

## WATER QUALITY SAMPLING EQUIPMENT

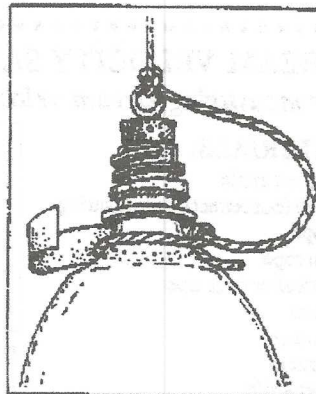
### DEEP WATER SAMPLER

*For collecting a water sample at a desired depth*

#### MATERIALS:

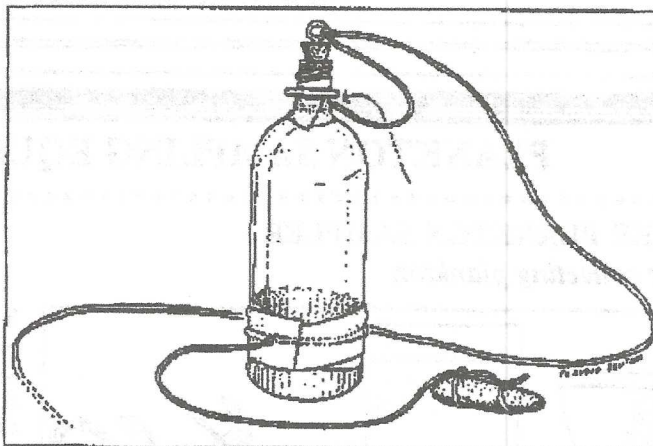
1 clear plastic milk or beverage bottle, preferably with a handle  
nylon rope (length will depend on how deep you plan to sample)  
rubber stopper (to fit bottle)  
eyehook  
drill with 1/4-inch bit  
electrical or duct tape  
rock  
scissors  
yardstick

4. Use yardstick to mark off 1-foot increments starting from where the rope is attached to jug handle or neck. Wrap tape around rope to mark increments



#### DIRECTIONS:

1. Drill hole in rubber stopper, screw in eyehook, and tie rope onto the eyehook leaving a 6 - 8-inch tail as shown.
2. Attach tail of rope to bottle handle or around neck of bottle. If you wrap around neck of jug, secure in place with electrical or duct tape.
3. Cut a 2-foot piece of rope to tie around rock. Tie rock to the bottle as shown. Secure rope around the jug with tape.



### SECCHI DISK

*For measuring the turbidity (suspended solids) of water*

#### MATERIALS:

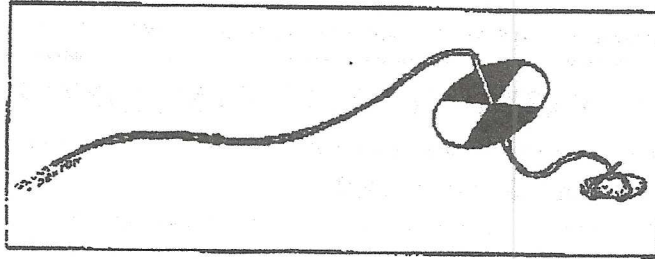
1 circular stiff plastic lid, flattened pie plate, or piece of plywood  
empty pen housing or metal casing  
scissors  
drill with 1/2 or 3/8 inch bit  
50-foot nylon rope

yardstick  
electrical or duct tape  
rock  
black and white enamel paints  
paint brushes

#### DIRECTIONS:

1. Cut lid, pieplate, or plywood into circle, 8 inches in diameter.
2. Paint circular piece black and white as shown.
3. Drill hole in center of disk and insert pen housing or metal cas-

- ing. Fit should be snug.
4. Draw rope through casing and tie it to the rock as shown.
  5. Use yardstick to mark off 1-foot increments on nylon rope. Wrap tape around rope to mark increments.

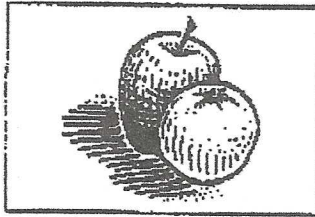


## STREAM VELOCITY SAMPLER

*For measuring stream velocity or flow*

### MATERIALS:

orange or apple  
 30-100 foot retractable measuring tape  
 nylon rope  
 electrical or duct tape  
 2 sticks  
 stopwatch  
 yardstick  
 pocket knife

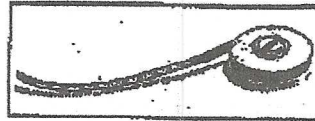


### DIRECTIONS:

1. Use either a retractable measuring tape or rope. If using a rope,

use a yardstick to mark off 1 foot increments and wrap tape around rope to mark increments.

