



Fashion a Michigan Fish

Key Concept: Adaptations

Grade Level: 1–7

Education Subject: Science

Success Indicator:

After participating in this activity, learners will be able to:

- ▶ Classify fish according to body shape and coloration.
- ▶ Describe adaptations of fish to their environments.
- ▶ Describe how adaptations can help fish survive in their habitat.
- ▶ Interpret the importance of adaptations in animals.
- ▶ Learn to be better anglers by using lures, baits and other gear designed for various adaptations of fish.

Materials and Methods

Preparation Time: 30 minutes

Lesson Time: 30 minutes

Space: Any

Materials:

- ▶ Adaptation cards (one from each of the five categories for each group) (Note: Body shape and coloration are the only cards needed for younger participants.)
- ▶ Colored markers (four or five sets of a variety of colors)
- ▶ Newsprint or other large paper
- ▶ Photos or drawings of a variety of Michigan fish (available online from Project F.I.S.H. at projectfish.org or from the Michigan Department of Natural Resources at http://www.michigan.gov/dnr/0,1607,7-153-10364_18958---,00.html)

Background Information:

The major purpose of this activity is for learners to investigate the concept of adaptation in fish. An adaptation is a feature that increases the animal’s likelihood of surviving and reproducing in its habitat. Aquatic animals are the products of countless adaptations over long periods of time.

When a habitat changes, either slowly or catastrophically, the species of animals with adaptations that allow them many options are the ones most likely to survive. Some species have adapted to such a narrow range of habitat conditions that they are extremely vulnerable to change. They are overspecialized and are usually more susceptible than other animals to death or extinction.

In this activity, the learners will design a fish and draw pictures of the adaptations their fish will have. As these adaptations become part of the fish’s design, the fish becomes better suited to the habitat in which it lives. Because of the variety of conditions within each habitat, many types of fishes can live together and flourish. This is important to anglers. As they learn about the particular adaptations of the fish they pursue and about the habitat where these adaptations occur, they can adjust their fishing methods or techniques. Some fish adaptations are listed in the table at the end of this activity.

Instructions:

(Note: The first three steps are optional for younger participants. The remaining steps need to include only the adaptation cards for body shape and coloration. The reproduction and mouth and fin type cards are optional for younger learners.)

1. Ask the learners to draw a kind of animal that has a special adaptation; for example, long necks on giraffes for reaching high vegetation to eat, large eyes set into feathered cones in the heads of owls to gather light for night hunting.
2. Conduct a group discussion on the value of various kinds of adaptations in animals.
3. Pool all of the drawings of adaptations. Categorize them into the following groups:
 - ▶ Protective coloration and camouflage.
 - ▶ Body shape or form.

Tips for Success

Make sure all of the learners in a group are providing input to the group's drawing. Visit each of the groups to see if they need more information or help, especially for younger learners.

Adaptation

- ▶ Have each group create a three-dimensional fish with the particular adaptations out of scrap materials you make available. These can then be made into a display about adaptations. Visit a recycling center in your community to pick up reusable materials.
- ▶ Pick one card from a set and have participants find photos of fish with that particular adaptation.

Michigan Grade Level Content Expectations:

Grades 1 through 7: Generate questions based on observations (S.IP.01.12, S.IP.02.12, S.IP.03.12, S.IP.04.12, S.IP.05.11, S.IP.06.11, S.IP.07.11); communicate and present findings of observations and investigations (S.IA.01.1, S.IA.02.13, S.IA.03.13, S.IA.04.13, S.IA.05.13, S.IA.06.13, S.IA.07.13).

Grade 1: Identify the needs of animals (L.OL.01.13); identify characteristics that are passed on from parents to young (L.HE.01.11).

Grade 3: Identify and compare structures in animals used for controlling body temperature, support, movement, food getting and protection (L.OL.03.32); relate characteristics and functions of observable body parts to the ability of animals to live in their environment (L.EV.03.12).

Grade 4: Identify individual differences in organisms of the same kind (L.EV.04.21); identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction (L.EV.04.22).

