

## Title: Fins, Scales, and Tails: The Art of Fish Identification

Edited by: Tennessee Aquarium Education Staff    Last Edit: Nov 2024

<b>Subject:</b> Science, Biology	<b>Grade Level:</b> 6-8
<b>Objective(s):</b> <ul style="list-style-type: none"> <li>Students will be able to compare and contrast the physical characteristics of four different families of freshwater fishes.</li> <li>Students will be able to recognize fish adaptations and their form and function.</li> </ul>	

### Standards:

#### 6.LS2: Ecosystems: Interactions, Energy, and Dynamics

7) Compare and contrast auditory and visual methods of communication among organisms in relation to survival strategies of a population.

#### 7.LS1: From Molecules to Organisms: Structures and Processes

6) Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.

#### 8.LS4: Biological Change: Unity and Diversity

2) Construct an explanation addressing similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.

### Aquarium Exhibit Use:

Ridges to Rivers Gallery: 3<sup>rd</sup> floor of River Journey



## Materials Needed

### Pre-aquarium activity:

- Blank fish characteristics worksheet
- Family characteristics cards
- Diagrams: mouth position, fins, etc.
- Vocabulary

### Aquarium activity:

- Pencil/paper (colored pencil or markers recommended)
- Tablet/phone for pictures/videos
- Family characteristics cards
- Exhibits

### Post-aquarium assessment:

- Pictures/videos taken at the aquarium
- Projector
- Pencil/paper

## Background Information

Fish are classified into families based on their similarities in body structure, behavior, and genetics. Scientists look at features like the shape of the mouth, type of fins, and the arrangement of bones; these features help them group fish that are related. For example, fish in the same family might all have similar ways of feeding or swimming. These traits, called adaptations, help the fish survive in their environment. By studying these adaptations, scientists can understand how fish live and how they are related to each other. This classification helps us learn more about the diversity of life across all environments.

Form refers to the shape or structure of an adaptation, like a fish's fins or mouth. Function is what the adaptation does, like helping the fish swim or eat. Together, form and function show how a feature helps an animal survive. For example, a fish's streamlined body (form) helps it swim fast (function).

**See document** *"Identification of Freshwater Fishes"* (as an extension of background information) for specific vocabulary and more in-depth information on anatomy and different fish species. We highly encourage sharing the vocabulary and diagrams with the students as reference sheets throughout the entire process. If this is your students' first-time using characteristics for identification purposes, please see the powerpoint in the 4<sup>th</sup>-5<sup>th</sup> section of Tennessee Aquarium Teacher Resource page.

Program Planning	
Introduction	Duration
<ul style="list-style-type: none"> <li>The southeastern (SE) United States are a biodiversity hotspot, supporting more freshwater species than anywhere else in the country! The SE is also a globally recognized freshwater ecoregion, our temperate zone is only surpassed by the tropical regions found in SA and SE Asia!               <ul style="list-style-type: none"> <li>Watch this video: <a href="#">Why We Designed Our Newest Showcase Exhibit to Recreate a Southern Appalachian Waterway (youtube.com)</a></li> <li>Ask students what they noticed about all the fish shown.</li> </ul> </li> <li>Briefly explain the lesson's objectives.</li> <li>Groups of 3 are recommended for the activities moving forward. Groups should remain the same throughout.</li> </ul>	<p>~10-15 minutes</p> <p>&lt; 5 minutes</p>
Pre-aquarium Activity	Duration
<ul style="list-style-type: none"> <li>Review what adaptations are and some basic examples in the animal kingdom.               <ul style="list-style-type: none"> <li>Ex. Mimic colors of a non-venomous milk snake to camouflage as a venomous coral snake; large and colorful peacock feathers to attract a mate.</li> </ul> </li> <li>Review basic fish anatomy.               <ul style="list-style-type: none"> <li>To remember the difference between anterior and posterior, remember that A is at the beginning of the alphabet (towards the head of the fish) and P is towards the end of the alphabet (towards the tail of the fish).</li> <li>Show diagrams to see how different body parts can look different depending on the fish's habitat/food preference.</li> <li>Emphasize mouth placement, fins, lateral line, patterning.</li> </ul> </li> <li>Pass out Fish Characteristic worksheets to the groups and give instructions to complete.</li> <li>Once complete, compare group answers to Family Characteristic Cards and fill in the question of the worksheet, "What Family do I belong to?".</li> <li>If needed, use this video of our stream exhibit to practice observing adaptations in movement (they can use a blank characteristic sheet for this):  <a href="https://www.youtube.com/watch?v=rjTQ48IMAcA">https://www.youtube.com/watch?v=rjTQ48IMAcA</a> </li> </ul>	<p>~15-20 minutes</p> <p>~30-45 minutes depending on understanding of fish characteristics</p>
Aquarium Activity	Duration
<ul style="list-style-type: none"> <li>Have each group choose a fish in the stream exhibit.               <ul style="list-style-type: none"> <li>Draw out the fish as well as describe their physical characteristics. (can take photos/videos if needed).</li> <li>Match the fish to one of the families on the cards.</li> </ul> </li> </ul>	~10-15 minutes

<ul style="list-style-type: none"> <li>○ Attempt to ID to species using the exhibit signage (not required).</li> <li>○ Can do more than one species if time allows.</li> </ul>	
<b>Post-aquarium Assessment</b>	<b>Duration</b>
<ul style="list-style-type: none"> <li>• Compare and contrast the fish and their individual adaptations identified at the aquarium versus the species on the worksheet. <ul style="list-style-type: none"> <li>○ Create a chart to show comparisons as a group.</li> <li>○ Are there drastic difference amongst families, across, or both?</li> <li>○ What does this signify?</li> <li>○ Were any behaviors observed that confirmed family ID?</li> </ul> </li> <li>• Ask students if there are any other adaptations that should be added to the family identification cards to make identification easier.</li> </ul>	~20-30 minutes
<b>Closure/Reflection</b>	
<ul style="list-style-type: none"> <li>• Emphasize the importance of a biodiverse ecosystem.</li> <li>• Emphasize the importance of adaptations for survival.</li> </ul>	

### Extensions:

- Research one of the four families of fish, are there any behaviors that are characteristic of the family?
  - Can you observe those behaviors in the stream exhibit?
- How closely related are the families in this lesson?
  - Can you infer who is closely related by their adaptations or habitat?