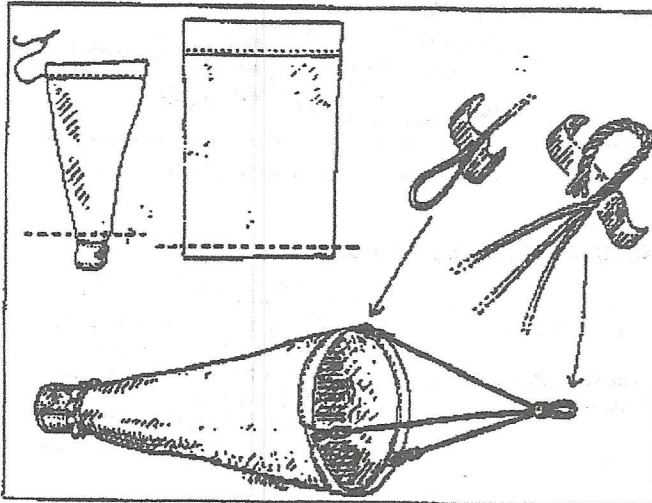
2. Use pocket knife to sharpen point on sticks for markers.



## PLANKTON SAMPLING EQUIPMENT

### LAKE PLANKTON SAMPLER

*For collecting plankton*



### MATERIALS:

pillow case or shirt sleeve  
 4 wire coat hangers  
 scissors  
 electrical or duct tape  
 pliers  
 wire cutters  
 small jar  
 heavy duty rubber band  
 thread  
 sewing machine

### DIRECTIONS:

1. Bend 1 coat hanger into a circle.
2. If using pillow case, make cut into the casing with scissors, insert coat hanger, retwist, bend



- over twisted section with pliers, and wrap with tape. If using shirt sleeve, make casing and use same procedure.
3. Cut other 3 coat hangers with wire cutters into three 12-inch pieces.
  4. Cut 3 small slits an equal dis-

- tance apart in the casing of the pillow case (or shirt sleeve) and insert one of three 12 inch wires through each slit. Bend wire with pliers to make a loop, twist together, and apply tape as shown.
5. Twist three wires together, bend to make a loop, twist the loop,

- and tape as shown.
6. If using a pillow case, cut opposite end of pillow case off, gather it around jar opening, and clamp it to jar with rubber band. If using shirt, cut off cuff end of sleeve and attach same way.

## STREAM PLANKTON SAMPLER

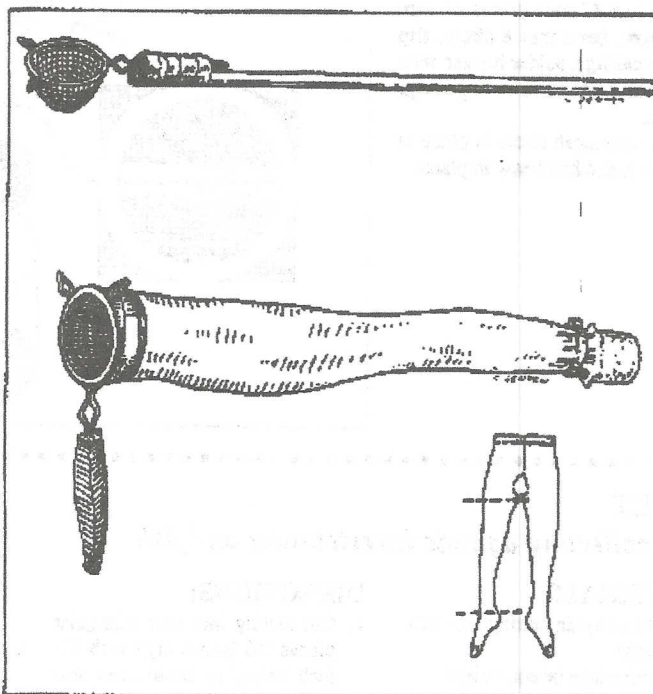
*For collecting plankton*

### MATERIALS:

wire kitchen sieve (any size) with handle  
 pantyhose (no holes)  
 test tube or baby food jar  
 heavy-duty rubber band  
 electrical or duct tape  
 scissors  
 broom handle

### DIRECTIONS:

1. Cut off one leg of pantyhose with scissors, then cut off foot end.
2. Attach larger end of pantyhose to kitchen sieve as shown. If sieve has metal loops, cut small slits in pantyhose and slip over the loops. Secure in place with tape.
3. Attach baby food jar to smaller end of pantyhose with the rubber band.
4. Use tape to join the broom handle to sieve handle as shown.