Grade 5: Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment (L.EV.05.11); describe the physical characteristics (traits) of organisms that help them survive in their environment (L.EV.05.12).

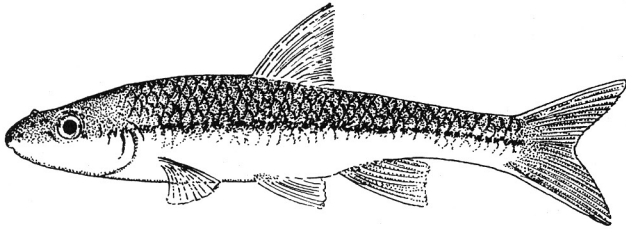
- ▶ Mouth type and feeding behavior.
 - ▶ Reproductive behavior.
 - ▶ Other (one or more categories the learners create in addition to the four groups listed above which they'll need for the rest of the activity).
4. Divide the adaptation cards into five groups of five cards each, one each of coloration, mouth type, fin type, body shape and reproduction.
 5. Distribute one complete set of cards to each group of learners. There might be five groups with four to six learners in each group. If the group is larger than about 30 people, make additional sets of adaptation cards.
 6. Ask the participants to "fashion a fish" from the characteristics of the cards in the set they receive. Each group should:
 - ▶ Create an art form that represents the group's fish.
 - ▶ Name the fish (common name and scientific name).
 - ▶ Describe and draw the habitat for the fish.
 - ▶ Design and describe what it would take to catch this fish.
 7. Ask each group to report on the attributes of its fish and identify and describe its adaptations. Ask the learners to describe how this kind of fish is adapted for survival.
 8. **(Optional)** Now that the learners have some knowledge of adaptations, place the fish photos or drawings (these should be the same-sized photos or drawings or be put onto cards of the same size) on the floor or table and ask the learners to categorize them according to their adaptations. See if they can get them into proper families, and have them describe how and where these fish may feed. This part of the activity is optional or may be done as a separate activity.
 9. **(Optional)** Playing the game "Concentration" or "Memory" can reinforce what has been taught in this activity. Simply create a second set of photos or cut the ones you have in half (this is the reason to have the photos or drawings on the same-sized cards) and mix them upside down in columns and rows. Have the learners flip over two at a time to find a match. If no match is found, the cards are turned back over and it's the next player's turn. If a player finds a match, that player gets another turn. This will enhance the observation skills of any age group.

Learn More:

- ▶ Invite a biologist from a local college or university, a zoo or nature center, or from a state or federal agency to speak to the group.
- ▶ Contact a local charter or commercial fisherman, a biologist, or even a taxidermist to arrange a variety of fish species for your group to examine.
- ▶ Have learners create three-dimensional and poster fish for examination in a local public area. This is a great fair project for both school and 4-H club or group events.
- ▶ Get information about adult Project FISH training online at projectfish.org.

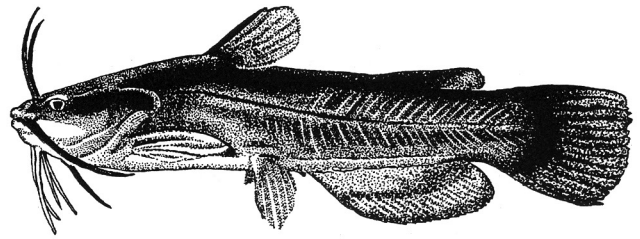
HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

COLORATION



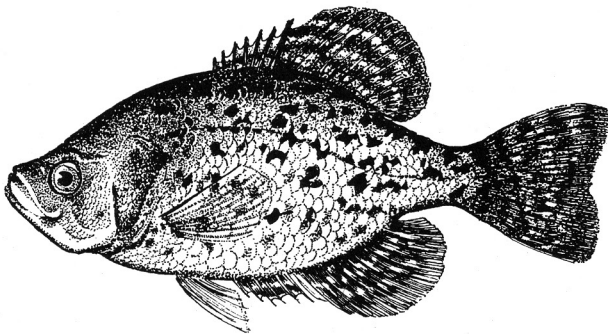
Light-Colored Belly
(Most Minnows)

