

SEINING THE RIVER WILD

LESSON OVERVIEW

OBJECTIVE

Students will identify the parts of a fish and the purpose each feature serves.

RECOMMENDED GRADE LEVELS

K-3

DURATION

30-60 minutes

MATERIALS

- East River Fish print outs (provided)
- Fish Matching Game Cards (provided)
- Parts of the Fish worksheet (provided)
- White paper
- Pencils, crayons, or markers
- Optional: construction paper, scissors, glue, sequins, pipe cleaners, toothpicks, glitter, foam, clay

TOPIC BACKGROUND

During your field trip to Brooklyn Bridge Park, students will be exploring and learning about the ecology of the East River estuary. An **estuary** is a special name given to a body of brackish water. **Brackish** water is a mix of saltwater and freshwater. The brackish water creates a very unique environment for a variety of organisms. Many fish even **migrate** to estuaries to breed or lay eggs.

Historically, the New York Harbor has been polluted by humans. Oil from ships, chemicals from factories, and

plastic debris are a few examples of pollutants in the waterways. Since the early 1970's, scientists and communities have worked together to clean these waterways. Overtime there has been an increase in species **biodiversity** (variety of species) and **populations** (number of species).

There are over 100 species of fish and invertebrates in the East River. Some examples of estuary **invertebrates** are crabs, snails, clams, mussels, and shrimp.

GETTING READY

Activity 1: Gather a children's book about fish. See page 3 for suggestions.

Activity 2:

- Print the unlabeled fish on page 5 or draw your own fish on your whiteboard or smartboard.
- **Optional:** Print one copy of the Parts of the Fish worksheet for each student.
- Print & cut provided East River fish (there are 6 different fish, you may want to print enough for each student to have a fish)

Activity 3: Print and cut fish matching cards. You may need to print multiple multiples of some pairs, depending on class size. There are 13 pairs (26 cards)

Activity 4: Collect art materials for fish design such as paper, crayons or colored pencils, scissors, glue, sequins, glitter, pipe cleaners, and/or clay.

ACTIVITY 1: FISH STORY

1. Refer to page 3 for a list of recommended children's books or select another of your choosing.
2. Use a story to begin a conversation about where fish live and what they look like.

ACTIVITY 2: INTRODUCTION TO FISH ANATOMY

1. Draw or put a picture up on the board of a fish without any labels.
2. Ask students if they can think of any similarities between the bodies of humans and bodies of a fish. Begin to label things they might mention such as, eyes, mouth, or nostrils. Next ask them to think of other body parts unique to fish and what purpose these serve. Answers include: fins (help to swim and balance), scales (provide protection), gills (extracts oxygen, allows the fish to breathe). See teacher guide on pages 6-8 for in-depth anatomy guide.
**Optional:* Have students each complete the Parts of the Fish Coloring Page (provided) as you are identifying each fish part or use as a take home activity.
3. Explain to students that we usually can tell different types of fish apart by observing:
 - Body shape
 - Tail shape and number of fins
 - Coloration
 - Patterns
4. Give each student one fish sketch. Have them examine their fish for a few moments individually to make observations about their fish. Then turn and talk to a neighbor and share out some observations they made about their fish.

ACTIVITY 3: MATCHING GAME

1. Hand each child 1 fish photo card or matching feature card. Tell students they must swim around the classroom to find a friend who has a card that matches their fish.
2. **For easier game play:** Use only the photo images (making 2 copies of each) for children to match their cards with an exact replicate.
For more advanced game play: Use the fish features cards which identify body shape, fin shape, color, or pattern. Encourage students with the fish card to swim around the room to find a classmate with a description card that matches what their fish looks like. There are multiple correct ways cards can be paired. In some events you may see students form a chain of adjoining pairs because many fish have the same coloration or tail shape. If you want to ensure students end up matched in separate pairs of 2, require students to find a feature match that is also of matching card color.
(i.e. the fin cards are pink, pattern cards are yellow, etc.)

PROCEDURE CON'T

ACTIVITY 4: FISH DESIGN

1. Take a deeper dive into fish anatomy by using some of the information provided in the teacher guide: Fish Morphology and Function. Show students the fish photo cards to talk about what purposes those shapes and colorations serve.
2. Challenge students to design their own fish. Remind students to include fins, scales, a mouth and eyes!
3. Provide students paper and coloring materials. If resources permit, consider giving students the options of using additional materials such as construction paper, sequins or glitter, googly eyes, clay, toothpicks, pipe cleaners, etc.

RECOMMENDED VIDEO

Seining the River (How we will fish during your field trip!)

<https://www.youtube.com/watch?v=fhPM5CbL4z0>

RECOMMENDED BOOKS

- *Hooray for Fish* by Lucy Cousins
- *Fish Eyes: A Book You Can Count On* by Lois Ehlert
- *What's It Like to Be a Fish?* by Wendy Pfeffer
- *About Fish: A Guide for Children* by Cathryn Sill and John Sill
- *DK Eyewitness Books: Fish* by Steve Parker

RECOMMENDED WEBSITES

Clearwater's Key to Common Hudson River Fishes

<http://clearwater.org/fishkey>

NYS DEC Hudson River Estuary

<https://www.dec.ny.gov/lands/4923.html>

East River Crew Estuary Guide

<http://bit.ly/ERCGuide>

The River Project

<https://www.riverprojectnyc.org/>

TEACHER NOTES:

ADDITIONAL VOCABULARY

Biodiversity: The variety of life in a particular habitat or ecosystem.

