Life-Sized Sturgeon

Subjects: Math and Science

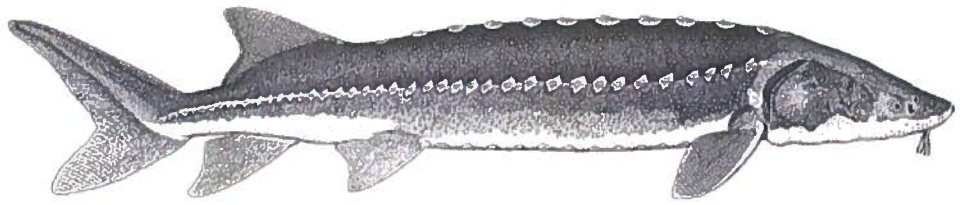
Objectives: Students will make a representation of a life-sized sturgeon and compare it to their own body size.

Materials:

- Sturgeon with grid overlay
- White Sturgeon Weigh / Age Chart
- Pencils
- 30 pieces of 12" x 12" construction paper
- Black markers
- Tape measure
- 10' x 3' area to hang finished picture

Procedure:

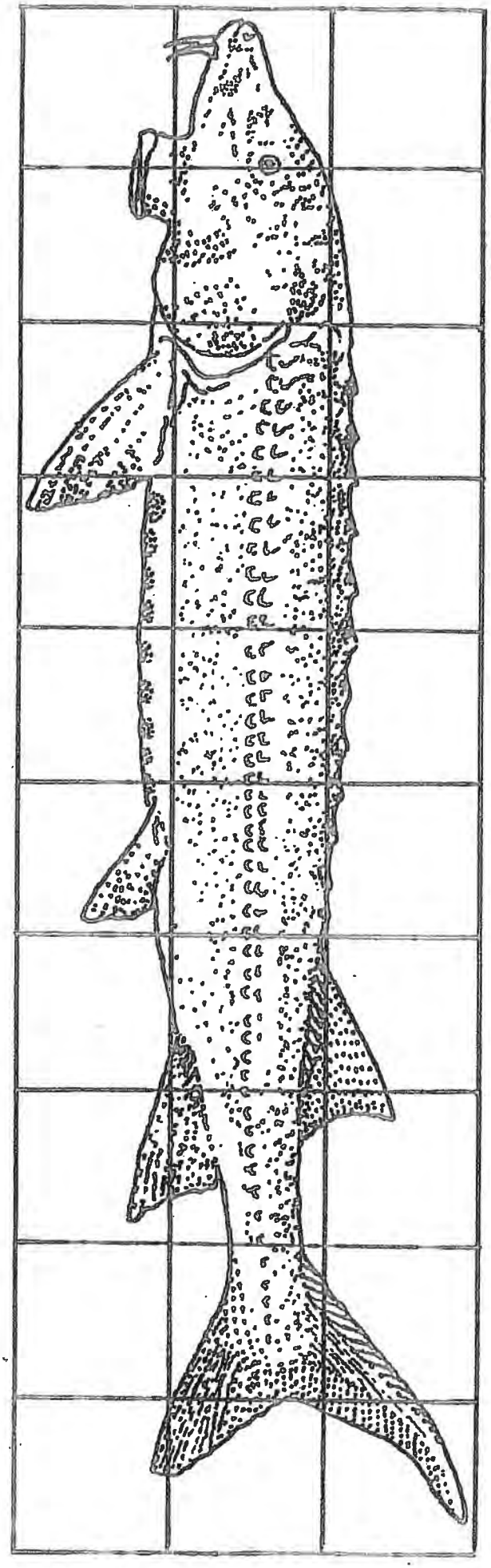
1. Ahead of time: photocopy the sturgeon picture with the overlaying grid, number each square in numerical order, then cut out the squares.
2. Have each student pick a square until all are chosen.
3. Have students draw what is on the small square of paper onto a 12" x 12" sheet of paper. They should first draw with a pencil then go over the pencil with a black marker when their square is complete. With the same orientation, have them write the number on the small square of paper on the back of their large square.
4. When all squares are complete, use the numbers on the back to arrange them into the sturgeon picture and tape the squares together.
5. Have students measure the length of the sturgeon and compare it to their own height. Compare your class sturgeon to record sturgeon lengths (about 20 feet).
6. Use the White Sturgeon Weight / Age Chart to make additional comparisons and develop estimates about the age and weight of the 10-foot sturgeon created by the students by graphing or making educated guesses.



