Fishy Adaptations

Adapted from: "Fashion a Fish" in Project Wild Aquatic Education Activity Guide. The Council for Environmental Education, 1992

Grade Level: Basic

Duration: 45 minutes

Setting: Classroom

Summary: Students design a variety of fish adapted to various aquatic habitats

Objectives: Students will describe how fish adapt to their environment, describe how adaptations can help fish survive in their habitat, and interpret the importance of adaptations in animals.

Vocabulary: adaptation, habitat

Related Module Resources:
- Fins, Shapes, Spots, Stripes, and Tails Fact Sheet
- All About Fish Fact Sheet
- Fish Colors Fact Sheet
- Fish Parts Fact Sheet

Materials (Included in Module):
- *Examples ofAdaptations in Fish* file on website to project
- *Pictures of Adaptations in Fish* file on website to project
- Adaptation Cards
- Fishy Adaptations Quiz

Additional Materials (NOT Included in Module):
- Art materials, markers, construction paper
- Projector

ACADEMIC STANDARDS: ENVIRONMENT & ECOLOGY

7th Grade

4.6A Explain the flows of energy and matter from organism to organism within an ecosystem
- Describe and explain the adaptations of plants and animals to their environment

4.7A Describe the diversity of plants and animals in ecosystems
- Identify adaptations in plants and animals

4.7B Explain how species of living organisms adapt to their environment
- Explain how an adaptation is an inherited structure or behavior that helps an organism survive and reproduce

10th Grade

4.7A Explain the significance of diversity in ecosystems
- Identify a species and explain how its adaptations are related to its niche in the environment

4.7B Explain how structure, function, and behavior of plants and animals affect their ability to survive
- Describe an organism's adaptations for survival in its habitat
- Compare adaptations among species

BACKGROUND: Adaptation is an important survival skill in all species. **Adaptations** are changes an organism undergoes to fit different surroundings. If an organism is not able to evolve over time to suit its environment it may eventually become extinct. The natural surroundings in which an animal or plant is adapted to live is called its **habitat.** When a habitat changes the species that is able to adapt best is most likely to survive.

Fish, like other animals, have also adapted to live in different types of habitats. In Pennsylvania there are over 160 species of fish, each with their own adaptations and body structure.

Most physical adaptations in fish occur in the mouth, body shape, coloration or method of reproduction. Various adaptations in these areas help fish survive in their habitats.

Fish that forage on insects in streams have a much different mouth structure than fish that feed on other fish. The walleye, for example, has a large jaw with strong teeth, only round vacuum-like mouths, these fish suck up organic material from the bottom of a

stream or river.

Body shape is also an important adaptation in fish. Fast moving fish have long torpedo shaped bodies to help them move though the water. Other fish that stay at the bottom of a stream or river have longer flat bodies. Most fish have fins; the location and shape of these fins vary from species to species. In general fish have a dorsal fin on their back and pelvic and anal fins on their undersides. They also have pectoral fins near the gills and a caudal fin as the tail. These fins can be prominent parts of the body structure or they can be, as in the case of the eel, practically unnoticeable. The size and texture of the scales also varies from fish to fish. Some, such as carp have large, noticeable scales; other fish have small scales, which are embedded in the skin giving the fish a smooth feeling.

Another adaptation in fish, and probably one of the most noticeable, is the skin coloration. A fishes coloration can help it adapt to its' environment but the environment can also affect the skin color making it brighter or duller. Coloration can also be used as camouflage to help the fish hide from predators. For example, some fish such as pickerels and blue gills have vertical stripes to help them hide in vegetation. In some species, the male and female have different markings. Variation of patterns on the skin can be used to identify different sexes.

OVERVIEW: Students create pictures of fish with various adaptations. Students then display these pictures and explain how their particular adaptations help the fish survive in its habitat.

