

# Instrument Construction: Freshwater Macroinvertebrates

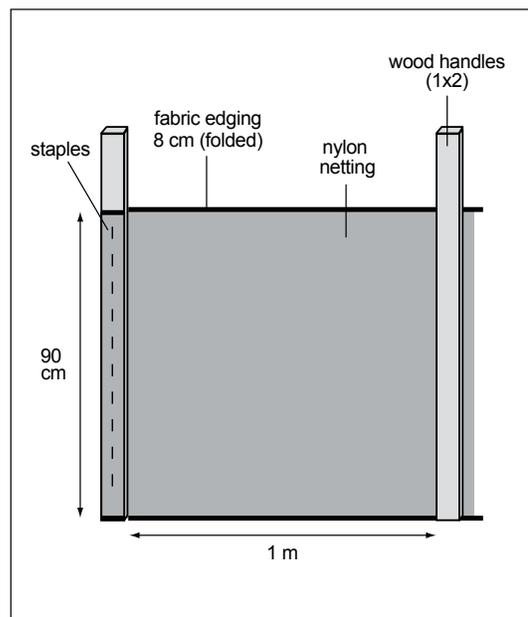
## Instructions for Making a Kick-Net to Collect Freshwater Macroinvertebrates

### Materials

- One piece of 95 cm x 132 cm nylon netting (0.5 mm mesh)
- Staples
- One piece of 120 cm x 150 cm (or larger) nylon netting (0.5 mm mesh) for a funnel (optional)
- 2 pieces of denim or other heavy fabric (8 cm x 132 cm each)
- 2 poles (132 cm long, 4 to 5 cm diameter)
- Needle and thread or heavy waterproof tape

### Directions for Construction

1. Fold each of the 8 x 132 cm strips of heavy fabric over each of the long edges of the 95 cm x 132 cm nylon netting (0.5 mm mesh). Hold in place by sewing or using waterproof tape.
2. Attach the nylon netting and the fabric to the poles with staples. The poles should be even with the netting at the bottom and extend above the netting to form handles at the top.
3. Roll the poles so that the netting wraps around the poles until the width equals 1 m and staple again.
4. Optional: at the center, cut a 30 x 30 cm square to sew a funnel-shaped net. This is not necessary but can be very useful to concentrate organisms and transfer them into a bucket. If you have more 0.5 mm nylon netting, you could also make the whole net into a pouch or a funnel starting at the 90 cm x 100 cm edges and tapering back like a butterfly net.





# Instrument Construction: Freshwater Macroinvertebrates

## Instructions for Making the D-net to Collect Freshwater Macroinvertebrates



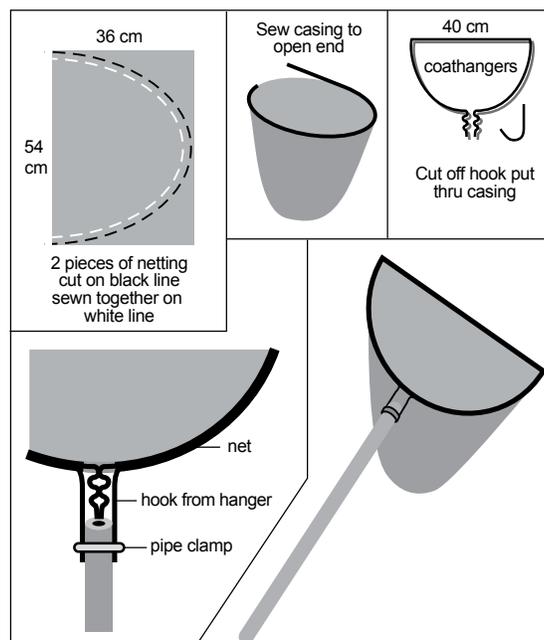
### Materials

- 2 pieces of nylon netting (36 x 53 cm) (0.5 mm mesh)
- 1 meter of very stiff wire or 3 stiff coat hangers
- Heavy fabric (8 x 91 cm) (e.g. denim)
- Needle and thread or heavy waterproof tape
- 152 cm pole (e.g. broom or rake handle)
- 4 cm pipe clamp



### Directions for Construction

1. Lay the 2 pieces of nylon netting on top of each other. Cut a net shape from the nylon netting pieces (see diagrams) and sew them together.
2. Open the net so that the seam is to the inside. Sew the strip of fabric (8 x 91 cm) on to the edge of the open end of the net, leaving an opening to insert the hangers.
3. Shape the heavy wire into a 'D' shape, with the straight side of the 'D' being about 40 cm long. If you are using hangers, cut the hooks from the hangers and untwist the wires, then shape them into a 'D'.
4. Insert the wire through the fabric casing and twist the ends together at the opening. Use heavy waterproof tape to tape the hangers together.
5. Drill a hole in the tip of the handle large enough to insert the ends of the wires.
6. Attach the net to the pole by inserting the ends of the wire into the hole drilled in the pole end. Loop a short piece of wire over the net frame and clamp the ends to the pole to secure the net to the pole.



