

Water Pupils' guide



Freshwater macroinvertebrates Identification. Data sheet



Class or group name: _____

Name(s) of Student(s) collecting data: _____

Date samples collected: Year: _____ Month: _____ Day: _____

Name of study site: _____

For a rocky bottom with running water site:

Riffles: number of samples: _____

Runs: number of samples: _____

Pools: number of samples: _____

(Total number of samples = 3)

For a multi-habitat site:

Habitats	Estimate of % area	Number of samples $\frac{(\% \text{Area} \times 20)}{100}$
Submersed vegetation		
Vegetated banks, around logs, snags, roots		
Muddy bottom		
Gravel or sand		
Total	100%	20 samples

Activity 17 :Defining your site and Mapping

The Task

To define and map in detail your macroinvertebrate study site

What you need

- Completed Site definition sheet (Activity 1)
- Mapping your site sheet (See Activity 2)
- Freshwater macroinvertebrates Identification. Data sheet

How to do it

1. Select a 50m section of our stream, lake or pond.
2. Create a map that includes all the important features surrounding and within your water body, in particular, the types of habitats where macroinvertebrate sampling will be done (See hydrology site definition and mapping protocol). Represent all habitats even if they can not be reached.

Each time you visit your site and collect macroinvertebrates (MI's), describe the habitats at the site at the time of sampling. Over time, habitats may change at your site and this could affect which ones are found

3. Estimate the area covered by each habitat. The proportion that each covers will determine the number of samples taken in each habitat

Here are some questions to ask yourself to help identify different habitats where MI's live

- Is the water flowing or still? if both identify where
- If flowing, is it fast or slow?
- What and where are the substrates? (ground) – boulders, cobbles, pebbles mud etc
- Are plants growing in the water body?
- Do any of the plants break through the surface of the water?
- Are the banks vegetated?
- Which areas are being eroded? Where are snags, logs, roots?
- Does the surrounding vegetation provide shade to water?

If your site has running water and stones, indicate the riffle habitats, run habitats, pool habitats

- Pool: a deeper region with slower moving water and smaller sediments
- Riffle: a shallower area with faster flowing water and larger sediments
- Run: and intermediate category between pool and riffle. Water in a run does not have the turbulence of a riffle, but moves faster than a pool
- Snag: a tree or branch embedded in the bed of the water body

Activity 18 :Choosing a sampling protocol. Rocky substrate in running water or Multi habitat

The Task

To choose a sampling method based on the type of site

What you need

- Your site map
- Freshwater macroinvertebrates Identification. Data sheet

How to do it

1. If your site is a body of visibly running water, shallower than 90cm with a rocky substrate, use:

Rocky substrate in running freshwater macroinvertebrate protocol

2. If the water is deeper than 90cm or if many habitats are present, use:

Multi habitat freshwater macroinvertebrate protocol

Be safe in the habitats samples. Determine which habitats can be safely sampled and evaluate the % cover of each accessible habitat. Record in the metadata which habitats could not be sampled.

Activity 19 :Multi habitat Freshwater Macroinvertebrate Protocol

The Task

To collect macroinvertebrates from on or more of the following habitats:

- Vegetated banks
- Submersed vegetation
- Snags
- Logs
- Roots
- Mud
- Sand
- Gravel

What you need

- Hydrology site map
- 1 x 1m quadrat
- trowel
- 0.5mm mesh Net
- 20 buckets/trays/containers

How to do it

1. Locate the areas where you will collect your samples on your map and in the water
2. Estimate the proportion of each accessible habitat type within your hydrology site
3. Calculate the number of samples collected within each habitat type for a total of 20 samples
4. Start sampling downstream and move upstream as you collect samples. If the water is not visibly moving, collect samples in the order that will minimise the impact of taking one sample on taking others

Use the field guides to collect samples in

- Submersed vegetation
- Vegetated banks or around snags, logs and roots
- Muddy bottom
- Gravel and sand

Record the number of samples taken in each habitat. The total should be 20 samples.