## INVERTEBRATE SAMPLING

### COLLAPSIBLE SIEVE

*For cleaning and separating organisms in an aquatic field collection*

### MATERIALS:

2 wire coat hangers  
 soldering gun and solder

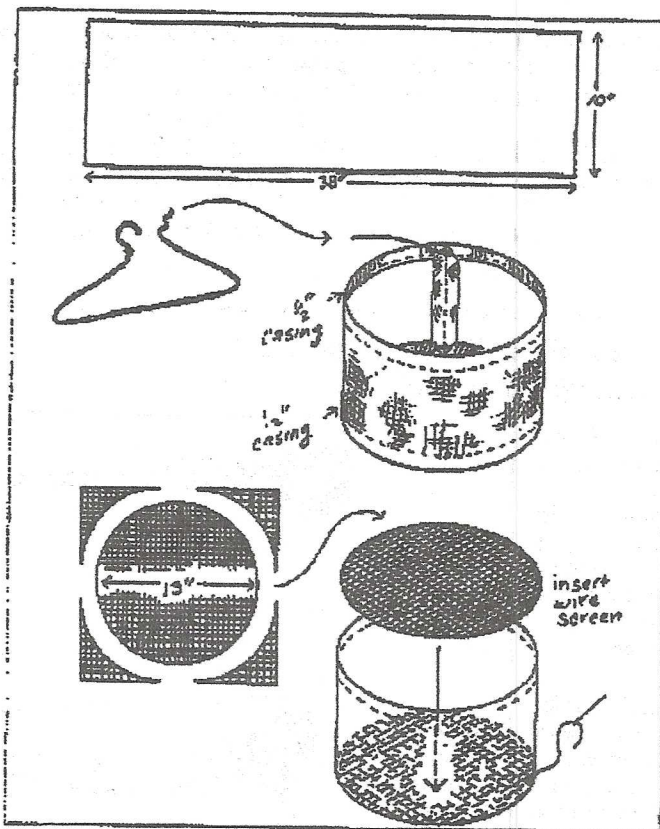
1/4-inch mesh wire screen (13-inch  
 x 13-inch)

piece of heavy muslin (38-inch by  
 10-inch)

sewing machine  
 thread  
 needle  
 tin snips or kitchen scissors

**DIRECTIONS:**

1. Using tin snips or scissors, cut wire screen piece to make 13-inch diameter circle.
2. Sew 10-inch ends of muslin together to make wide cylinder and make 1/2-inch casing at top and bottom, leaving openings to insert wire.
3. Cut two 41-inch pieces of wire hanger, bend into a circle, slip into casings, solder hanger ends together, and hand-sew openings shut.
4. Put wire mesh circle in place as shown and hand-sew in place.



**D-NET**

*For collecting aquatic invertebrates and fish*

**MATERIALS:**

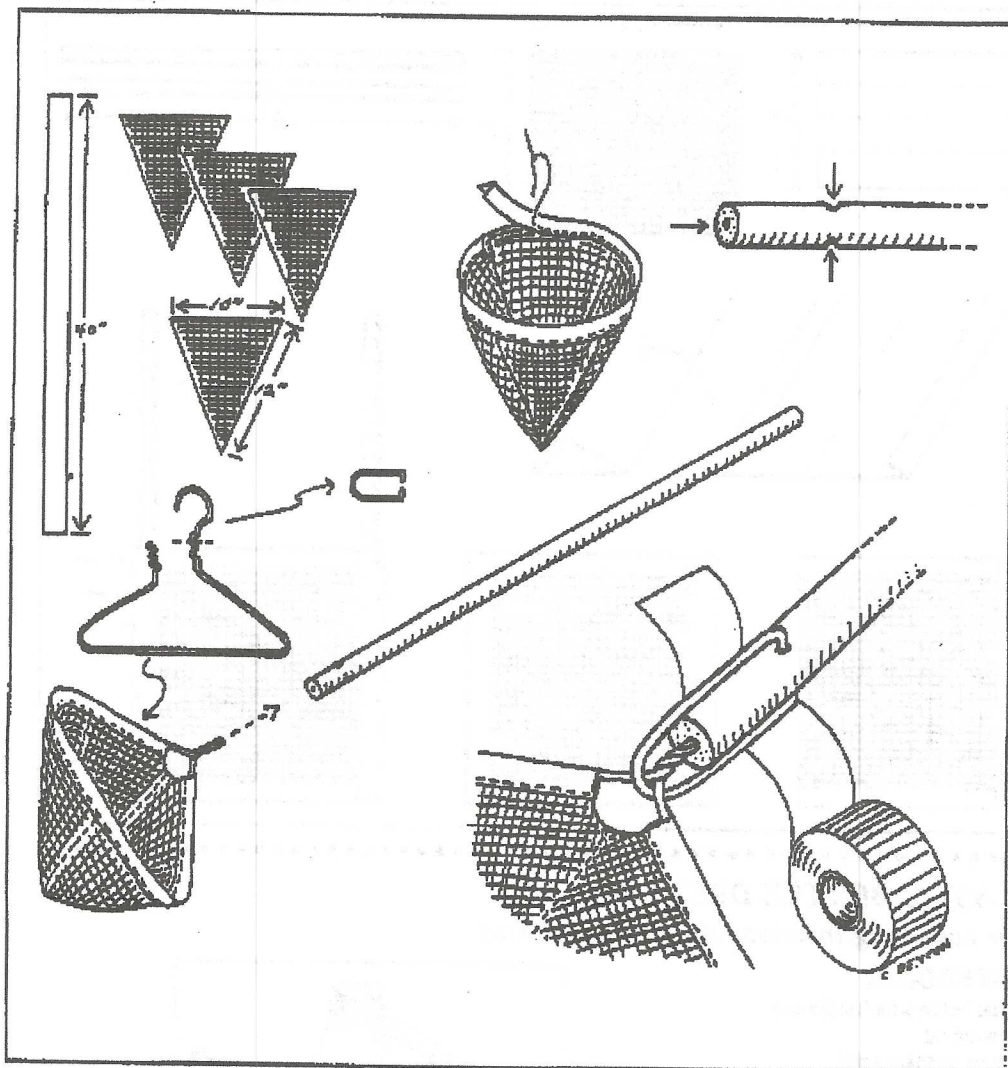
4 pieces of nylon netting (10-inch x 12 inch)  
 1-in-h bias tape or equivalent fabric scrap (40 inches long)  
 thread  
 scissors  
 sewing machine  
 wire coat hanger  
 wire cutters  
 drill with 1/4-inch wood bit  
 broom handle or wooden dowel (4 foot long)  
 pliers  
 duct tape

