

Freshwater Classification

Time Frame: 40-60 minutes

Grade: 3rd-5th

Class/Group Size: 20-30 students

Setting: Indoors

Staff: 1

Use: In-class

NYS Education Standards:

MST-Section 1: Analysis, Inquiry, and Design

Students will: use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

- *Key Idea 1:* The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

MST-Section 4: Living Environment

Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

- *Key Idea 1:* Living things are both similar to and different from each other and non-living things.
- *Key Idea 6:* Plants and animals depend on each other and their physical environment.

Objectives:

- ✓ Students will be able to identify invertebrate and vertebrate species in a freshwater ecosystem
- ✓ Students will be able to identify at least 3 external anatomy characteristics of fish
- ✓ Students will be able to compare and contrast invertebrate and vertebrate organisms
- ✓ Students will be able to characterize invertebrates in a freshwater ecosystem

Motivation: Observing and identifying living invertebrates

Materials: 1 10-15 foot seine net, 1-2 scap nets, buckets or a large plastic bin, waders, 10-15 Petri dishes, 10-15 hand-held lenses, 10-15 hand-held dip nets, 2 semi-deep collection trays/pond, box of plastic spoons, 10-15 pipettes, 10 laminated *Freshwater Organism Classification worksheet*, 8-10 copies of *Freshwater Organism Identification worksheet*, small-medium plastic containers, freshwater fish mounts/pix/dead on ice.

Pre-Lesson Procedures:

Seining (1/2 day)

1. Go seining at a local fresh body of water.
2. Collect and store organism in buckets, a large plastic bin or a small water jug.

At School

1. Set up the “classroom pond” by pouring some of the pond water into the 2 collection trays/pond.

2. Set up and distribute the Petri dishes, small-medium plastic containers, pipettes, spoons, and *Classification worksheets*.

Lesson Procedures:

Welcome/Introduction (1-2 minutes)

1. Introduce yourself and the I FISH NY program.
2. Introduce the day's activities:
 - a. The freshwater environment
 - b. Invertebrate and vertebrate identification

Freshwater Introduction (2-4 minutes)

1. Define freshwater. Have students brainstorm a few local examples.

Pond Study (18-25 minutes)

1. Tell students they are scientists and are studying invertebrates and vertebrates found in a “classroom pond” or a freshwater ecosystem.
2. Discuss the differences between invertebrates and vertebrates.
 - a. Say: What is a vertebrate?
3. Begin by focusing on invertebrates.
4. Have students work in groups of three. Provide each group with the following supplies: pipette; Petri dish; *Freshwater Organism Identification worksheet*; plastic spoon; and hand lens.
5. Have each group work together to identify two invertebrates. Assign a different task to each member of each group:
 - a. Scientist #1 collects the organism
 - b. Scientist #2 describes and draws the organism
 - c. Scientist #3 records answers on the *Identification worksheet*
6. Begin the first round of collections by demonstrating how to collect organisms using the dip net; then let students practice the procedure using a net and plastic container.
7. After the collection process is complete, have all scientists work on identifying the invertebrate.
8. Circulate among students during identification process. Field questions and offer suggestions.
9. When finished, start 2nd round of collections. Have students switch roles.
10. Time permitting, run a 3rd round of collections. Again have students switch roles.
11. After the students have finished, ask for some groups to identify the critters found.

Vertebrate Identification (8-10 minutes)

1. Show the students 3-5 different FW fish species.
 - a. Discuss external anatomy features, proper handling, and the 5 senses.
2. After finished, have students complete back of *Identification worksheet*. Review answers together.

Big Picture (3-5 minutes)

1. Discuss relationships between invertebrates and vertebrates in the freshwater environment. Introduce the terms, “predator” and “prey.”
 - a. Say: How are these two types of organism similar? How are they different?

- b. Say: Could invertebrates and vertebrates in a freshwater environment depend on each other? How?

Closing (1-2 minutes)

1. Re-cap lesson. Field any questions.
2. Go over fishing trip or upcoming events.

Adapted from: NYSDEC DPAE-Environmental Education Unit; Pond Study lesson plan