COLORATION



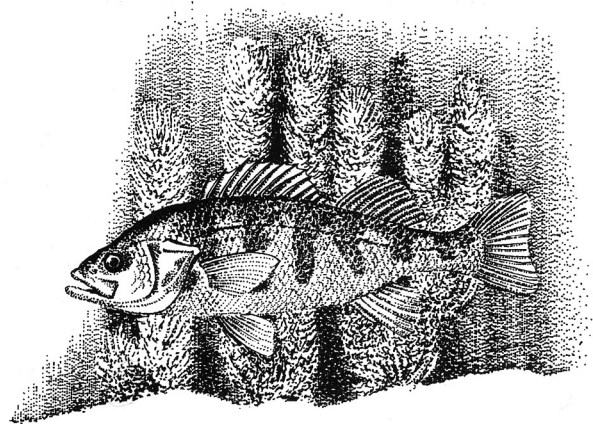
Dark Upperside
(Bullhead)

COLORATION



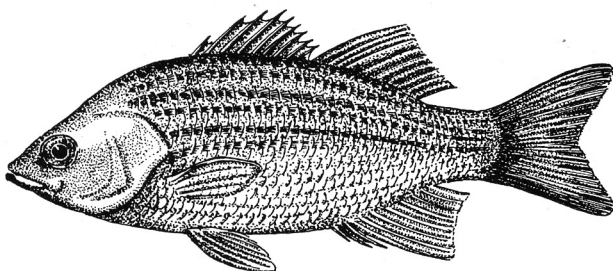
Mottled
(Crappie)

COLORATION



Vertical Stripes
(Yellow Perch)

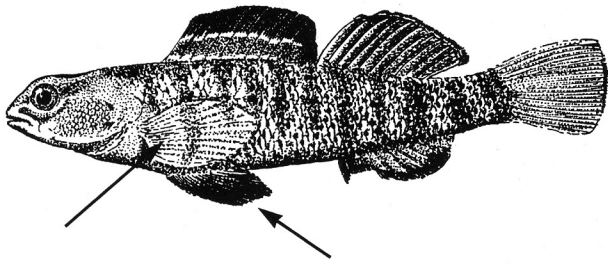
COLORATION



Horizontal Stripes
(White Bass)

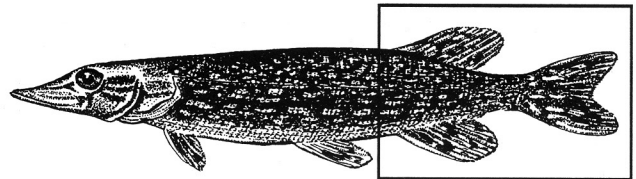
HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

FIN SHAPE AND LOCATION



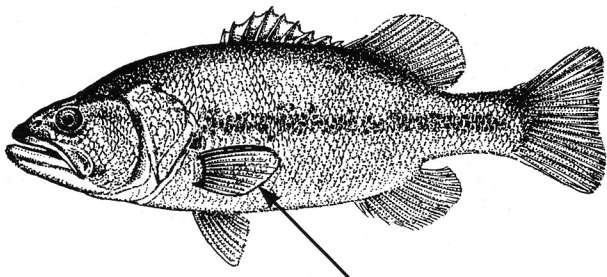
Large Pectoral or Pelvic Fins
(Rainbow Darter)

FIN SHAPE AND LOCATION



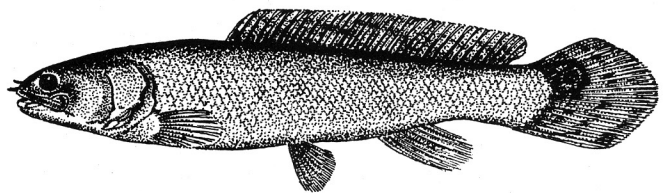
Anal and Dorsal Fins Posterior
(Northern Pike)

