



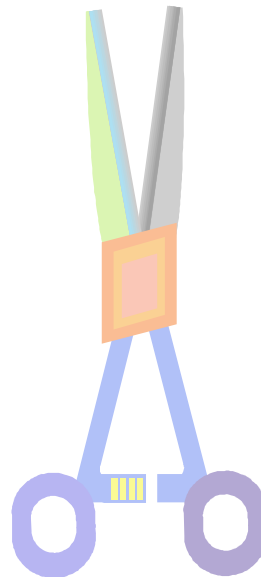
# Outdoor Biology Instructional Strategies

## OBIS TOOLBOX 1

### EQUIPMENT & TECHNIQUE CARDS

Inserted in this folio you will find an assortment of equipment and technique cards. These cards give you instruction for building and using various pieces of equipment required for certain activities. A few of these cards may be used in more than one activity. You may make additional copies of any of the cards. The following is a list of the activities that require these equipment or technique cards.

- ***Animal Movement in Water***  
Basic Aquatic Equipment
- ***Animals in a Grassland***  
Sweepnet
- ***Habitats of the Pond***  
Bottom Scrapers I and II  
Basic Aquatic Equipment  
Plankton Net  
Weed Grapple
- ***How many Organisms Live Here?***  
Bottom Scrapers I and II  
Basic Aquatic Equipment
- ***Terrestrial Hi-Lo Hunt***  
Measuring Light  
Measuring Slope  
Measuring Wind Direction and Speed
- ***Water Holes to Mini-Ponds***  
Basic Aquatic Equipment  
Measuring Light
- ***What Lives Here?***  
Basic Aquatic Equipment



### BASICS EQUIPMENTS, AIDES, & GUIDES

#### Data Board:

Many OBIS activities call for the use of a data board. This board serves as a portable blackboard, record, board, map, and all

-purpose data organizer. Because your participants probably will not have a desk or locker for storage of records from one investigation to the next, a data board allows you to maintain a continuing record. The data board relieves students of the burden of pencils and notebooks; important terms can be easily viewed by all group members, and field observations are conveniently displayed in one place for group consideration.

#### **Making a Data Board:**

1. You will need a piece of thick cardboard, masonite, or fiberboard for a data board. A good size is 80 cm x 60 cm.
2. Attach paper sheets (butcher or other) to the board.
3. Crayons or felt-tip markers are good for recording data because they leave broad marks and come in a variety of colors, allowing for easy color coding.

As an alternative, you can use a large sketch pad or small blackboard.

#### **Comparison of Data:**

Some OBIS activities require comparisons of data collected on different occasions but at the same study site. It is often convenient to record the date on plastic overlays on a data board map of the site. A good source of overlay plastic is inexpensive plastic dropcloth material sold at paint stores and discount variety stores (wax paper also works well) Data can be recorded on one overlay during one investigation, and on others at subsequent investigations. For comparison of data, simply stack up the overlays.

#### ***Lawn and Pond Organism Guides***

These guides are designed for quick, easy identification of some of the most commonly encountered lawn and pond organisms. Only those organisms readily observed by the unaided eye or by means of a simple magnifying lens have been included.

To use the guides, simply flip through the pages until you come to a drawing that corresponds to the organism you wish to identify. Use the size scales or scale-size drawings and the text to verify the organism's identity. Since the drawings are black and white and do not move, be sure to explain to your group that the organisms located will not exactly match the guide's drawings. The investigator should look for the drawing that most closely resembles his organism.

#### **Action Cards:**

Many folios contain activity cards which must be duplicated in order to provide sufficient copies for the students. These cards, and in some cases, the equipment cards, may be duplicated on any copying machine and the master sheet saved for future activities. We suggest you do the copying before the activity period and in the case of summer camps or wilderness situations, before leaving the office machine behind.

Each sheet of action cards contains four cards; cut the copies apart and give one card to each participant. In some cases, we provide blank cards which allow you to create additional experiences that are suited to your particular environment.

**EQUIPMENT CARD**  
**ANIMALS IN A GRASSLAND**  
**SWEEPNET**

**Materials:**

- 1 wire coat hanger
- 1 stick approximately 1 meter long for your net handle
- 1 piece of cheese cloth or netting for the net bag (1 square meter)
- 1 needle and thread for sewing (or a sewing machine)
- 1 piece of tape or wire to attach net to handle

1. Preparing the hoop:

Take a wire coat hanger, straighten the hook and pull the hanger into a square.



2. Preparing the bag:

Your net should be approximately one 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 coat hanger square and thread on the net.

Attach wire hoop to stick.

4. 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 method of use. A sweepnet is best used as a random sampling tool. You walk at moderate speed across the 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 end of the net in your hand to keep the catch from escaping.

