison, WI 53701-2093:

- "Insects in a Garden"

WHO LIVES WHERE - PART B

Many insects spend at least part of their lives in wet habitats, in or near water. Others live on land. In this activity, you will collect insects from both environments to identify and compare.

NEEDED:

Information on collecting in Module IV -- Activities 1, 2 and 3
Collecting and mounting equipment

LEADER DOES:

- 1- Plan ahead. You may need two meetings to complete this activity in which members collect insects from two locations -- a dry land habitat (hayfield, open field, city park, yard) and wetland habitat (close to lakes, ponds, streams, rivers, marshes). If members have completed the WHO LIVES WHERE - PART A, compare insects collected in that activity with wetland insects.
- 2- Work with youth leader to help members collect and mount insects according to the directions in the first three activities in Module IV. Have members keep four to six specimens found in each location. Help members identify and label as many insects as possible by order and/or common name.
- 3- Guide members in answering the questions in MEMBERS DO.

MEMBERS DO:

- 1- Bring the necessary equipment to collect and mount insects you find in different locations.
- 2- After preparing, mounting, identifying and labeling each specimen, answer these questions:
 - In which location did you find the most different insects?
 - Where did you find the most colorful insects?
 - Did any of the water insects have any parts (adaptations) that appear to help them survive in or near water?

GOING FURTHER:

Research one of the insects you found from the wet habitat and one from the dry land environment. Write a short report on how these insects are adapted to their home. Describe and draw a picture of an imaginary insect that could live in both places.

BAITING INSECTS

Insects are attracted to different odors, which they usually associate with food or mating. By using foods that smell differently as bait, this activity will help you collect a number of different insects.

NEEDED:

Information on collecting in Module IV -- Activities 1, 2 and 3
Three wide-mouth quart jars
A ripe banana
Small amount of raw meat (hamburger will do)
A slice of bread
Collecting and mounting equipment

LEADER DOES:

- 1- You may want to set up the materials before the meeting begins (read INFORMATION YOU WILL NEED). Then have members check the jars at the meeting's start and again after an hour or more.
- 2- Guide members in answering the questions.

MEMBERS DO:

- 1- Bring the necessary equipment to collect and mount the insects that are drawn to the different odors.
- 2- After preparing, mounting, identifying and labeling each specimen, answer these questions:
 - Which bait attracted the most insects?
 - Which insect order was attracted most frequently?
 - Which bait attracted the most different kinds of insect?
- 3- Write a report on your findings.

INFORMATION YOU NEED:

- 1- Place the wide-mouthed jars on their sides, about five feet apart and out of direct sunlight.
- 2- In Jar 1 put the ripe fruit; in Jar 2, the raw meat; and in Jar 3, the bread.
- 3- Collect as many insects as you can after several hours, separating them according to the bait used to catch them.

GOING FURTHER:

Do the experiment on your own, checking the jars for insects after four hours, one day, three days and one week. Then, set out three baited jars at night and collect the insects the next morning. Write a report on your findings.

INSECTS OF THE NIGHT

Many insects are only active at night. This activity tells you two methods used to attract these night-loving insects.

NEEDED:

Information on collecting in Module IV -- Activities 1, 2 and 3

Collecting and mounting equipment

Large white bedsheet and flashlight; OR flashlight or light bulb with extension cord, one-pint jar half-full of alcohol, and one two-foot square sheet of construction paper

LEADER DOES:

- 1- Plan a night meeting and have members try one (or both) methods of attracting night-time insects (see MEMBERS DO).
- 2- Work with youth leader to help members collect and mount insects according to the directions in the first three activities in Module IV. Help members identify and label as many specimens as possible by order and or/common name, and answer the questions in MEMBERS DO.

MEMBERS DO:

- 1- Bring equipment for collecting and mounting insects.
- 2- Try at least one of the following methods to collect at night:

White Sheet Method

- Hang a white sheet outside.
- Shine a flashlight on it.
- Capture the insects that are attracted to it.

Berlese Funnel Method

- Using the construction paper, make a funnel at least eight inches in diameter at the large end and, at the other end, slightly smaller than the mouth of the jar.
- Place the small end of the funnel into the mouth of the jar that is half full of alcohol.
- Suspend a light about eight inches above the funnel and leave it on for a few hours.

- 3- Mount and label the insects you collect.
 - How many of them would you classify as crawlers?
 - How many were fliers?
 - What do you think the insects that you caught feed on?