FIN SHAPE AND LOCATION



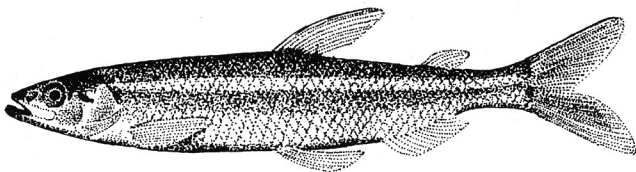
Pectoral Fins on Side
(Largemouth Bass)

FIN SHAPE AND LOCATION



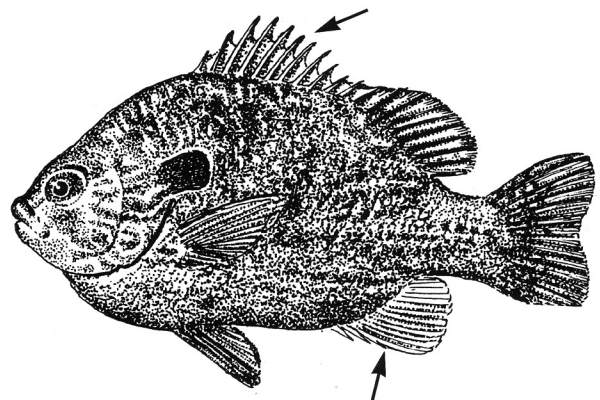
Long Dorsal Fin
(Bowfin)

FIN SHAPE AND LOCATION



V-Shaped Tail
(Rainbow Smelt)

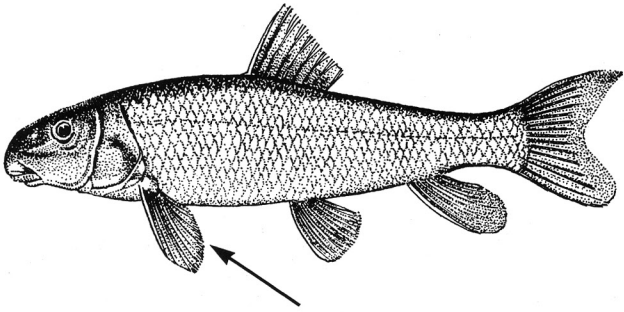
FIN SHAPE AND LOCATION



Anal and/or Dorsal Spines
(Sunfish)

HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

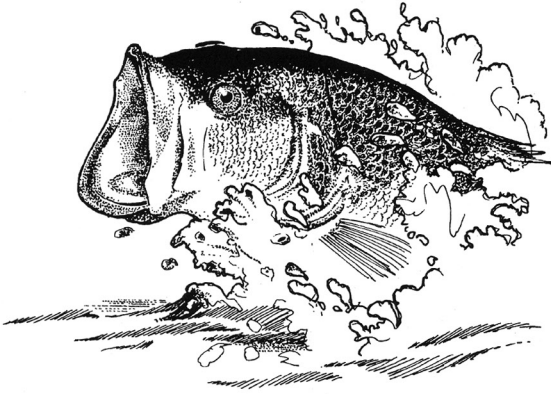
FIN SHAPE AND LOCATION



Pectoral Fins on Bottom
(Sucker)

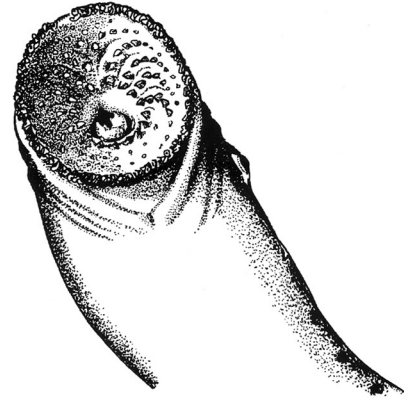
HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

MOUTH/FEEDING



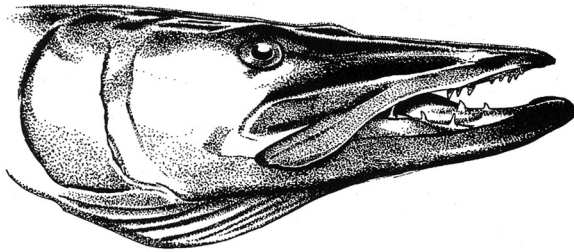
Very Large Flexible Jaw
(Largemouth Bass)