**DIRECTIONS:**

1. Cut netting into four triangular pieces (10 inches high with 12-inch bases) as shown and sew together.
2. Cut a 40-inch strip of bias tape or fabric to make casing and sew onto net opening, leaving casing open to insert wire frame.
3. Take a wire coat hanger and untwist, slip into net casing, and retwist. Cut stem to 2 inches with wire cutters.
4. Drill hole in a broom handle or dowel and insert the stem as shown.
5. Take one of the remaining pieces

of coat hanger and cut and bend it into a U-shape as shown.

6. Drill two shallow holes in handle, put U-shaped piece into position, push into holes as shown, and wrap with tape to secure handle.



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## KICK NET

*For collecting aquatic invertebrates and fish*

### MATERIALS:

3-foot by 6-foot piece of nylon screening  
 4 strips of heavy canvas (6 inches x 36 inches)  
 2 broom handles or wooden dowels (6 feet long)  
 finishing nails  
 thread

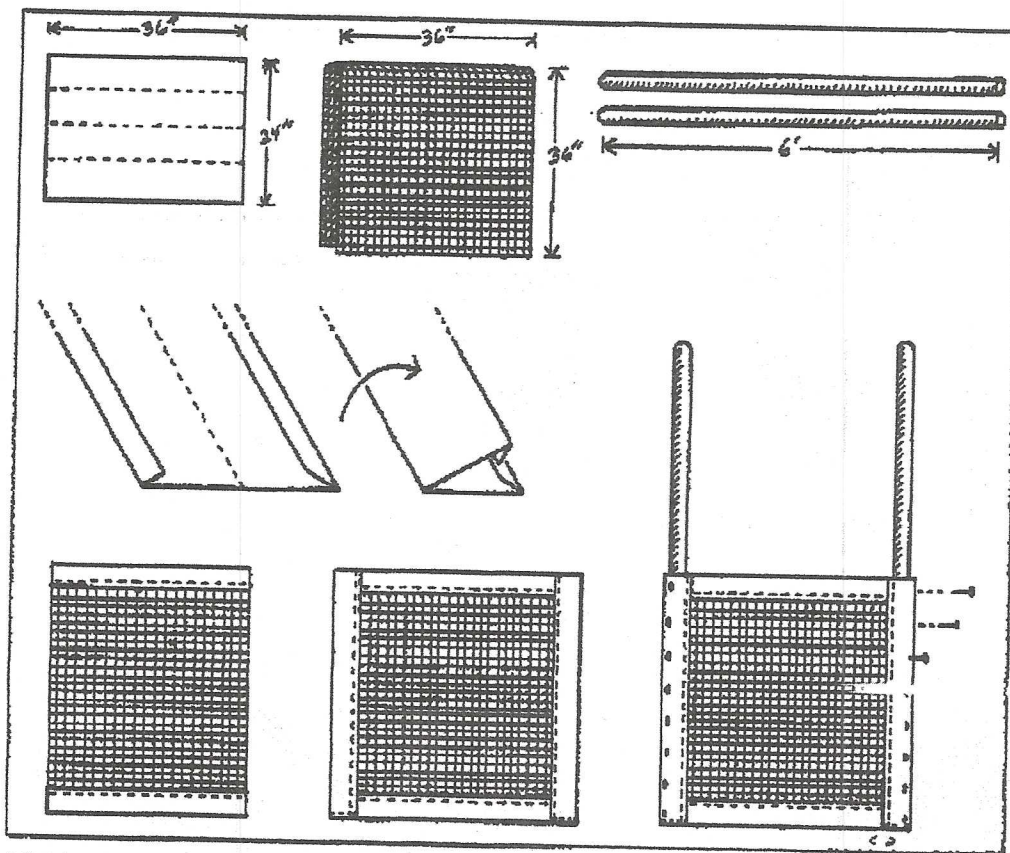
sewing machine  
 hammer  
 iron and ironing board

### DIRECTIONS:

1. Fold nylon screen in half (3 feet x 3 feet).
2. Fold edges of canvas strips under, 1/2-inch, and press with iron.

3. Sew 2 strips at top and bottom and then use other 2 strips to make casings for broom handles or dowels on left and right sides. Sew bottom of casings shut.
4. Insert broom handles or dowels into casings and nail into place with finishing nails.





