PREPARE TO TEACH

SET UP STATION MATERIALS

- ☐ Make sure bin contains all of the materials you need. Alert lead instructor if materials are missing or broken. *The bin should be on deck, but the materials are not set up until just before the station begins to leave space on deck for larger group activities at the beginning of the program.*
- ☐ Examine the sediment wash station – make sure hose is present – and prepare to set it up just before the station begins.
- ☐ Setup datasheet with your name, date, time and location. Review datasheet directions.
- ☐ Gather index card, pencils, and logbooks for students. Smile!

PURPOSE

At this station we will assess lake health by asking:
Does the benthos contain a **wide variety of organisms**, and **no invasive species**?

CONNECTION TO LAKE HEALTH

Benthos have a big influence on the energy and nutrient flow in the lake since they eat dead organisms and small particles in the water, and are food for many larger organisms. Benthos also act as living monitors of environmental conditions so the composition of the benthic community – both plants and animals – can say a lot about the health of a body of water.

COLLECTING THE SAMPLE

NEXT-GEN ONLY • NEXT-GEN ONLY • NEXT-GEN ONLY • NEXT-GEN ONLY

Pre-sampling discussion (4 min)

1. Is the lake healthy?

→ The bottom can give us clues.
→ Look for a **diversity** of organisms.

2. How deep is it here?

→ Where is the bottom?
→ Find out with the **depth meter**

3. What is the bottom like?

Hard? *Soft?*
Mucky? *Sandy?*
Pebbles? *Boulders?*
Light? *Dark?*

4. What might live on the bottom?

Fish *Mussels*
Plants *Bacteria*
Worms *Crayfish*
Shrimp-like things

Introduce the PONAR grab and demonstrate how it works (8 min)

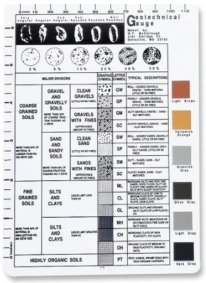
Get 2 samples *(3 attempts, ask for help if needed)*

1. **Let out line slowly & gradually**
2. **Allow line to go slack**
3. **Pull up slowly at first, then haul normally**
4. **Dunk in the lake to wash PONAR**

Examine the Sample (2 min)

→ **Color**

→ **Texture**



Prep for peer teaching! (3 min)
Student should talk about:

- ☐ Sampling info in logbook
- ☐ How to use PONAR grab
- ☐ Sediment color/texture
- ☐ What we will do with the sediment
- ☐ Benthos and lake health

TEACHING THE STATION

INTRODUCTION (1 min)

Purpose:

Assess the health of the lake bottom

Why look at benthos?

→ **Benthos link predators to producers**
→ **Benthos return nutrients to the lake (decomposition)**

A healthy lake bottom has:

□ **A diversity of organisms**
□ **Many species that are common**
□ **No invasive species**

EXAMINE SAMPLES (8 min)

Mentally divide up the sediment so all groups get some

Half of the group:

Sediment wash station

Other half:

Otter Trawl material

Part way through:

Switch tasks!

→ *Examine ALL of the sediment by the end of the program*

COUNT SPECIES (4 min)

→ **Use animal and plant keys to identify species**
→ **Share cool facts!**
→ **Count, weigh, or estimate**
→ **(follow logbook)**
→ **Record numbers in logbook**

Midge larvae:

- → Red is from hemoglobin in the blood (just like in humans) = very efficient at obtaining oxygen
- → Important food for many forage fish
- → Adults do not sting or bite and are important food for birds, bats, and dragonflies.

Quagga (and zebra) mussels:

- → *Invasive species* arrived by ballast water in 1988(zebra)/89(quagga)
- → Filter feeders; have concentrated nutrients at the bottom of the lake.
- → Less plankton means more transparent water, which combined with additional nutrients, allows for more algae growth deep in the lake. Algal growth can foster Botulism type E, and leads to mass algal die-offs, which then foul beaches.

ANALYZE RESULTS (LAST 3 min)

Is the Benthos healthy? Did we find a diversity of organisms?

1. Compare Deep to Shallow sample:

Which had more species?

2. Did we find invasive species?

→ No = Healthy!
→ Yes = Ecosystem problems

3. Is the benthic zone healthy?

Look for:

- □ Several species (3 or more)
- □ Two or more species with lots of individuals
- □ No invasive species

BETWEEN GROUPS

→ Keep organisms collected by all groups for a final tally for the whole program.
→ Reset materials for the next group.

CLEAN UP

- □ Tally or weigh all organisms (complete the datasheet).
- □ Return samples and organisms to the lake.
- □ Ensure everything is clean.
- □ Place everything neatly back into the Benthos bin.
- □ Give your completed datasheet to the Lead instructor.