MOUTH/FEEDING



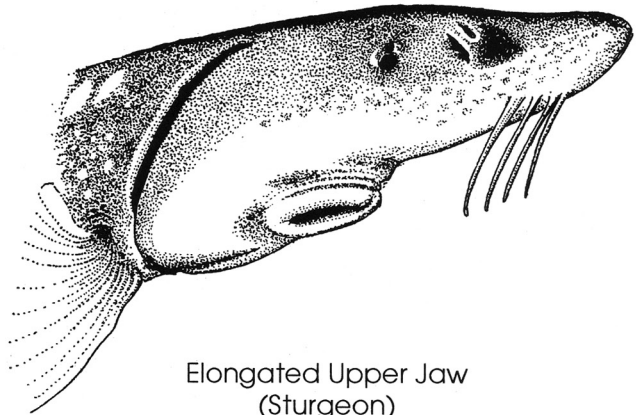
Sucking Disks
(Lamprey)

MOUTH/FEEDING



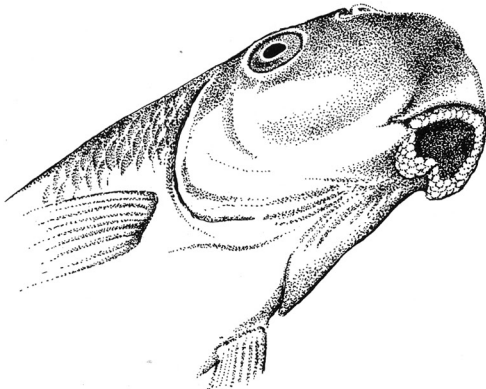
Duckbill Jaws
(Northern Pike)

MOUTH/FEEDING



Elongated Upper Jaw
(Sturgeon)

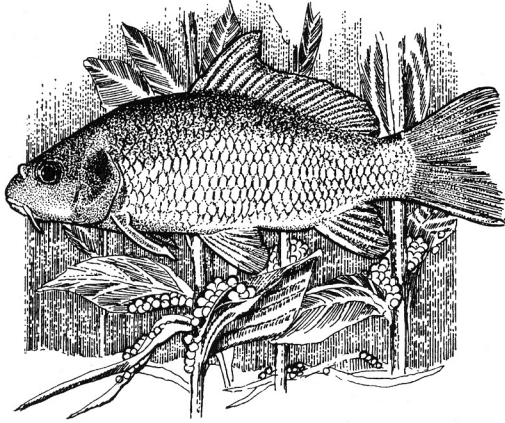
MOUTH/FEEDING



Sucker Shape
(Sucker)

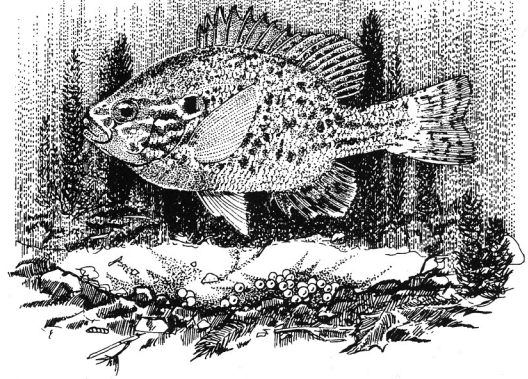
HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

REPRODUCTION



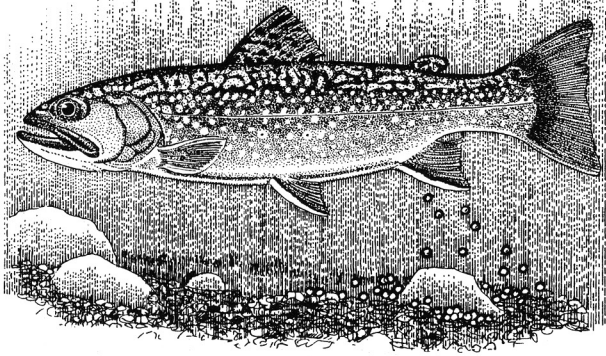
Eggs Deposited in Vegetation
(Carp)