## PLASTIC BOTTLE DREDGE

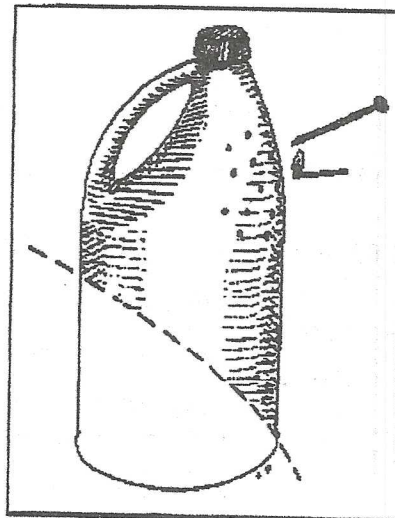
*For collecting invertebrates in bottom mud*

### MATERIALS:

plastic bottle with handle and  
screw-on lid  
scissors or sharp knife  
large nail  
matches

### DIRECTIONS:

1. Screw on the lid securely. Take bottle and cut out as shown.
2. Using a "red hot" nail as shown, poke holes into the plastic.



## SURBER SAMPLER

*For collecting invertebrates in waters less than 1 foot deep*

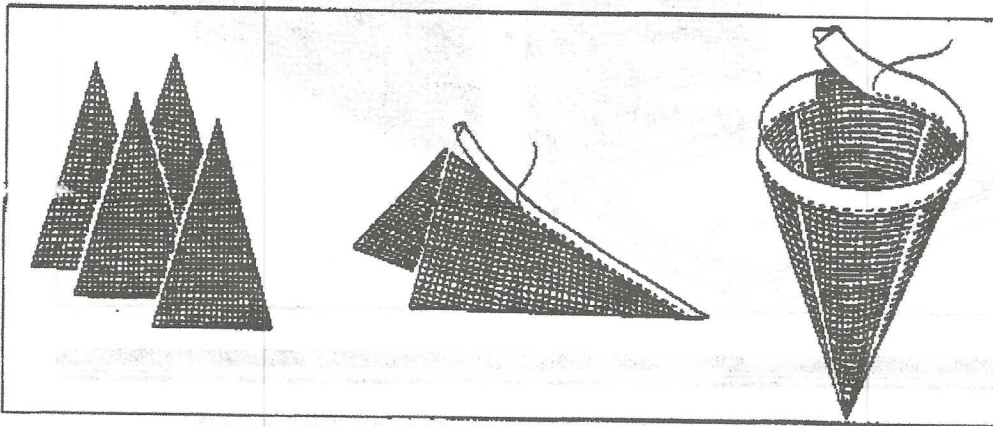
### MATERIALS:

- 8 straight 1-foot wood or aluminum pieces (approximately 3/16 inch x 1 inch x 1 foot in length)
- 2 collapsible right angle corner braces (4-6 inches long)
- 36 nuts and bolts (1/4 inch in diameter and 1/2 inch length)
- 8 right angle braces (2 inches)
- 2 brass hinges (1-2 inches wide)
- 12 brass nuts and bolts for hinges
- 4 pieces of nylon netting (13 inches x 23 1/2 inches)

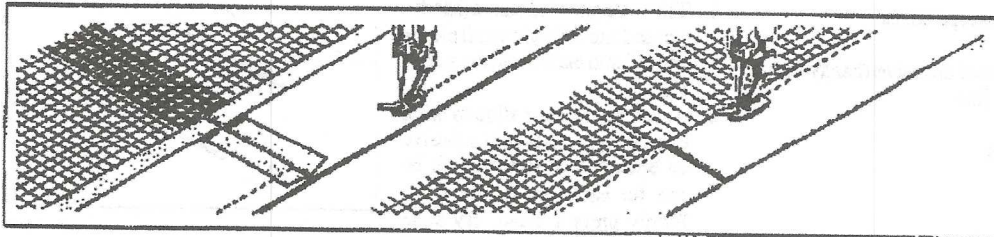
- 4 inch by 50 inch piece of heavy canvas (several pieces can be sewn together to make 30 inch strip)
- bias tape
- hacksaw or wood saw
- screwdriver
- scissors
- drill with 1/4 inch and 3/16 inch bits
- sewing machine
- thread
- adjustable wrench
- ruler
- pencil

