

Shoreline Sampling

ESSENTIAL QUESTION: How does the biodiversity of aquatic macroinvertebrates indicate the health of the Hillsborough River ecosystem?

OBJECTIVES: Students will

- Collect and identify aquatic macroinvertebrates from the river
- Collaborate to determine the biodiversity of macroinvertebrates
- Use the biodiversity data to determine the overall health of the river

STANDARDS:

- SC.N.1.2: Explain why scientific investigations should be replicable.
- SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.

SAFETY:

- Do not walk without shoes on feet
- Properly hold dipping nets vertically up and down
- Instructor checks for alligators and snakes-if seen, all students leave water
- Always walk/No horseplay
- Stay within the designated area
- Water no higher than your knees
- Shuffle your feet to avoid holes
- Return animals to the water

MATERIALS NEEDED:

- Dipping nets
- Water shoes
- Identification charts
- Specimen buckets
- Data recording chart
- Pencil
- Clipboard

OPTIONAL:

- Magnified instrument
- Specimen jars

ENGAGE: Think back to the scientific process. What scientific skills do you think you will use as we conduct the shoreline field study?

VOCABULARY:

- **Biodiversity:** The number of different species in an ecosystem. A high level of biodiversity is an indicator of environmental health.
- **Ecosystem:** A community of organisms that live in a specific area, along with their nonliving environment. Ex. Riverine wetland.
- **Indicator Species:** An animal or plant species that can be used to infer conditions in a habitat. Ex. Mayfly nymphs are an excellent indicator of the health of a body of water because certain levels of pollution will kill them.
- **Pollutions:** Environmental contamination by any solid, liquid, or gas substance.
- **Sensitive Species:** Organisms tolerant of a small quantity of pollution.
- **Tolerant Species:** Organisms tolerant of a large quantity of pollution.
- **Invertebrate:** An animal with no backbone.
 - **Mollusks:** Invertebrates with a hard-outer calcified shell (snails, clams, mussels).
 - **Annelids:** Segmented invertebrates (worms, leeches).
 - **Crustaceans:** Invertebrates with 10 or more legs and an exoskeleton (glass shrimp, crayfish, scud).
 - **Arachnids:** Invertebrates with eight legs, two body parts and an exoskeleton (spiders).
 - **Insects:** Invertebrates with six legs, three body parts and an exoskeleton (flies, bugs, beetles).

EXPLORE:

- Students will wade into the water (if wearing water shoes) or dip nets from the shoreline, scooping up large amounts of detritus.
- Students will sift through the detritus to the invertebrates, place invertebrates in specimen buckets, and return all detritus in nets back to the river.
- Students will work to identify their invertebrates using taxonomy characteristics and identification sheets.
- Instructor or students will record items found on a data collection sheet.
- At the end of sampling, the class will gather around buckets to see what was found. Students will count the number of different species found to determine the class biodiversity count. Seven is an average biodiversity number. Empty shells count towards class biodiversity count.

EVALUATE:

- Students can explain why or why not the Hillsborough River is healthy based on their observations and data collection of macroinvertebrates.

EXTENSIONS:

- Personal stories
- Invertebrate dichotomous key
- Extended time in water
- Discussion of characteristics of individual benthic macroinvertebrates sampled
- Discussion of other invertebrates not found in the river and their connection with sampled invertebrates

H.O.T. QUESTIONS:

- What is the importance of this activity?
- Why are aquatic macroinvertebrates often better indicators of water quality than chemical testing?
- What do aquatic macroinvertebrates tell us about the condition of the water?
- What are some variables that could have changed our biodiversity count?
- How could your class improve the reliability of the results?
- The biodiversity of the invertebrates has a connection to the health of the river. Explain this connection.
- Why are invasive exotic species not counted, but are instead given a value of zero?
- Compare and contrast your data with that of other classes.