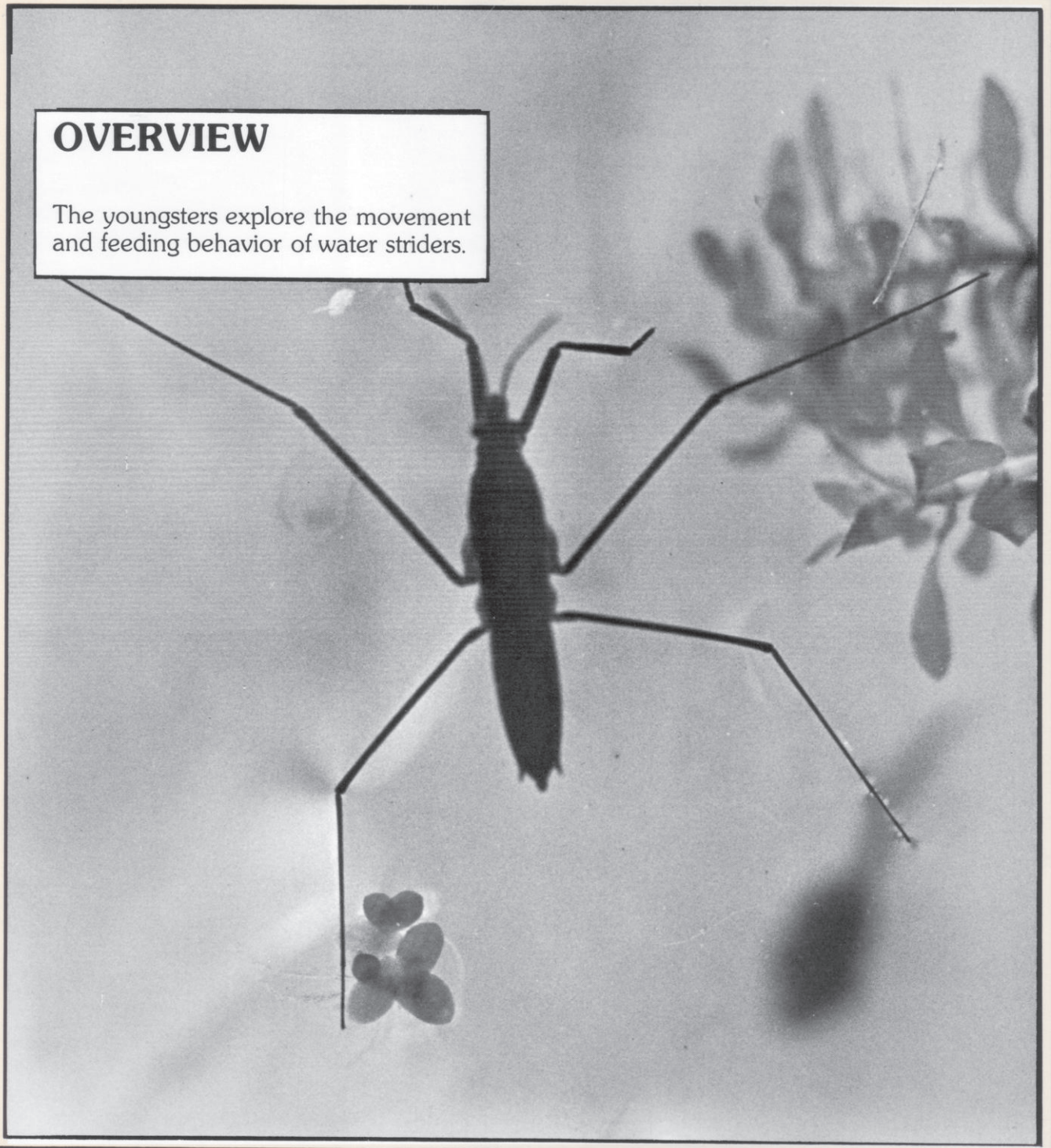
WATER STRIDERS

BIO KEY

Aquatic Organism Investigation
Insect Behavior
Experiment

OVERVIEW

The youngsters explore the movement and feeding behavior of water striders.



BACKGROUND

The darting movement of the water strider is a common sight at many streams, brooks, and ponds. Striders are insects that move across water using their middle legs as oars, and steering with their rear legs. A strider can walk on water because it has long legs covered with hundreds of tiny hairs that distribute its weight over a large area of water. The surface tension of water supports striders just as it can support a carefully placed sewing needle.