White Sturgeon Weight / Age Chart

The following chart is from the British Columbia Frasier River white sturgeon study program.

Length in Feet	Weight in Pounds	Age in Years
3'1"	15	9.4
3'3"	17	10.1
3'5"	20	10.8
3'7"	23	11.6
3'9"	27	12.4
3'11"	31	13.1
4'1"	35	13.9
4'3"	39	14.8
4'5"	44	15.6
4'7"	49	16.5
4'9"	55	17.4
4'11"	61	18.3
5'1"	67	19.9
5'3"	74	20.4
5'5"	82	21.4
5'7"	90	22.5
5'9"	98	23.6
5'11"	107	24.8
6'1"	116	26
6'3"	126	27.3
6'5"	137	28.6
6'7"	148	30
6'9"	159	31.5
6'11"	172	33
7'1"	185	34.7
7'3"	198	36.4
7'5"	212	38.2
7'7"	227	40.2
7'9"	243	42.3
7'10"	259	43.4
8'	276	
8'2"	294	
8'4"	312	
8'6"	332	
8'8"	352	
8'10"	372	
9'	394	



Sandpaper Sturgeon Story

Subjects: Language Arts, Science and Art

Objectives: Students will create a sturgeon out of sandpaper and write a story about a sturgeon's unique characteristics.

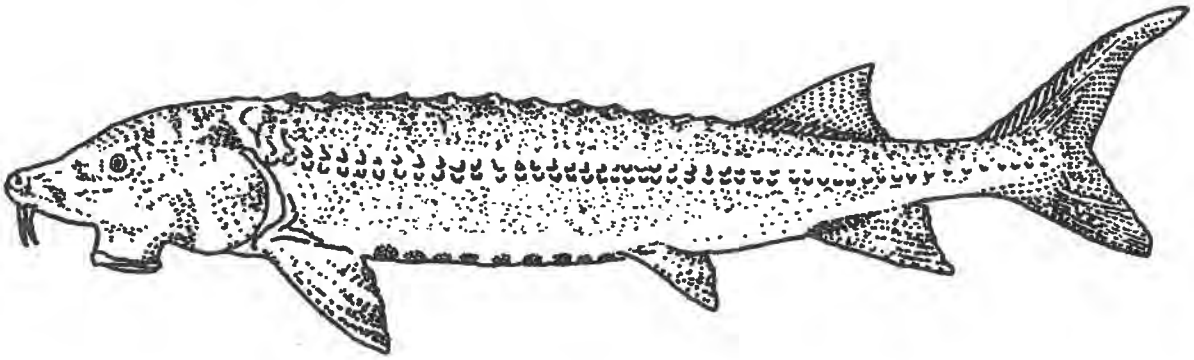
Materials:

