



Using Fish Species to Learn About Classification

Concepts:

- Recognizing and identifying fish species can be done through careful observation and by comparing and contrasting specific physical characteristics of two or more organisms
- Different fish species may vary in subtle ways that are often difficult to recognize.
- A dichotomous key is a useful taxonomic tool
- Juvenile fish nurseries are important to the health and productivity of adult fish populations

CT Science Standards Addressed:

- 6.4 – Water moving across and through earth materials carries with it the products of human activities.
- 6.2 -- Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.

General Goal(s):

- Compare and contrast the different morphological characteristics of LIS near shore fish species
- Recognize the diversity of fish species that exist in the near shore communities of LIS and relate that to productive adult fish populations

Required materials:

- Internet access
 - Online taxonomic Key
 - Online fish database

Background information:

Nearshore ecosystems along Connecticut's coast are vital to the ecological and economic health of Long Island Sound. These areas are essential to shoreline protection, productivity of commercial and sport fisheries, and cycling of nutrients. Nearshore ecosystems are specifically valued for their extremely high productivity, which supports a great abundance and diversity of fish as well as shrimp, oysters, crabs, and other invertebrates. Because of the abundance of juvenile fish and shellfish found in these areas, nearshore ecosystems are widely considered "nurseries."

The nursery role of coastal estuaries and marine ecosystems is well accepted by scientists, conservation organizations, fisheries managers, and the public, and it is often cited to support protection and conservation of these areas. During their juvenile stage, individuals will often move between multiple habitats and receive benefits from each. In some cases, individuals may not even have to reside in a habitat to receive benefits from it. Nearshore ecosystems that include these habitats are in decline, and continue to be threatened by drainage, development, and pollution. As a result, these areas are the focus of many management and conservation programs.

According to the Long Island Sound "Soundkeeper", Terry Backer,

"More than 90% of the Long Island Sound salt marshes and wetlands have been plowed under, paved and/or separated from the Sound. These areas are essential sanctuaries for spawning fish and their offspring. Without these essential habitats, there are no naturally-protected spawning grounds and fish stocks disappear. As a result, a disproportionate number of fingerlings and larvae fall prey to natural predators. Those predators, by decimating their own supply of prey, have also nearly disappeared from the area. This depletion of native species is reducing the productivity of Long Island Sound's one-billion-dollar-per-year fishing industry and undermining ecosystem biodiversity."

Specific Objectives:

Students will

- Explore the various structural features that help to identify nearshore fish species
- Compare and contrast the morphological features of at least two nearshore fish species found in Long Island Sound
- Diagram at least two different LIS nearshore fish species
- Practice keying out species of fish based on observed structures
- Utilize an interactive online taxonomic key in order to reinforce the characteristics of species they have selected

Engagement technique:

- Show students online images of **fish adaptations**
- Ask students to identify some of the unique structures that fish have that allow them to be adapted to their selected environments.
- Break class into small teams and ask them to sort images of LIS fish (those typically found nearshore) by structural characteristics
- As a larger group (entire class): What characteristics were helpful in making decisions about grouping? What new information would students need in order to be more accurate? Review concept of **taxonomy** and **dichotomous keys**.

Specific outline of the lesson:

- Assign two different fish species to each team of students
- Students will use online resources such as FishBase.org to research the unique morphological characteristics of their 2 fish species
- Students will sketch and label each of the fish species, being certain to note the specific characteristics
- Use a chart to outline the similarities and differences between the two fish species
- Use the online keying tool as a way of checking knowledge about the fish. Follow each step of the key, using distinguishing characteristics of each of the two fish species, to get to the “end point”, i.e. the two assigned fish species.
- If the keying process proved difficult, students should go back to their diagram and chart to make the necessary changes/edits

Assessment:

- Diagram and chart of each fish species (see rubric)

Extensions: (optional)

- Research the LIS fish species that are economically significant and relate that to the species identified in this taxonomy activity
- Find photos of fish that are closely related to the species that were studied. Note similarities & differences

References:

- FishBase, (Froese and Pauly 2000)
<http://www.fishbase.org/search.php>
- LEARNNC: University of North Carolina School of Education
<http://www.learnnc.org/lessons/lemuellamb5232002512>

- “The Role of Nearshore Ecosystems as Fish & Shellfish Nurseries”
Ecological Society of America, Spring 2003
http://esa.org/science_resources/issues/FileEnglish/issue11.pdf
- “The Soundkeeper”, 2008
<http://www.soundkeeper.org/programinitdetail.asp?ProgramID=45>