

TENNESSEE AQUARIUM

Title: Fin-tastic Adaptations: The Secrets of Fish Survival

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

Subject:

Life Science

Grade Level:

4th – 5th

Objective(s):

- Students will be able to identify adaptations of freshwater fish.
- Students will be able to explain how specific adaptations help fish survive.
- Students will design and name a fish based on adaptations of their choosing.

Standards:**3.LS4: Biological Change: Unity and Diversity**

- 2) Infer that plant and animal adaptations help them survive in land and aquatic biomes

Aquarium Exhibit Use:

Ridges to Rivers Gallery: 3rd floor of River Journey



Materials Needed

Pre-aquarium activity:

- Fish adaptation PowerPoint

Aquarium activity:

- Adaptation observations worksheet
- Pencils
- Clipboard

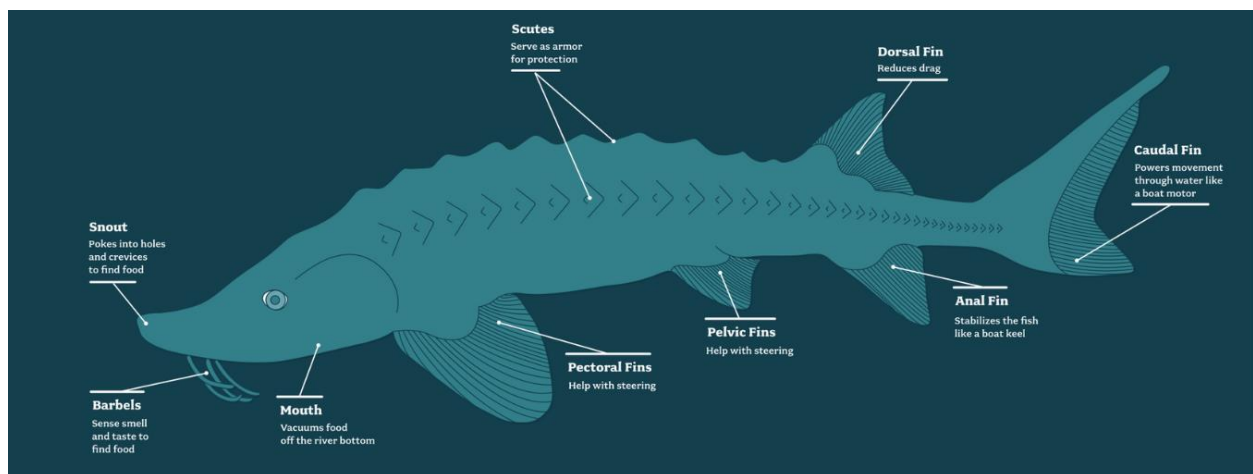
Post-aquarium assessment:

- Blank fish design sheet
- Coloring utensils

Background Information

An adaptation is defined as a physical or behavioral characteristic that helps an animal survive in their environment. Almost all fish have similar body features however the size and shape of them vary based on their environment and/or feeding habits. For this activity, we will be focusing on fins, color/pattern, and mouth placement.

Fins



Sturgeon graphic from Ridges to Rivers

**Emphasize to students*

*Caudal fin**

Also known as the tail fin, this fin is the main source of propulsion for most fish, like a boat's motor. The shape of the caudal fin varies depending on how the fish needs to move, faster fish have larger caudal fins

with a deep V cut. Slower fish that have to make sharp turns tend to have rounded or paddle shaped caudal fins.

*Pectoral fins**

These fins help fish balance and maneuver. Can also act as brakes to slow down. The position of the pectoral fins can also vary depending on how the fish swims. For example, oceanic fish that swim quickly may have pectoral fins that sit almost horizontally on their bodies, while slower fish may have pectoral fins that sit almost vertically.

Pelvic fins

These fins help stabilize the fish while swimming and also allow it to move up and down in the water.