PROCEDURE:

1. Conduct a class discussion on the importance of different adaptations in animals. Ask the students to identify adaptations and give examples of how these adaptations would benefit the animal. Use examples and pictures on website that you can project for the class to see.
2. Hand out the fish adaptation cards, giving each student one card from each of the four categories (reproduction methods, body shape, coloration, & mouth shape). Ask the students to draw a fish giving it physical features that are represented on each of the adaptation cards.
3. Ask the students to then name the fish they created and have the students draw a habitat suitable for their fish according to its adaptations.
4. Have each student present his or her fish to the class, explaining the characteristics of the fish he or she has created. During the presentation, the students should identify and describe the fish's adaptations. Ask the students about how the given adaptations would help it survive in a particular habitat.
5. To make this presentation more challenging: Ask the students to compare the adaptations they have given their fish to real adaptations found in nature. Why are these adaptations important for survival?

DISCUSSION:

How do the adaptations help the fish find its' food, travel through the water, or successfully reproduce? *Answers may vary, for example a carnivorous fish with large and strong jaws would be better suited to grasp and eat its prey.*

What might happen if the fish did not have these adaptations? *If a fish did not have a specific adaptation that it needed to survive in its habitat, it would be forced to find another, more suitable, habitat or it would die.*

EVALUATION:

- List adaptations that fish have and how these adaptations help fish to survive in their habitat.
- Name some adaptations of other organisms and explain how these adaptations assist the organism in its environment.
- Fishy Adaptations Quiz
    - ✓ Look closely at the four fish on the Fishy Adaptations Data Sheet
    - ✓ What types of adaptations does each fish have (there will be more than one adaptation for each fish)
    - ✓ List the physical adaptations for each fish *(You may choose to have the students identify the fish and research its reproductive method.)*
    - ✓ See Data Sheet: Fishy Adaptations Key for answers

EXTENSIONS & MODIFICATIONS:

- Use pictures of real fish. Identify the fish's adaptations. Based on the fish's adaptations, make inferences on the type of habitat the fish lives in.
- Create a fish that would survive on your school's grounds. Discuss the habitat of a local waterway, and then make estimates on the optimal coloration, mouth shape, feeding behavior, and body shape for that habitat.

NOTES: (TEACHERS, PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR OTHER TEACHERS USING THIS ACTIVITY IN THE FUTURE):