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Water striders are voracious feeders, eating insects (dead or alive) and other tiny animals that land on the water's surface. Like all members of the waterbug family, striders have long, thin beaks for mouths. The beak is used as a straw to suck body juices from prey. Striders locate their food by both sight and their ability to detect the vibrations tiny animals create when struggling to escape from the water. Striders may wait for food to drift by or may actively "skate" across the water searching for food. Water striders breed during the spring and early summer. During these seasons it is common to see striders riding "piggy-back" as they mate.

CHALLENGE: INVESTIGATE WATER STRIDERS' MOVEMENTS AND FEEDING BEHAVIORS.

MATERIALS

For each buddy team:
1 sweepnet*
1 observation tray*
1 bug box* or magnifying lens*
1 clear plastic cup*
2 half-meter-long sticks or flags*
1 meter tape* or meter stick*

For the group:
pipe cleaners*
bright acrylic or thick tempera paint in a small plastic container
1 copy of the "Aquatic Observation Aids" Equipment Card*
1 copy of the "Sweepnet" Equipment Card*
1 two- to three-gallon bucket (or large dishpan*) for every four to six kids

* Available from Delta Education.

PREPARATION

Group Size. This activity works best with groups of less than fifteen kids. For large groups, you will need an assistant to help you conduct the activity and an activity site that is large enough and contains enough striders for a larger number of youngsters.

Time. Time limits are difficult to set for this activity. Plan on one or more activity periods totaling one to two hours. The activity works best on warm, sunny days.

Site. Select a freshwater site with banks that are not too steep or slippery. There should be at least two striders for every youngster. Find a level area near the site for sharing observations. You will also need a grassy or bushy area nearby for sweepnetting insects to use in the "Strider Feeding Behavior" investigation. If necessary, obtain permission to use the site.

Materials. See the "Aquatic Observation Aids" Equipment Card and the "Sweepnet" Equipment Card in this folio for instructions on making and using the equipment.

The sweepnet is used in this activity as both an aquatic dip net and a terrestrial sweepnet. Practice using the sweepnet with an underhand scooping motion to catch striders before conducting the activity.

Safety. When working around the water, use the buddy system. (See the "Safety" section of the *Leader's Survival Kit* folio.)

Conservation. Establish some rules of procedure to promote respect for the activity-site environment. Refer to the "Conservation—Take 'Em Back Alive!" section in the *Leader's Survival Kit* folio.

ACTION

Catching and Observing Striders

1. Divide the group into buddy teams, and establish the limits of the activity site.

2. Announce to the kids that they will be exploring the movement and feeding behavior of water striders.

3. While emphasizing the need for gentle handling, show the youngsters how to:

- slowly and quietly approach wary striders.
- use an underhand scooping motion to net the striders.
- transfer a netted strider into an observation tray.
- use a magnifying lens or bug box lid to view the strider.
- use a clear plastic cup to view striders from the side.

4. Give each team a net, an observation tray, and a lens or bug box. Challenge each team to catch two striders. Suggest that the buddy without the net can help by herding striders toward the net. Circulate among the teams, and encourage the kids to closely observe their captured striders by asking questions such as:

- How many legs do striders have?
- What parts of their legs do striders place in the water for support?
- Which legs do striders use to move?
- Are striders wet or dry?

5. After ten to fifteen minutes, gather the youngsters to share observations.

Strider Movement

1. Ask the teams if they think striders tend to stay in one place or travel long distances. Encourage the kids to suggest ways to find out.

2. Explain that an individual strider's movements are easier to follow if the strider is marked in some way.

Demonstrate this strider-marking technique:

a. Herd a strider from an observation tray into a plastic cup.

b. Bend the tip of a pipe cleaner back on itself so no sharp wire is exposed. Use the pipe cleaner to dab a small dot of thick tempera or acrylic paint on top of the strider's rear end (abdomen). Let the paint dry.

c. Emphasize that only a *small dot* of paint is needed—no "slopping" the striders with paint! Avoid getting paint on the strider's legs.

Have each team mark their striders.

3. Demonstrate the following method for releasing striders. Lower the plastic cup into the water so the cup slowly fills with water. Then tip the cup so the marked strider "pours" out with the water. Hand out two half-meter sticks or flags, and a meter tape to each team. Ask the teams to select a spot in the stream or pond at which to release one of their marked striders. Each team should place a stick at that point.

4. Explain that when you yell, "Let them go!", each team will release one marked strider and follow its movements. Caution the teams not to interfere with their striders after releasing them. Explain that after five minutes, you will yell

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"Stop!" Each team should then place their second stick at the farthest point reached by their strider. Then each team will measure with the meter tape the distance travelled by their marked strider.