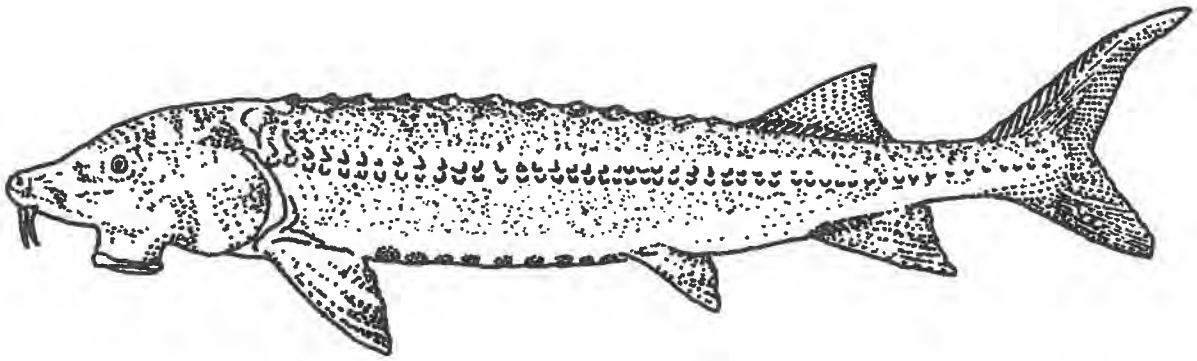
- Writing materials
- 12"x18" construction paper
- Gray colored sandpaper (about 220 grit)
- Sturgeon master to trace – one for each student
- Circles from three-hole punched paper – five for each student
- Small wriggle eye – one per student
- Scissors
- Glue

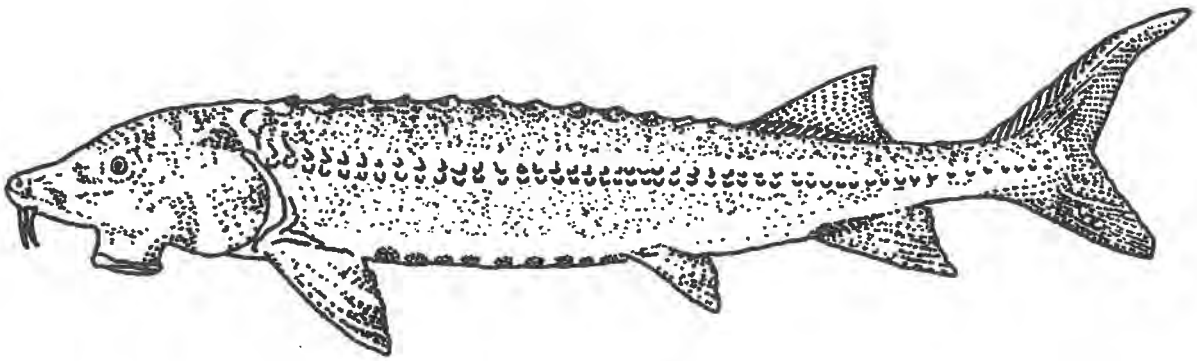
Procedure:

1. Have students cut out the sturgeon outline, trace the outline onto the back of a piece of sandpaper and cut out the sandpaper sturgeon. The sandpaper represents the sturgeon's sandpaper-like skin.
2. Glue five white circles along the side of the sturgeon to represent the sturgeon's scutes (bony plates). Glue on a small wiggle eye or make an eye with a marker.
3. Have students write their names on the back of their sturgeon and set aside or collect to keep safe.
4. Review adaptations with students. Talk about how different animals have unique characteristics to help them survive in the environment in which they live. The sandpaper-like skin and scutes on sturgeon help to protect them. Also think about the vacuum cleaner mouth for siphoning food and the barbells (whiskers). What function do they serve?
5. Ask students to write an essay describing the unique adaptations of sturgeon. Peer edit.
6. For final drafts, have each student type their essay and mount it on a piece of construction paper with the sandpaper sturgeon they made earlier.