### DIRECTIONS:

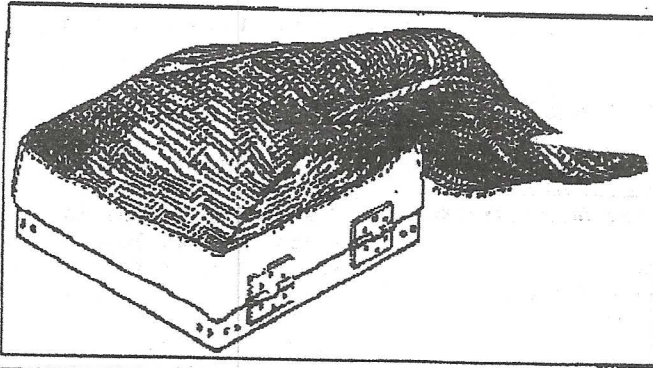
1. Make two squares. Use four 1-foot pieces of wood or aluminum to make each square. Mark bolt positions using ruler and pencil. Drill holes for bolts to go through. Use right angle braces to put two frames together and use wrench and screwdriver to tighten down the nuts. Leave corner of one frame unbolted to slip the net on.
2. Cut netting into 4 triangular pieces (23 1/2 inches high with 13 inch bases).
3. Sew edges of 4 pieces of netting



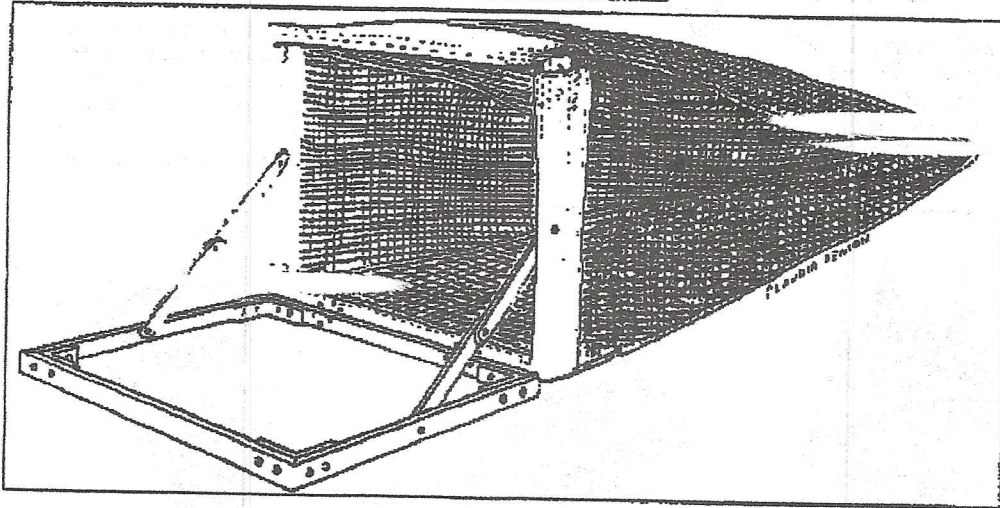
4. To make net casing, sew 4-inch ends of canvas together to form wide cylinder. Fold in half and sew the edges of the casing to netting leaving an opening in casing to slip it onto the frame. Finished net should be 26 inches long.
5. Slip net on the unbolted corner of frame, put right angle brace in place, and tighten down nuts.
6. Lay two frames beside one another and position two hinges. Use a pencil to mark where you are going to drill. Drill holes and attach hinges. Make sure two frames fold flat.







7. Open frames to a right angle and position collapsible right angle braces. Mark where you are going to drill with pencil, drill holes, and attach



## ARTIFICIAL SUBSTRATE SAMPLERS

### ATTACHED ALGAE SAMPLER

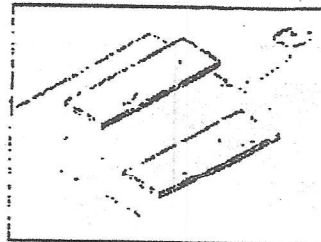
*Used as an artificial substrate in streams to collect attached algae*

#### MATERIALS:

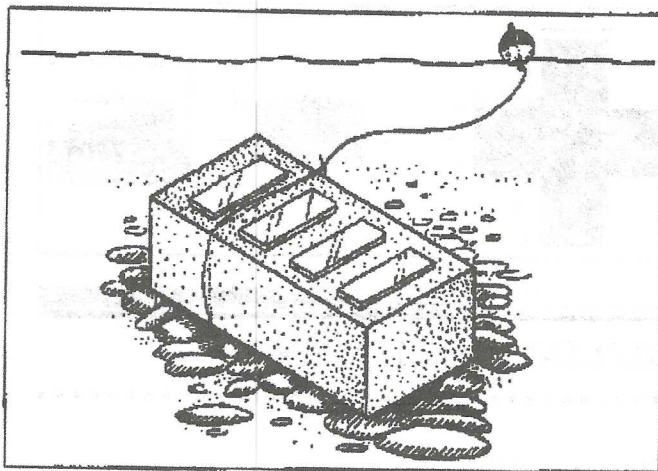
4 microscope slides  
1 brick  
waterproof adhesive (handy-tac)  
fishing line  
bobber  
scissors