5. Allow time for each team to set up, and then signal for the release. After five minutes, signal the stop. After the teams measure the distances, call them together to compare travelling distances of the marked striders.

6. Suggest that each team release a second marked strider in a different spot, e.g. in strong currents, in the sun or shade, or in the middle rather than at the edge of the water. Ask the teams to watch their striders for three to five minutes to discover where striders spend most of their time. Have the teams share their discoveries.

Strider Feeding Behavior

1. Tell the youngsters that they are going to offer striders small insects in order to observe strider feeding behavior.

2. Have the kids fill the buckets or dishpans three-quarters full of water, and catch about six striders for each bucket.

3. Take the group to a grassy or bushy area and demonstrate the sweepnetting technique. (First, shake the net vigorously to remove water remaining from netting striders.) Let the teams net some insects and then return (keeping the insects in the nets) to the strider site.

4. Ask the teams to first dunk the netted insects, net and all, in the water to slow the insects down. Then have the teams release the insects into the buckets by turning the nets inside out. Wet insects can also be released directly into the pond or stream near a bunch of striders.

5. Challenge the teams to discover how the striders catch and eat their food. Caution the youngsters to remain still while observing the striders. After the kids have observed the strider grabbing insects, suggest that each team take a closer look at feeding behavior by using a clear plastic cup to gently scoop up a strider that has caught an insect.

6. After ten to fifteen minutes, call the teams together to share their discoveries.

STRIDING AHEAD

Ask the youngsters how they think striders eat. Because this process is difficult to figure out, kids usually come up with some wild ideas. If this is the case, ask the kids how people would eat if their mouths were like straws. Then call attention to the strider's beak. Explain that striders jab their beaks into prey and suck out body juices. Ask the kids to look for a strider's beak sticking into an insect.

Release the striders at the end of the activity.

STRIDERS REVISITED

Return within a few weeks to locate marked striders. How far have the marked striders moved from the area where they were released?

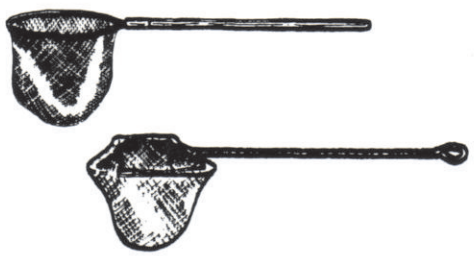
AQUATIC OBSERVATION AIDS:
For Aquatic Activities
Equipment Card 2 Side 1

Bug Boxes

A bug box is a small, clear plastic box with a magnifying lens for a lid. To use the bug box, place an object or organism in the box and replace the lid to magnify the contents. When exposed to direct sunlight a closed bug box heats up rapidly, so release organisms promptly after observing them. The lid can also be used separately as a magnifying lens.

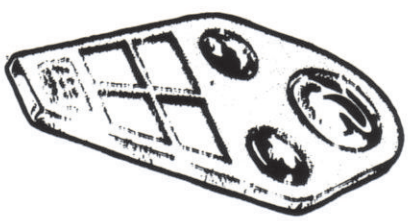
Dip Nets

Nets can either be made or bought. Aquarium nets work fine. You may want to extend the reach of an aquarium net by attaching a dowel, a stick, or a similar extension to the handle. A gradual, gentle scoop of the net is usually more successful and less damaging to organisms than a sudden, violent scooping motion. To prevent eye accidents, ask that the nets never be raised above shoulder level.



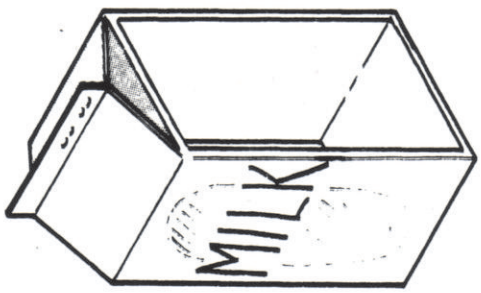
Magnifying Lenses

To use a magnifying lens, hold the lens close to one eye and move either your head or the object back and forth until you can see the object clearly.