Sturgeon Outlines







Fashion a Fish

Grade Level

Grades 4 – 12

Idaho Content Standards

Science

4.S.1.5.1; 4.S.3.1.1

5.S.1.5.1

6.S.1.5.1

7.S.3.1.1

9-10.B.3.1.1; 9-10.B.3.1.2

Visual Arts

4-5.VA.3.1.1; 4-5.VA.3.1.3; 4-5.VA.3.1.4; 4-5.VA.3.3.1

6-8.VA.3.1.3; 6-8.VA.3.1.4; 6-8.VA.3.3.1; 6-8.VA.3.3.2; 6-8.VA.3.3.4

Language Arts

4.LA.1.8.3; 4.LA.6.2.3

5.LA.1.8.3; 5.LA.6.2.3

6.LA.1.8.3; 6.LA.6.2.3

7.LA.1.8.3; 7.LA.6.2.3

8.LA.1.8.3

Time

30 to 45 minutes

Skills

Gathering (observing, collecting, researching); organizing (sorting, categorizing); analyzing (identifying components and relationships among components, discussing); interpreting (generalizing, summarizing); applying (designing, inventing); presenting (drawing, describing, public speaking)

Vocabulary

Adapt, adaptation, behavioral adaptation, camouflage, characteristic, coloration, evolution, habitat, natural selection, species, structural adaptation

Summary

Students design fish with unique forms, shapes and behaviors to discover the benefits of these adaptations.

Objectives

Students will…

- describe adaptations of fish to their environments.
- describe how adaptations can help fish survive in their habitats.
- interpret the importance of adaptation in animals.

Materials

- One copy of adaptation cards on page 71. (additional copies with a class of more than 30), with adaptations cut and separated.
- Paper or poster board.
- Markers or paint.

Background

All animals are the product of countless adaptations that occurred over long periods of time. Those adaptations are, for the most part, features that increase the animals' likelihood of surviving in their habitat.

When a habitat changes, either slowly or catastrophically, the 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. These species are usually more susceptible than other animals to death or extinction.

In this activity, the students design a fish. Students will choose the adaptations that their fish will have. As those 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 different fish can live together and flourish.

Procedure

Warm Up

Begin a discussion by asking the class to define what an adaptation is. An adaptation is a characteristic of an organism that increases its chance of survival in its environment. How do species adapt? Those individuals that are best equipped for life in a specific habitat are more likely to survive to the age where they can reproduce. Therefore, their genes and characteristics are more likely to be carried on. Over countless years those characteristics become common in the species.

The Activity

1. Assign students to find a picture or make a drawing of a species of animal that has a special adaptation. For example: a picture of a giraffe with a long neck for reaching vegetation in tall trees, or an owl with large eyes that gather light to aid with night vision.
2. Conduct a class discussion on the value of different kinds of adaptations to animals. As part of the discussion, ask the students to identify different kinds of adaptations in humans.
3. Collect the students' pictures or drawings of adaptations. Categorize them into the following groups:
   - protective coloration and camouflage
   - body shape or form
   - mouth type or feeding behavior
   - reproduction or behavior
   - other (one or more categories the students establish, in addition to the four above that will be needed for the rest of the activity)
4. Divide the adaptation cards into five groups of four cards each: one coloration, one mouth type, one body shape, and one reproduction in each group.
5. Break up the classroom into five groups. Pass one complete set of cards to each group of students. There might be five groups with four to six students in each group.
6. Review the adaptations by asking each group what they think the advantages are to the adaptations they were given. Record a list of the advantages to each adaptation on the board.
7. Ask the students to "fashion a fish" from the characteristics of the cards in the set they receive. Each group could:
   - create an art form that represents their fish
   - name the fish
   - describe and draw the habitat for their fish

Wrap Up

1. Ask each group to report on the attributes of the fish they have designed, including identifying and describing its adaptations. Ask the students to describe how this kind of fish is adapted for survival.
2. Ask the students to make inferences about the importance of adaptations in fish and other animals.

Assessment

Invent an animal that would be adapted to live in your community or a different and exotic habitat of your choice. Consider mouth, shape, coloration, reproduction, food, shelter, and other characteristics. Draw and describe your animal. Older grades may write a natural history of the animal – also describing social interactions, life cycle, and general life style.

Extension

Have the groups create the habitat that their fish would be best suited for. Use varying techniques – drawing, painting, furnishing a fish bowl, or creating a diorama. Each group then reports why this habitat would be best for the fish.