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Submersed vegetation, vegetated banks or around snags, logs and roots guide

1. Put the net in the water until it almost reaches the bottom, in front of the vegetation
2. Push the net horizontally into the vegetation, bouncing the net into the sediment twice
3. Vertically bring the net up through the vegetation at a constant rate until you reach the surface of the water
4. Slowly lift the net out of the water. This is one sample
5. Tip your net into a bowl/tray of water, turn upside down to make sure all the contents end up into the bowl/tray. Make sure that you have all the organisms from your net
6. Place the container in the shade until you are ready to sort, count and identify organisms
7. Repeat steps 1 – 6 until you have collected the number of samples you need for this habitat type

Muddy bottom guide

1. Use a quadrat or estimate a 1 x 1m square
2. Place the mouth of the net inside one corner of the quadrat (downstream if moving water) and lower it 4cm into the sediments
3. Move the net over the quadrat area and then slowly lift the net partly out of the water
4. Move the bottom part of the net through the water to wash out some of the sediments
5. Lift the net out of the water. This is one sample
6. Tip your net into a bowl/tray of water, turn upside down to make sure all the contents end up into the bowl/tray. Make sure that you have all the organisms from your net
7. Place the container in the shade until you are ready to sort, count and identify organisms
8. Repeat steps 1 – 7 until you have collected the number of samples you need for this habitat type

Gravel & sand

1. Lay the quadrat onto the sand or gravel and place the net downstream inside and along one side of the quadrat
2. One student holds the net whilst the other uses a trowel or shovel to lift the top 4cm of the substrate and place it into the net. Move the net next to where the student is digging until the whole quadrat is sampled
3. Slowly lift the net part way from the water
4. Move the bottom part of the net through the water to wash out some of the sediments
5. Lift the net out of the water. This is one sample
6. Tip your net into a bowl/tray of water, turn upside down to make sure all the contents end up into the bowl/tray. Make sure that you have all the organisms from your net
7. Place the container in the shade until you are ready to sort, count and identify organisms

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8. Repeat steps 1 – 7 until you have collected the number of samples you need for this habitat type



Activity 20 : Rocky substrate in running Freshwater Macroinvertebrate Protocol

The Task

Collect three samples of MI's.

What you need

- Your site map
- Freshwater macroinvertebrates Identification. Data sheet
- 1 x 1m quadrat
- 0.5mm net
- 3 buckets/trays/containers
- Stopwatch

How to do it

Where you sample depends on what is available at your site.

Select sampling areas in the following order

1. 3 different riffles
2. 2 different riffles, 1 run
3. 2 different runs, 1 riffle

If there is no combination as above, then include a pool habitat as long as it contains a rocky substrate.

If none of the above is present use the multi habitat protocol

1. Locate the areas where you will collect your three samples on your map and in the water
2. Begin sampling downstream. Place the 1 x 1m quadrat on the bottom of the stream so that two sides are perpendicular to the water flow
3. Hold the net vertically in the water column, perpendicular to the water flow. Press the net firmly against the bottom of the streambed, lined up with the quadrat and one metre downstream of the quadrat. Water must not flow over or under the net
4. Start working in the quadrat farthest away from the net. Overturn and scrape the underside of rocks and wood found in the quadrat. Place any large organisms directly into the bucket.
5. After scraping the large rocks and wood, use your feet, hands or a stick to disturb the stream bottom within the quadrat for exactly 3 minutes
6. Lift the net from the water. This is one sample
8. Tip your net into a bowl/tray of water, turn upside down to make sure all the contents end up into the bowl/tray. Make sure that you have all the organisms from your net
9. Place the container in the shade until you are ready to sort, count and identify organisms
7. Repeat steps 1 – 9 until you have collected the number of samples you need for this habitat type

Activity 21 : Identifying Freshwater Macroinvertebrates

The Task

To identify, sort and count the macroinvertebrates collected in all samples

What you need

- ID guide
- Freshwater macroinvertebrates Identification. Data sheet
- Samples
- Small containers
- Magnifying glass
- Spoons/basters/eye droppers/pipettes

How to do it

1. Sort animals into their different taxa (types), placing them into smaller containers
2. Use identification keys to identify individuals to the most detailed level possible (Phylum, Class or Order are required. Family, Genus or species if possible.)
3. Count the number of individuals in each taxon

Report number of individuals from zero – 100. In cases where there are too many to count you can report >100 or you can take a sub-sample to count

Put your results onto the data sheet and then enter them onto the GLOBE database