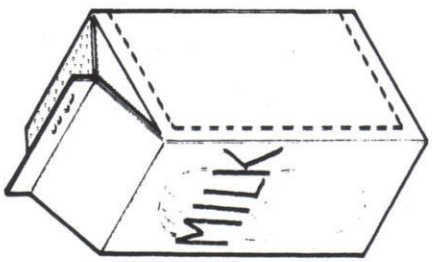


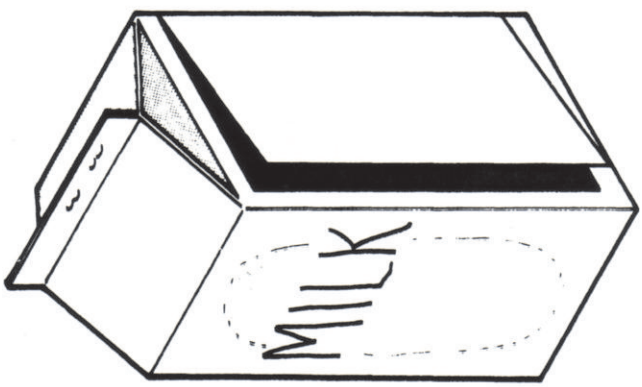
Observation Tray

Any container that will hold water can serve as an observation tray. Containers with light-colored bottoms are best for easy viewing of organisms that have been added. Half-gallon milk cartons can be made into deluxe observation trays. To make one, staple the pouring spout closed and cut out the carton wall on the same side as the stapled pouring spout.



To make a hinged-top observation tray, just cut along three sides (two short and one long) of the carton wall on the same side as the stapled spout.





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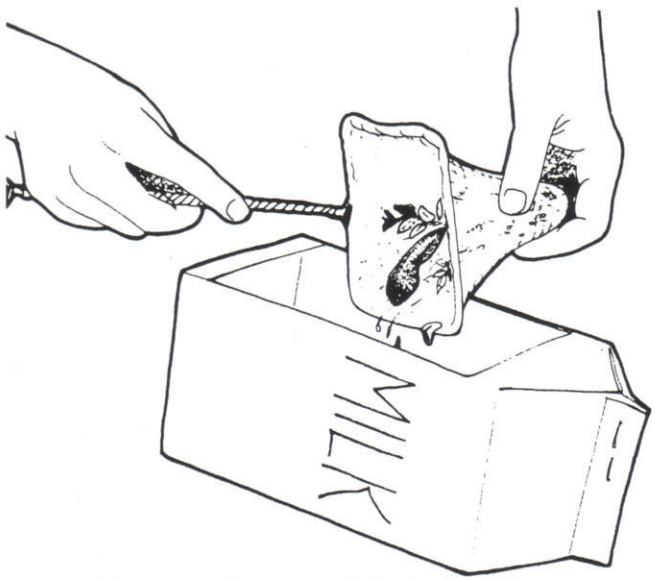
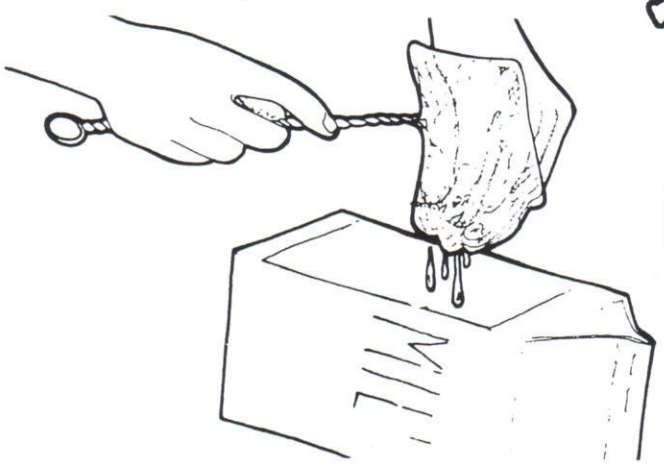
AQUATIC OBSERVATION AIDS:
For Aquatic Activities
Equipment Card Side 2

Transferring critters to observation trays. When using a net to transfer critters, first swish the net through the water without releasing the organisms. (You can use the pond or stream you are investigating.) The rinsing removes any sediment you may have netted. Fill your observation tray about one-half full of water (preferably water from the organism site). Hold the net hoop over the tray,



turn the net inside out, and dip the net bag into the water in the tray.

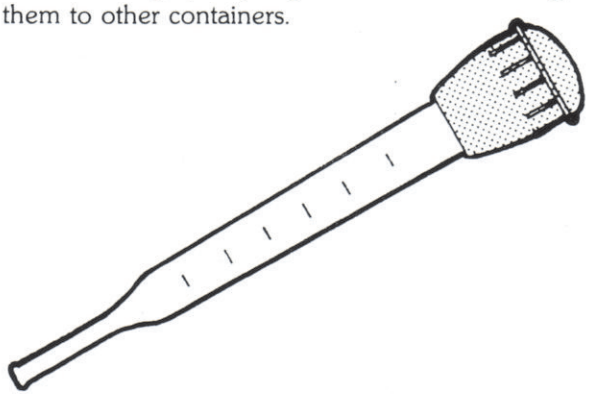


This will release netted organisms into the tray.