How to transfer animals from net to observation bag:

- A. Concentrate animals in the bottom of the net.
- B. Pinch the net closed, keeping the animals in the bottom of the nt.
- C. Turn net inside out while holding animals.
- D. D. Place net in plastic bag, release and shake animals into the bag.
- E. Grab top of bag.
- F. Twist the top a couple of times and tuck the top under your belt of into an open pocket while you continue to sweep.

## **EQUIPMENT CARD MEASURING SLOPE**

### **Materials for slope-measuring device:**

1 meter stick  
1 125 cm. piece of strong cord  
1 25 cm. sharpened stick  
1 level tube (test tube and cork)  
Household ammonia  
Water  
Tape

Slope can be determined by fixing an anchor point at the upper part of the slope, drawing the one meter cord taut, sliding it up or down until the cord is level, and reading slope directly in cm/meter. Assemble the apparatus like this:

1. Sharpen the 25 cm. stick and fasten the cord to it with a knot which can slide up and down the stick.
2. Attach the free end of the cord to the meter stick so that the distance between the two sticks is one meter, and the cord can slide on the meter stick. You can mark off centimeters on any stick if you do not have a meter stick.
3. Make your level: Fill the test tube almost full of water and add a drop of ammonia. Cork the tube so that a small bubble remains. Trim off top of cork. If your test tube has a flared lip at the top, tape a popsicle stick to the side of the tube before taping the level tube to the center of the cord.

\*A little bubble called a line level is available at hardware stores or may be purchased from the Lawrence Hall of Science. See the order form in the OBIS Toolbox folio.

4. Assemble all pieces and use like this.

**EQUIPMENT CARD**  
**MEASURING WIND DIRECTION AND SPEED**

**Materials for one wind station:**

- 2 nails (16 penny)
- 1 or 2 cardboard bases (three thicknesses of cardboard glued together, at least 10 cm. by 10 cm.)
- 2 pieces of plastic soda straw (6 cm. long)
- 1 piece of heavy duty aluminum foil (15 cm. by 2 cm.)
- A roll scotch tape
- 1 magnetic compass
- 1 pair of scissors
- 1 marking pen
- 1 tube of glue
- 1 watch with second hand
- 4 3" x 5" index cards
- 1 stapler
- A square of cardboard (6 cm. by 67 cm.)

**Construction of Wind Speed Measurer:**

1. Make 4 cones as follows:

Take a 3" x 5" card and fold it like this.

Tape it here with scotch tape:

Cut on a curve like this:

Open the cone, and make three more

2. Construct your cone holder as follows: Cut 6 cm. cardboard square and draw to diagonal lines.

Where the two diagonals intersect, poke a hole with your nail and enlarge it until your straw segment fits snugly in the hole

Cut four slots in the cone holder like this (cut in 1-2 centimeters):

3. Assemble the apparatus:

Slide a cone into each slot. Be sure they all face the same direction (clockwise or counterclockwise).

Put a reference mark on the cone holder near one of the cones to help you count revolutions.

Make your base by gluing three thicknesses of cardboard together.

Run a nail through the straw and stab it into the cardboard base.

You may want to put a small washer here if you have one.

**Construction of Wind Vane:  
(for measuring wind direction)**

1. Cut a piece of heavy-duty aluminum foil 15 cm. by 2 cm. Bend this around the second 67 cm. piece of straw.
2. Fold the pieces of aluminum foil tightly together and tape them near the straw. Slap a little piece of tape here to keep the aluminum foil from sliding up and down the straw.
3. Put a nail (small enough to allow the straw to rotate) through the straw and push it into a cardboard base (same as the wind speed measurer or a different base). Spread the two pieces of aluminum foil slightly, and you are ready.

**Using Your Wind Station:**

With these two pieces of equipment you can measure direction and speed to wind.

**Wind direction** is measured with your wind vane. Place it in the wind and note the direction the aluminum foil swings. Winds are named for the direction they come from. A wind blowing from the north is a north wind. You will want to use a compass if you have one to help you determine directions. This is a south-east wind:

**Wind speed** is determined using an anemometer (the gadget with the four paper cones). The faster the wind blows, the faster the device turns. Wind speeds should be reported in revolutions per minute. (You will need a watch with a sweep second hand.) Set the wind speed meter in the location that you want to measure wind speed, get the watch ready, and holler "Go!")./ One person watches the second hand while the other counts how many times the colored cone goes by. After a minute (or fraction of a

minute), the clock watcher hollers "Stop!" and the other reports how many times the colored cone went by. Wind speed in a calm area might be 6 or 7 revolutions per minute (rpm) while fast wind might be in excess of 00 rpm's