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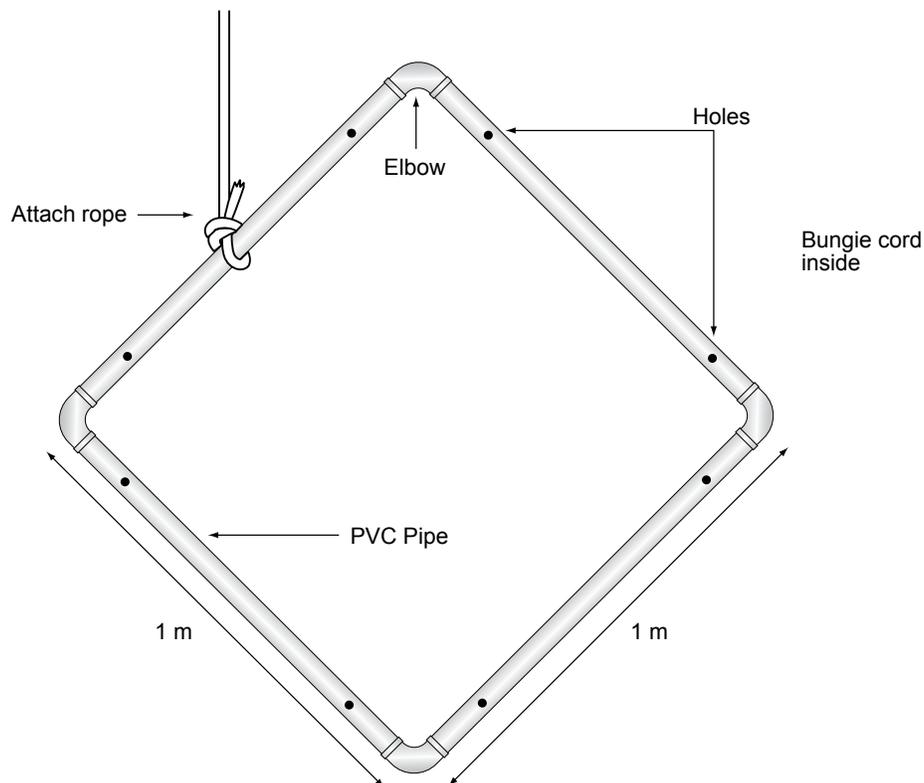
## Instructions for Making the Quadrat to Use When Collecting Freshwater Macroinvertebrates

### Materials

- ❑ Four poles of PVC pipe (100 cm long)
- ❑ 3.5 meters of bungie cord
- ❑ 4 elbows of PVC pipe
- ❑ 3 meters of rope (longer if needed)

### Directions for Construction

1. Assemble the four poles with elbows and adjust to exactly 1 x 1 meter inside the frame.
2. Drill holes in the four poles to allow water to enter and the quadrat to sink.
3. Insert the bungie cord through the four poles and tie the two ends with a knot. The cord will hold the quadrat together in the water and will allow you to collapse the quadrat when not in use.
4. Attach a rope to the quadrat to use for lifting the quadrat out of the water after sampling.





# Instrument Construction: Freshwater Macroinvertebrates

## Instructions for Making Sieves to Use When Collecting Freshwater Macroinvertebrates



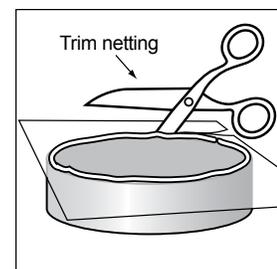
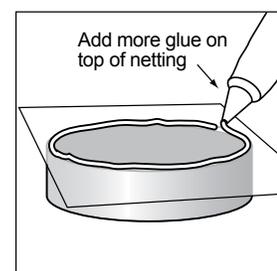
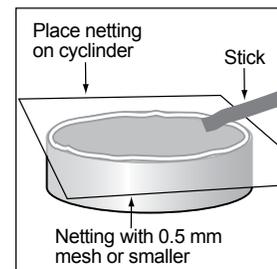
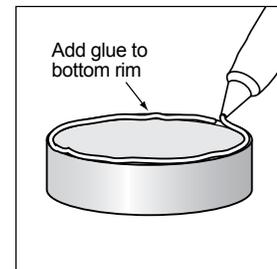
### Materials

- One piece of 25 x 25 cm nylon, cotton, or metal netting (0.5 mm mesh or smaller)
- Waterproof glue
- Stick or spatula
- One rigid plastic or metal cylinder (5 cm high and about 20 cm in diameter, but these dimensions can vary since the sieve is not used to quantify samples)
- Scissors



### Directions for Construction

1. The cylinders must be open at both ends. Add glue to the bottom rim of the cylinder.
2. Place the square of netting on top of the glue and use a stick or spatula to press the netting into the glue.
3. Add glue around the same rim but on top of the netting.
4. Allow the glue to dry completely (follow directions on glue package).
5. Once the glue is dry, cut the extra netting around the rim.



# Instrument Construction: Freshwater Macroinvertebrates

## Instructions for Making the Sub-Sampling Grid to Use When Measuring Freshwater Macroinvertebrates

### Materials

- Piece of stiff plastic, board or tray (30 x 40 cm) with at least 2-3 cm ridge around the outside OR shallow, white metal or plastic pan (30 x 40 cm) with flat bottom (a white plastic lid with flat bottom from storage boxes or sheet metal dampers can work)
- Ruler
- Waterproof marker for drawing on sampling grid
- Graduated cylinder
- Tube of waterproof silicon caulking compound
- White waterproof, nontoxic paint (if your pan or grid sheet is not already white)
- Two small levels

### Directions for Construction

1. If using a flat sheet of plastic or board, cut to the correct size, then paint the sheet white with nontoxic, waterproof white paint. The ridge around the outside of the board should be tall enough to hold 2 – 3 cm of water on the board.
2. Draw a grid on your sheet or in the bottom of your pan. The squares of the grid should be 4 cm x 4 cm.
3. Use the caulking compound to outline each square, building the lines up to about 5 mm in height.
4. Number the squares consecutively.
5. Glue the two small levels onto opposite sides of the grid.
6. Measure the volume of water necessary to cover the whole grid with water so that each square is wet almost all the way up to the 5 mm line. This will contain the live macroinvertebrates in their sub-sampling squares.
7. Record this grid volume and the number of squares onto the [Freshwater Macroinvertebrate Identification Data Sheet](#).
8. Practice spreading the grid volume of water evenly over the grid, filling all the squares.