Spoons and Clear Plastic Cups

Spoons and cups are useful for transporting tiny organisms and observing them at a close range.

Simply dip up tiny organisms with a spoon or cup and place the organisms in a container partially filled with clear water. Turkey basters are also useful for sucking up tiny organisms and transferring them to other containers.



Note: All of these aids are available from Delta Education.

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SWEEPNET

Equipment Card Side 1

Note: Commercially available sweepnets* are more durable and we suggest such an investment for schools, camps, or clubs.

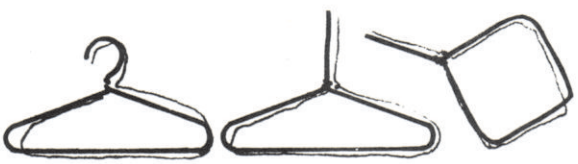
MATERIALS FOR ONE SWEEPNET:

2 wire coat hangers or 1 piece of heavy-duty wire
1 dowel or broom handle about one meter long and 1.5 cm in diameter
1 piece of nylon netting* (mosquito netting), .75 square meter
1 needle and thread for sewing (or a sewing machine)
filament or duct tape*
1 pair of pliers

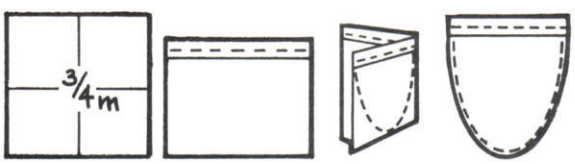
* Available from Delta Education.

MAKING A SWEEPNET:

1. Preparing the Hoop. Take the wire coat hangers, straighten the hooks and pull the hangers together into a square (one hanger on top of the other). The pliers make this job easier.

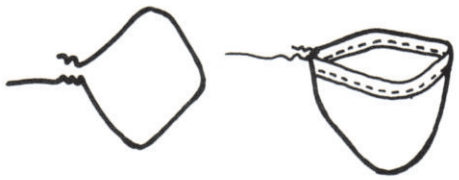


2. Preparing the Bag. Your net should be approximately .75 meter in circumference at the top, tapering down to a point. A sewing machine speeds up construction, but older kids can hand sew the nets if sufficient time is provided. Sew like this:

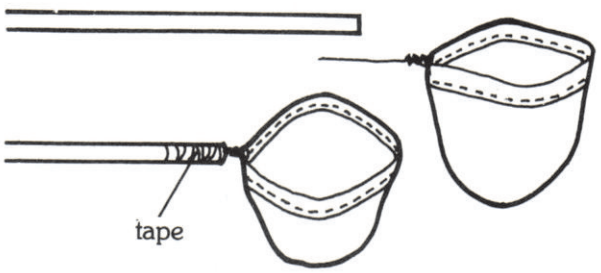


Fold one edge down and sew | Fold square in half and sew | Cut off excess

3. Assembling the Net. Open the wire square (both squares, if you used two hangers) and thread the net on the wire (or wires).



Attach the wire hoop to the stick.



USING A SWEEPNET:

While a sweepnet can be used to pursue and capture an animal that has caught your eye, this is not the most efficient use of the net. A sweepnet is best used as a random sampling tool. You walk at moderate speed across a grassy area, sweeping the net back and forth in pendulum fashion, in front of you. The net should just brush across the top of the grass. The idea is to sweep any animals that are buzzing around in front of you into the nets, so you must turn the net in your hand to capture animals on both right and left swings of the net. After you have made fifteen to thirty swings of the net, make a quick swing around your head to concentrate the animals at the bottom of the net, and grab the top of the net in your hand to keep the catch from escaping.

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SWEEPNET

Equipment Card Side 2

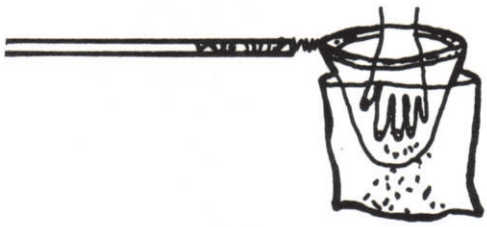
TRANSFERRING ANIMALS FROM THE NET TO AN OBSERVATION BAG:

1. Concentrate the animals in the bottom of the net.

2. Pinch the net closed, keeping the animals in the bottom of the net.

3. Turn the net inside out while holding the animals.

4. Place the net in a plastic bag, then release and shake the animals into the bag.



5. Grab the top of the bag.

6. Twist the top of the bag a couple of times and tuck the top under your belt or into an open pocket while you continue to sweep.

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