REPRODUCTION



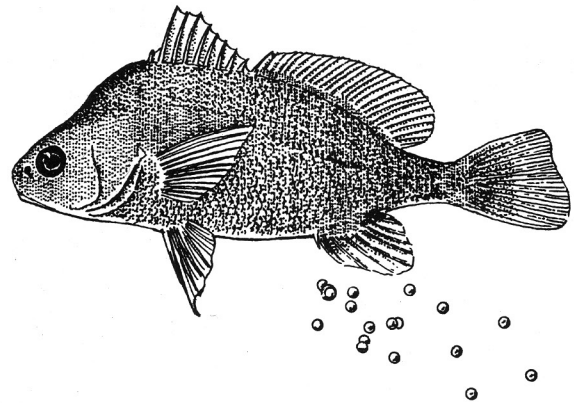
Eggs Deposited in Nest
(Pumpkinseed)

REPRODUCTION



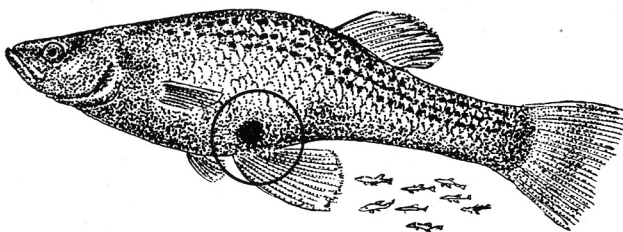
Eggs Deposited on Bottom
(Trout)

REPRODUCTION



Free-Floating Eggs
(Freshwater Drum)

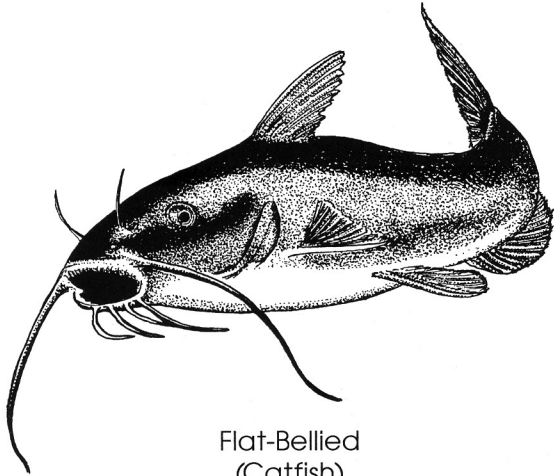
REPRODUCTION



Live Birth
(Gambusia)

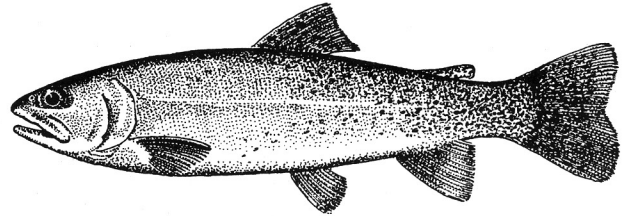
HANDOUT: FASHION A MICHIGAN FISH ADAPTATION CARDS

SHAPE



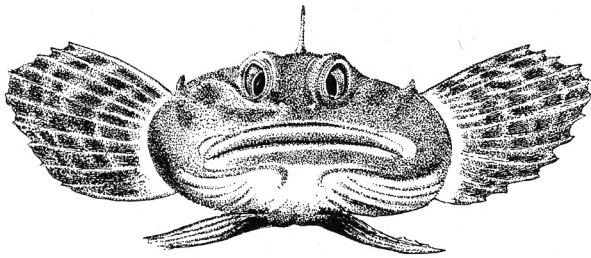
Flat-Bellied
(Catfish)