#### DIRECTIONS:

1. Take waterproof adhesive (handy-tac) and tear off eight small pieces and roll into balls about the size of a pea.
2. Attach microscope slide to brick by placing two pieces of adhesive on brick spaced so there will be one for each end of the slide. Firmly press a clean, dry slide onto two pieces of handy-tac until







- it is stuck tightly to the brick. Repeat with remaining slides.
- To make marker, cut a yard of fishing line and tie to bobber.
  - To attach marker, tie it securely to brick as shown.

## MULTI-PLATE SAMPLER

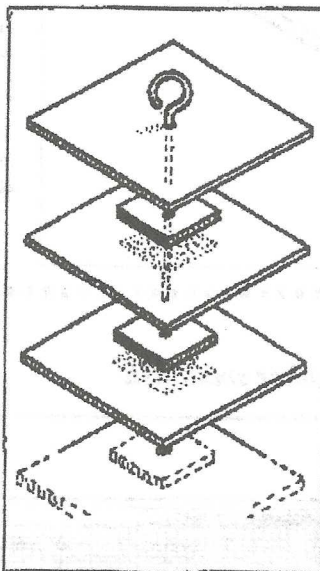
*For collecting a representative sample of invertebrates by providing a suitable surface for them to colonize*

### MATERIALS:

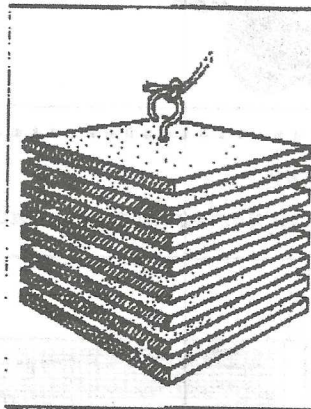
scrap of 3/8-inch tempered masonite (9 inches x 10 inches)  
 ruler  
 saber saw  
 drill with 3/8-inch wood bit  
 3/8 inch diameter eyebolt, 2 or 3 inches long  
 3/8-inch washer  
 3/8-inch wingnut  
 wire or rope (length will vary according to sampler placement)

### DIRECTIONS:

- Cut eight 3-inch squares and seven 1-inch squares of 3/8-inch tempered masonite.
- Drill 3/8-inch holes in center of all the squares.



- Assemble sampler by alternating squares on the eyebolt and secure with wingnut.
- Attach wire or rope to the eyebolt for suspending in water.



## WIRE BASKET

*For collecting a representative sample of invertebrates by providing a suitable surface for them to colonize*

### MATERIALS:

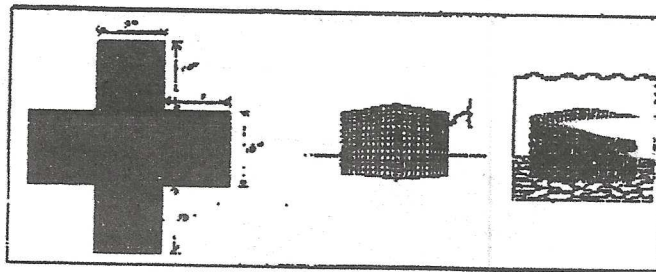
30-inch x 30-inch piece of heavy gauge window screening

tin snips  
 yardstick  
 wire or heavy nylon thread

scissors  
 rocks

**DIRECTIONS:**

1. Cut screen with tin snips in shape as shown.
2. Fold up sides and sew together with wire or nylon thread.
3. Fill basket with rocks.



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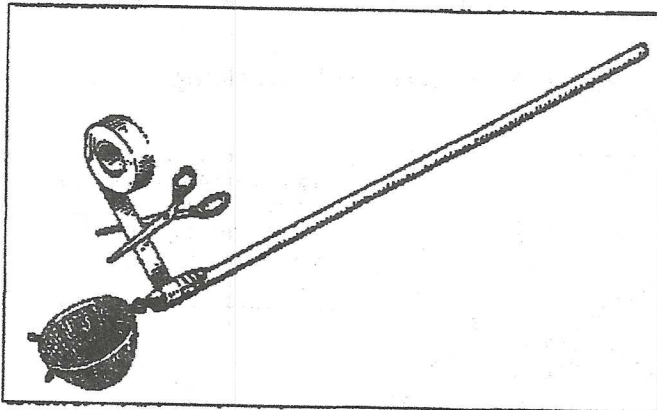
## FISH SAMPLING EQUIPMENT