*Dorsal fin**

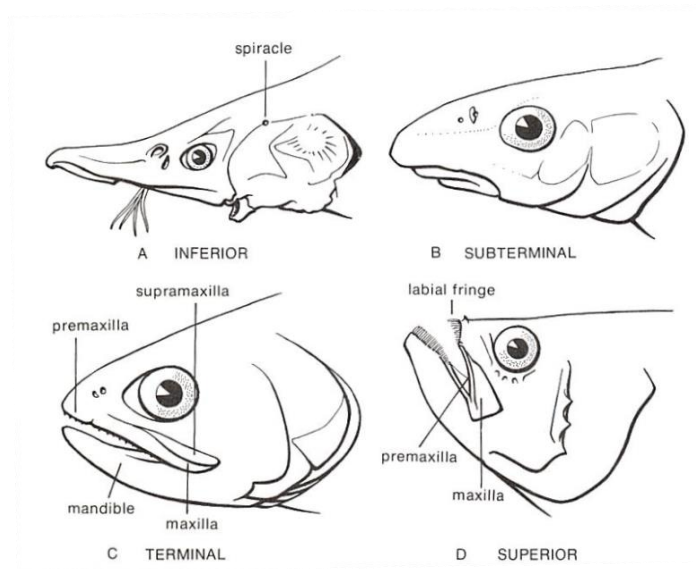
This fin extends along the length of the fish's back and can help with balance, steering, and changing direction quickly. Some fish, like angler fish, have dorsal fins that look like fishing lures to attract prey. Other fish may have sharp spines in their dorsal fins to protect themselves from predators.

Anal fin

This fin is located on the bottom of the fish, behind the anal opening, and helps with steering and balance.

Mouth Shape

Mouth location indicates where a fish will find it's food.



A. Inferior (Mouth on the bottom)

Located on the underside of the head, adapted for bottom dwellers that scavenge or feed on benthic (living in the river floor) organisms; like sturgeon.

B. Subterminal (Mouth pointing down)

Located slightly below the tip of the head, adapted for bottom-feeding fish, helping them graze on algae, detritus, or small organisms near the substrate; like carp.

C. Terminal (Mouth in the middle)

Located at the front of the fish's head, adapted for fish that feed in the middle of the water column or at the surface, allowing them to capture prey or forage efficiently in open water; like bass.

D. Superior (Mouth pointing up)

Located on the top of the head, adapted for surface feeders, allowing fish to capture prey or insects above them in the water or air; like topminnows.

Side note: Barbels – fleshy protuberances (tubercles, projections) that may be long and thread-like (off of face or chin). Barbels are sensitive to touch and taste making them extremely useful in conditions of low light (at night, deep water, turbid/opaque water). They can also be useful for fishes rooting through substrate to find food. Examples: sturgeon, catfish, madtoms.

Patterns/Colors

Patterns and colors in freshwater fish serve as important adaptations for survival in their specific habitats. Camouflage patterns help fish blend into their surroundings, protecting them from predators or allowing them to ambush prey. Bright colors or bold patterns can also play a role in attracting mates or signaling danger to potential threats, depending on the species and environment. Usually, colors are dependent on the time of year and the water's temperature. Patterns can be found on every part of the fish so look closely.

Introduction	Duration
Ask students to think of the physical traits and behaviors that we as humans use to survive.	5 minutes
Pre-aquarium Activity	Duration
<ul style="list-style-type: none"> Go through PowerPoint presentation with students. Explain the observation worksheet and complete it as practice for when you visit the aquarium. <ul style="list-style-type: none"> Use the picture of the Brook Trout from our website to start https://tnaqua.org/animal/brook-trout/ To practice how to observe while fish are moving, use the following video of our Brook Trout https://www.youtube.com/watch?v=1z1U32_IMtM Using the same fish, but in different scenarios will help with how to find the adaptations they need; they may see things that they did not see before or 	~15-20 minutes

<p>even correct their previous observations. Recommended to be done on the same worksheet.</p>	
Aquarium Activity	Duration
<ul style="list-style-type: none"> • Allow students time in Ridges to Rivers exhibit to find, observe, and document two adaptations for each category to complete their worksheet and later design their own fish. • This can be done in groups or independently. 	~15-20 minutes
Post-aquarium Assessment	Duration
<ul style="list-style-type: none"> • Give students a blank fish design sheet and give them time to bring all of the adaptations they observed together and design their final fish. • On a separate blank sheet of paper, have them draw and color their fish • Using the adaptations, students come up with fish's common name. 	~20-30 minutes
Closure/Reflection	
<ul style="list-style-type: none"> • Summarize key points. • Allow students to ask questions and provide feedback. 	

Extensions:

- Have students present their fish they designed to the class highlighting the adaptations and how they help the fish survive.
- Use clay or paper mache to create three dimensional models of fish designed.
- Extend this to habitat design.