Related Reading

Amazing Fish by Mary Ling

Exploding Ants: Amazing Facts About How Animals Adapt by Joanne Settel

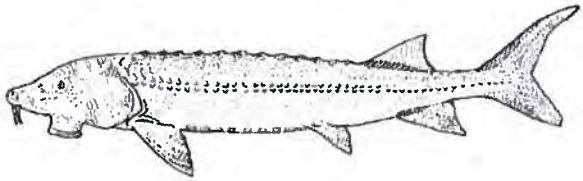
What is a Fish? by Bobbie Kalman

Adaptation	Advantage	Examples
Mouth		
Sucker-shaped mouth	Helps to feed on very small plants and animals on bottom	Sturgeon, sucker, carp
Elongated upper jaw	Helps to feed on prey it looks down on	Channel catfish
Hard plate on lower jaw	Helps to scrape algae off of rocks and the bottom	Chiselmouth
Duckbill jaws	Helps to firmly grasp prey	Northern pike, muskellunge
Extremely large jaws	Helps to completely surround prey	Largemouth bass, grouper
Body Shape		
Torpedo shaped	Increases the speed of the fish	Muskellunge, trout, salmon, tuna
Flat bellied	Allows fish to lay on bottom	Sculpin, catfish, sucker
Snake-like	Streamlines the fish for long distances	Pacific lamprey, American eel
Vertical disk	Allows the fish to feed above or below	Pumpkinseed sunfish, crappie, bluegill
Large, spiny dorsal fin	Makes fish look larger, prevents predator attack from behind	Yellow perch
Coloration		
Light-colored belly	Camouflages so that predators have difficulty seeing it from below	Sockeye salmon, perch, sturgeon
Dark upper side	Camouflages so that predators have difficulty seeing it from above	Bluegill, crappie, flounder
Vertical stripes	Allows the fish to hide in vegetation	Tiger muskellunge, pickerel, bluegill
Spotted	Helps the fish hide in rocks and on the bottom	Rainbow trout, cutthroat trout
Mottled coloration	Helps the fish hide in rocks and on the bottom	Black crappie, sculpin, burbot
Reproduction		
Eggs deposited in nest on bottom	Hides eggs from predators, keeps them oxygenated	Bull trout, salmon, most minnows
Defends spawning territory	Eggs are protected by adults	Longnose dace, bass
Cavity spawners	Eggs are hidden from predators	Bullhead catfish
Eggs attached to vegetation	Eggs remain stable until hatching	Carp, perch, northern pike
Migrate to spawn in groups	Helps mix genes to maintain diversity in population	Burbot, grouper