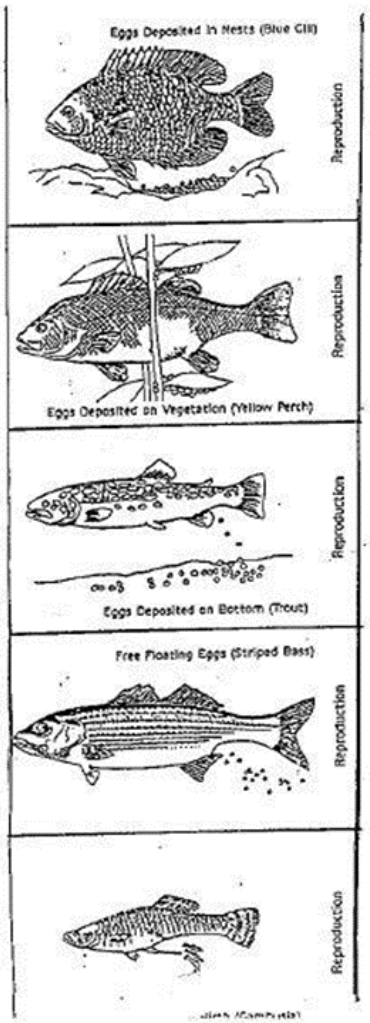
Examples of Adaptations in Fish

ADAPTATION	ADVANTAGE	EXAMPLES
Mouth		
sucker shaped mouth	feeds on very small plants and animals	Sucker, carp
elongate upper jaw	feeds on prey it looks down on	spoonbill, sturgeon
elongate lower jaw	feeds on prey it sees above	Barracuda, snook
duckbill jaws	grasps prey	Muskellunge, pike
extremely large jaws	surrounds prey	bass, grouper
Body Shape		
torpedo shape	fast moving	trout, salmon, tuna
flat bellied	bottom feeder	Catfish, sucker
vertical disk	feeds above or below	Butterfish, bluegill
horizontal disk	bottom dweller	Flounder, halibut
hump backed	stable in fast moving water	sockeye salmon, chub, razorback
Coloration		
light colored belly	predators have difficulty seeing it from below	most minnows, perch, tuna, mackerel
dark upper side	predators have difficulty seeing it from above	Bluegill, crappie, barracuda. flounder
vertical stripes	can hide in vegetation	Muskellunge, pickerel, bluegill
horizontal stripes	can hide in vegetation	yellow and white bass, snook
mottled coloration'	can hide in rocks and on bottom	trout, grouper, rockbass, hogsucker
Reproduction		
eggs deposited in bottom	hidden from predators	trout, salmon, most minnows
eggs deposited in nests	protected by adults	Bass, stickleback
floating eggs	dispersed in high numbers	striped bass
eggs attached to vegetation	stable until hatching	Perch, northern pike, carp
live bearers	high survival rate	guppies

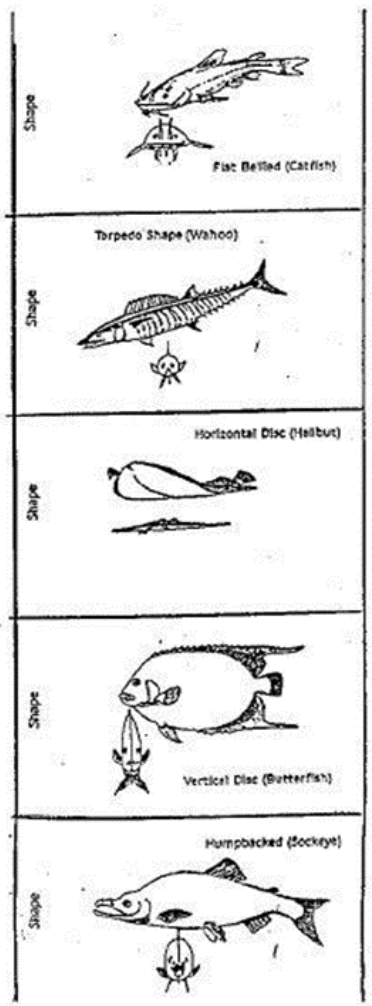
Adapted from: "Fashion a Fish" in Proiect Wild Aquatic Education Activity Guide. The Council for Environmental Education