SHAPE



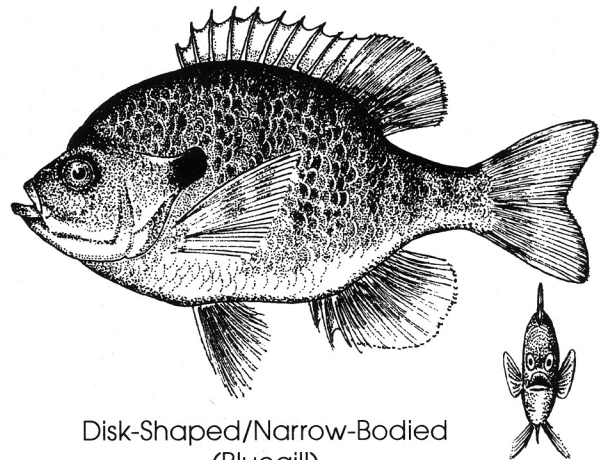
Torpedo Shape
(Trout)

SHAPE



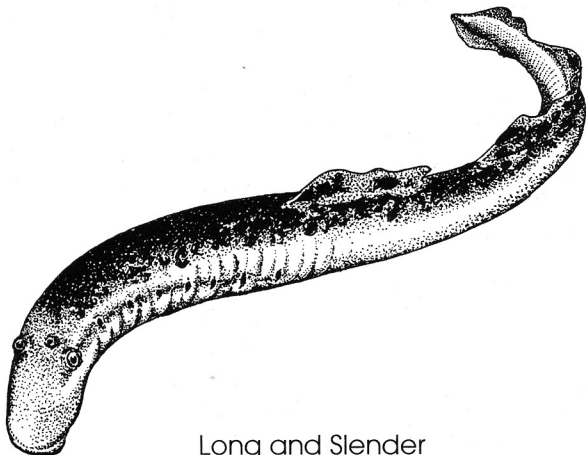
Horizontally Flattened
(Sculpin)

SHAPE



Disk-Shaped/Narrow-Bodied
(Bluegill)

SHAPE



Long and Slender
(Lamprey)

Adaptation	Advantage	Examples of fishes from Great Lakes watersheds
Mouth		
Sucker-shaped mouth	Bottom feeds on very small animals	Sucker, carp
Elongated upper jaw	Feeds off bottom	Sturgeon
Sucking disk	Attaches to prey/substrate	Sea and brook lamprey
Duckbill, elongated jaws	Grasps prey	Pike, muskellunge, gar
Extremely large, flexible jaws	Surrounds prey	Largemouth bass
Body Shape		
Torpedo	Fast moving, away from bottom	Trout, salmon
Flat-bellied	Bottom-oriented swimmer	Catfish, sucker
Vertical disk	Feeds above or below in slow water	Bluegill, pumpkinseed
Wide/horizontally flattened	Bottom dweller	Sculpin, sturgeon
Long and slender, scaleless	Attached feeder, needs low resistance	Sea lamprey
Coloration		
Light-colored belly	Predators have difficulty seeing it from below	Most minnows, perch
Dark upper side	Predators have difficulty seeing it from above	Bluegill, bullhead, catfish
Vertical stripes	Can hide in vegetation	Muskellunge, bluegill, yellow perch
Horizontal stripes	Can hide in vegetation	White bass
Mottled coloration	Can hide in rocks and in bottom	Trout, rock bass, darters
Reproduction		
Eggs deposited on bottom	Hidden from predators	Trout, salmon, minnows
Eggs deposited in nests	Protected by adult males	Bluegill, bass, stickleback
Floating eggs	Dispersed in high numbers	Freshwater drum
Eggs attached to vegetation	Stable until hatching	Perch, northern pike, carp
Live bearers (does not lay eggs)	High survival rate	Guppy, mosquito fish (no native Michigan species)
Fin Shape/Location		
Large pectoral/pelvic fins	Help stay on bottom in moving water	Johnny and rainbow darter
V-shaped tail	Continuous movement	Channel catfish, rainbow smelt
Anal and dorsal fins—posterior	Burst speed, power	Pike, muskellunge, gar
Anal and/or dorsal spines	Protection from predators	Sunfish, stickleback
Pectoral fins on side	Good for sharp turns and “rowing”	Sunfish, black bass, yellow perch
Pectoral fins on bottom	Good for stabilizing in flowing water	Trout, suckers
Long dorsal fin	Used for propelling forward or backward without body movement	Bowfin