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### DIP NET

*For collecting aquatic invertebrates and fish*



**MATERIALS:**

- wire kitchen strainer (any size) with handle
- broom handle or wooden dowel (4 feet long)
- electrical or duct tape
- scissors

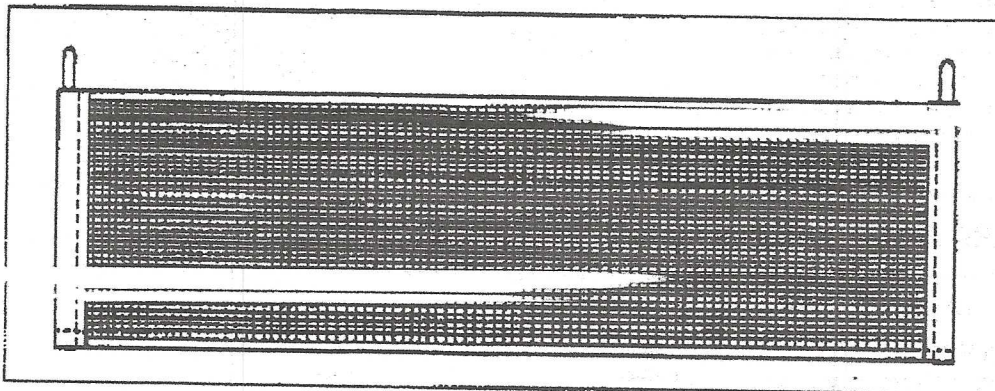
**DIRECTIONS:**

Take wire kitchen strainer and mount on broom handle using tape as shown.

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### SEINE

*For capturing minnows and other small fish*





**MATERIALS:**

6, 8, or 10 foot long by 3-4 foot wide fiberglass window screening or 1/4-inch netting  
 two 4-inch wide strips of canvas (6, 8, or 10 feet long)  
 two 4-inch wide strips of canvas (3-4 feet long)  
 2 broom handles or wooden

dowels (4-6 feet, both need to be same size)  
 thread  
 sewing machine

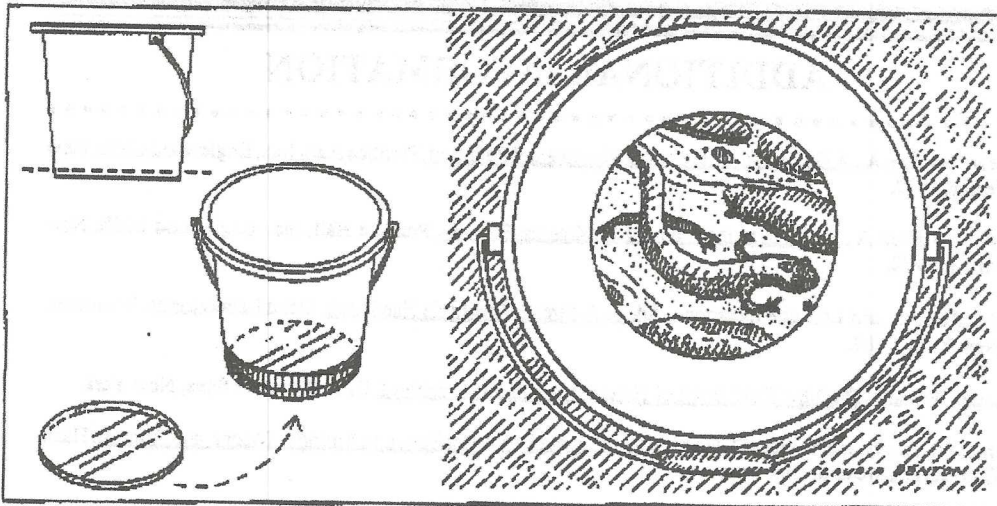
**DIRECTIONS:**

1. Sew 6, 8, or 10 foot long (depending on your net size) strips of canvas to top and

bottom of the net.  
 2. Make two 1-inch casings at either end of net with the 3 or 4 foot strips of canvas making sure to sew bottom end of casings shut as shown.  
 3. Insert broom handles or wooden dowel.

**UNDERWATER VIEWER**

*For viewing aquatic organisms*

**MATERIALS:**

any size plastic, metal, or wooden bucket  
 1/4-inch thick plexiglass piece (size to fit bottom of bucket)  
 saber saw

hand saw or tin snips  
 silicone sealant or duct tape

**DIRECTIONS:**

1. Use saber saw to cut plexiglass into a circle to fit diameter of bucket.

2. Use regular saw or tin snips to cut off bottom of bucket.  
 3. Use silicone sealant or duct tape to attach plexiglass to bottom of bucket.

**SAMPLING SUPPLIES****SAMPLING PANS**

*For sorting and counting aquatic invertebrates*

**MATERIALS:**

opaque plastic bottles or milk jugs  
 scissors or sharp knife

OR

aluminum pie pans  
 white enamel spray paint  
 newspaper