Pictures of Adaptations in Fish

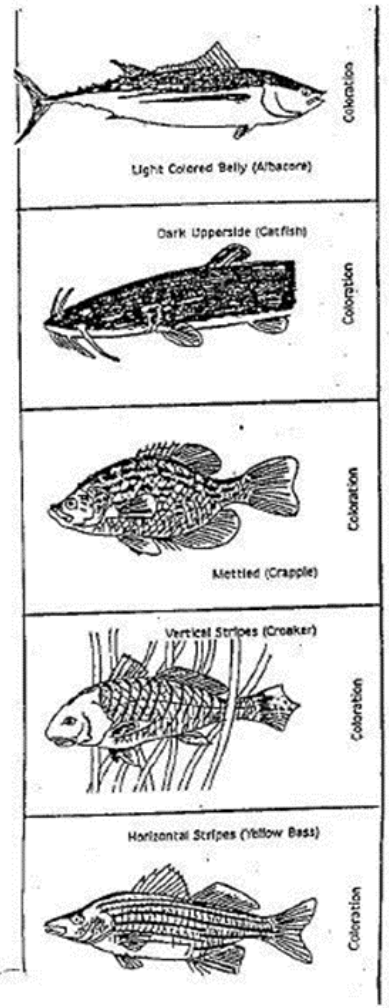
Reproduction Methods



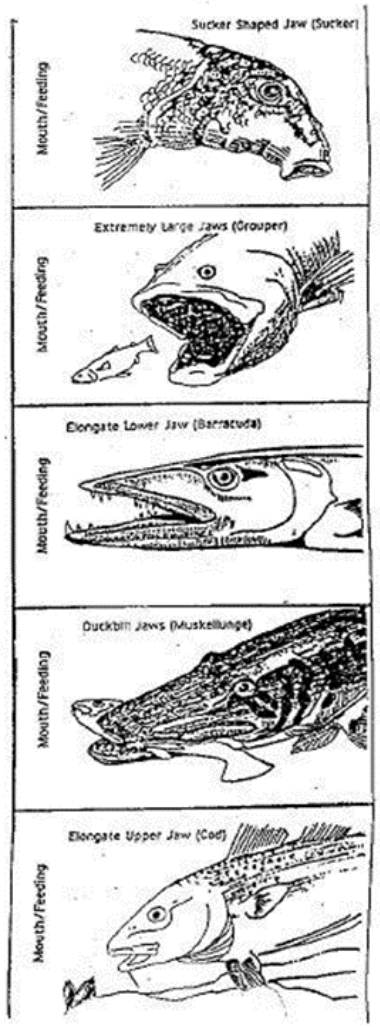
Adaptations relating to Body Shape



Adaptations Relating to Color



Examples of Mouth Shape and Method of Feeding

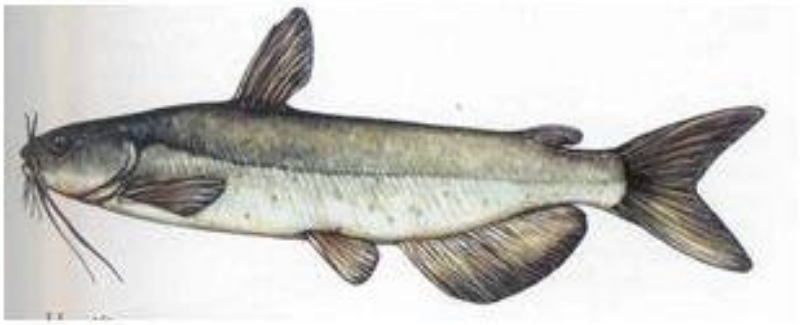


WORK SHEET: FISHY ADAPTATIONS

Name_____Date_____

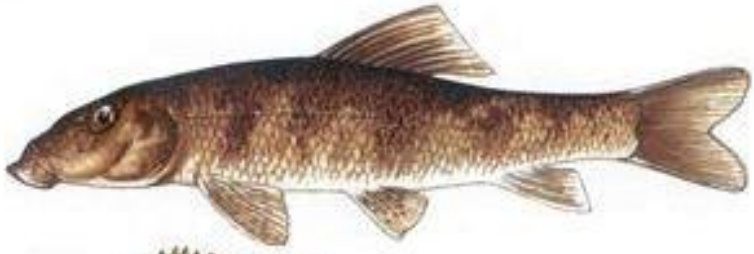
Name the physical adaptations of each fish for each category: mouth shape, body shape, and coloration.

A.

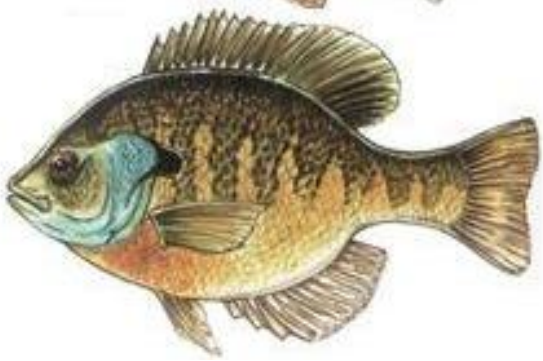


B.

C.



D.



KEY: FISHY ADAPTATIONS

FISH NAME	ADAPTATION
A) Catfish	Barbels around mouth at end facing forward Flat underside Light colored underside
B) Striped Bass	Large Jaws, mouth upturned Vertical disc body shape - Skinny and deep bodied Horizontal Stripes
C) Sucker	Downturned mouth Flat underside Mottled coloration
D) Bluegill	Mouth at end facing forward Vertical disc body shape - Skinny and deep bodied Vertical stripes