FISH ADAPTATION CARDS

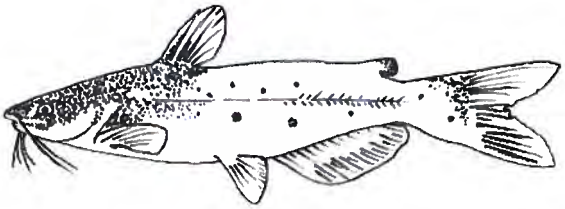
Mouth/Feeding:
sucker shaped mouth

Sturgeon



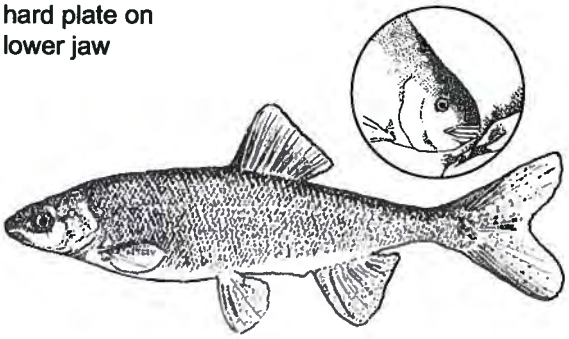
Mouth/Feeding:
elongated upper jaw

Channel catfish



Mouth/Feeding:
hard plate on
lower jaw

Chiselmouth

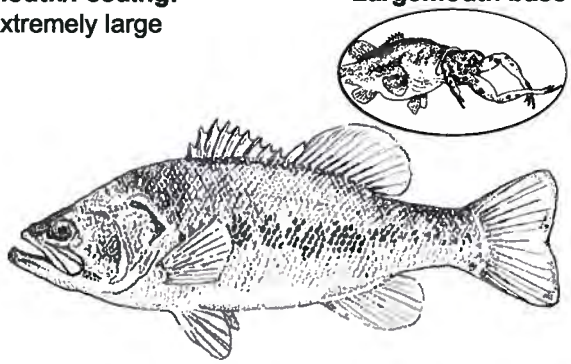


Mouth/Feeding:
Duck-billed jaws

Northern pike

Mouth/Feeding:
extremely large

Largemouth bass

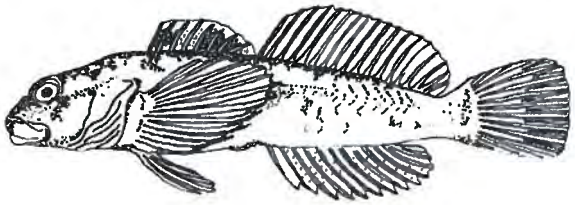


Body shape:
torpedo shaped

Muskellunge

Body shape:
flat bellied

Sculpin



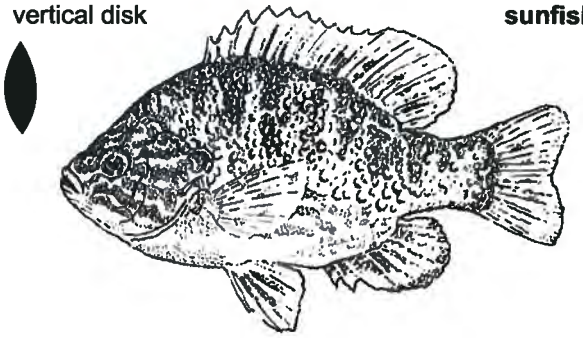
Body shape:
snake-like

Pacific Lamprey

FISH ADAPTATION CARDS

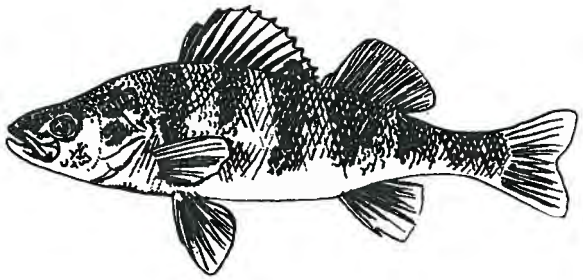
Body shape:
vertical disk

Pumpkinseed sunfish



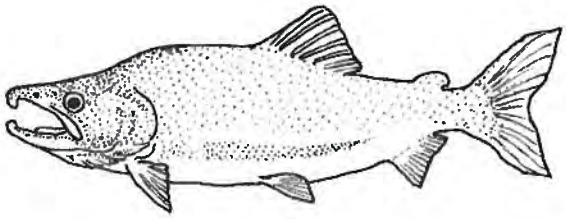
Body shape:
spiny dorsal fin

Yellow perch



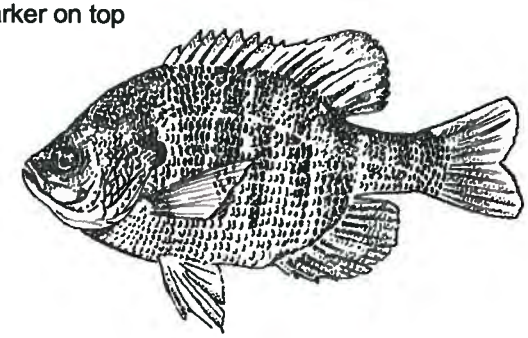
Coloration:
light-colored belly

Salmon



Coloration:
Darker on top

Bluegill

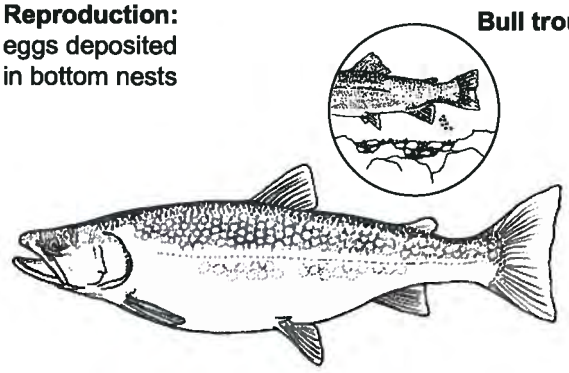


Coloration:
vertical stripes

Tiger muskellunge

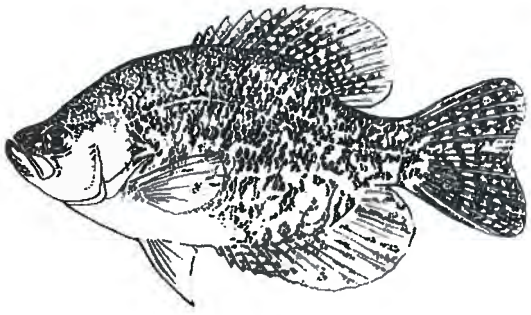
Reproduction:
eggs deposited
in bottom nests

Bull trout



Coloration:
mottled

Black crappie



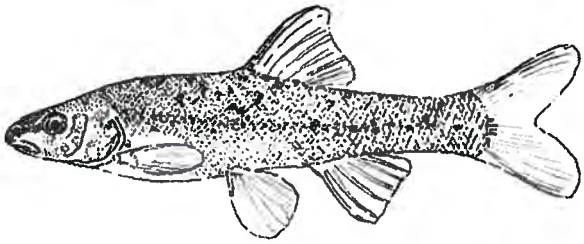
Coloration:
spotted

Rainbow trout

FISH ADAPTATION CARDS

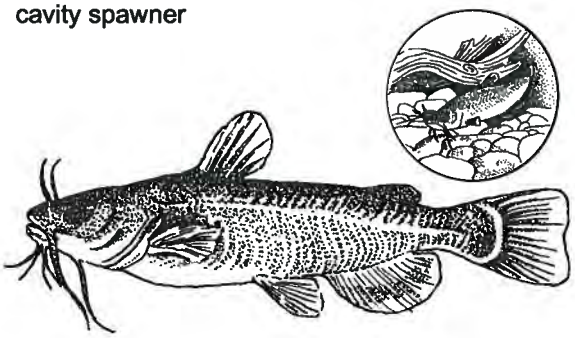
Reproduction:
defends spawning
territory

Longnose dace



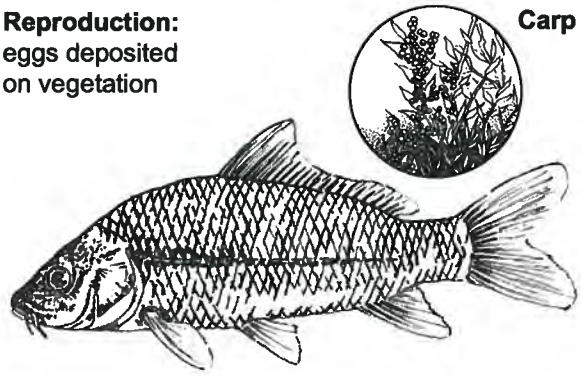
Reproduction:
cavity spawner

Bullhead catfish



Reproduction:
eggs deposited
on vegetation

Carp



Reproduction:
migrates to spawn in groups

Burbot