Brackish: Slightly salty water; the mixture of river water and seawater in estuaries.

Camouflage: The use of any combination of materials, coloration, or illumination for concealment, either by making animals or objects hard to see or by disguising them as something else. Animals often camouflage to hide from predators or to sneak up on prey.

Ecosystem: a biological community of interacting organisms and their physical environment.

Estuary: A semi-enclosed body of water containing both fresh and salt water.

Habitat: The area or environment where an organism or ecological community normally lives or occurs.

Horizontal: Moving across or a left to right movement. Horizontal lines are parallel to the horizon.

Migrate: To move from one region or habitat to another. Animals migrate to find food or more livable conditions. Some animals migrate to breed.

Population: A group of organisms of a species that live in the same place at a same time.

Vertical: An up and down movement. Vertical lines are perpendicular to the horizon.

***View Fish Anatomy Teacher's Guide on the following pages for additional terminology.

STANDARDS

COMMON CORE ELA

- Reading Informational Text
- Speaking and Listening
- Literacy in Technical Subjects
- Literacy in Science
- Writing Standards

COMMON CORE MATH

- Counting and Cardinality
- Ratios & Proportional Relationships

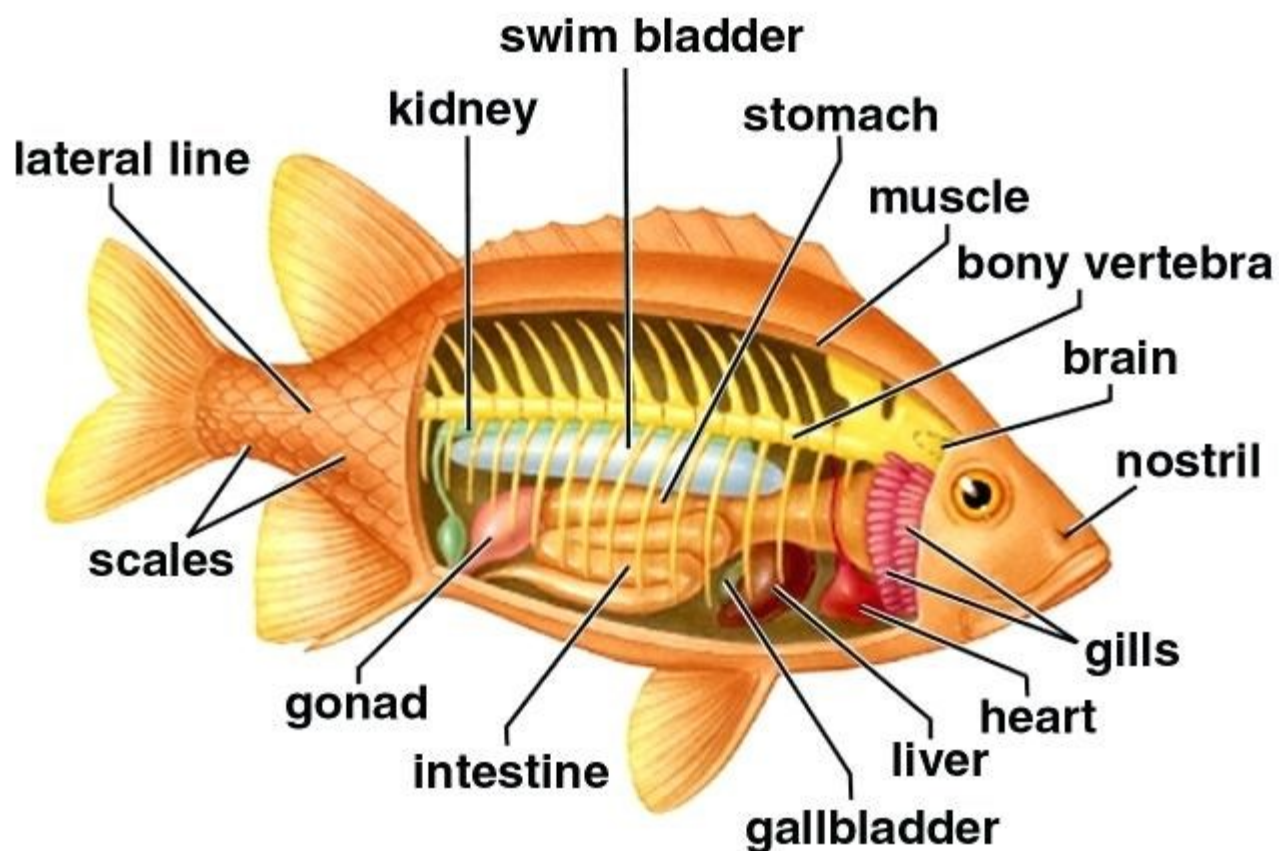
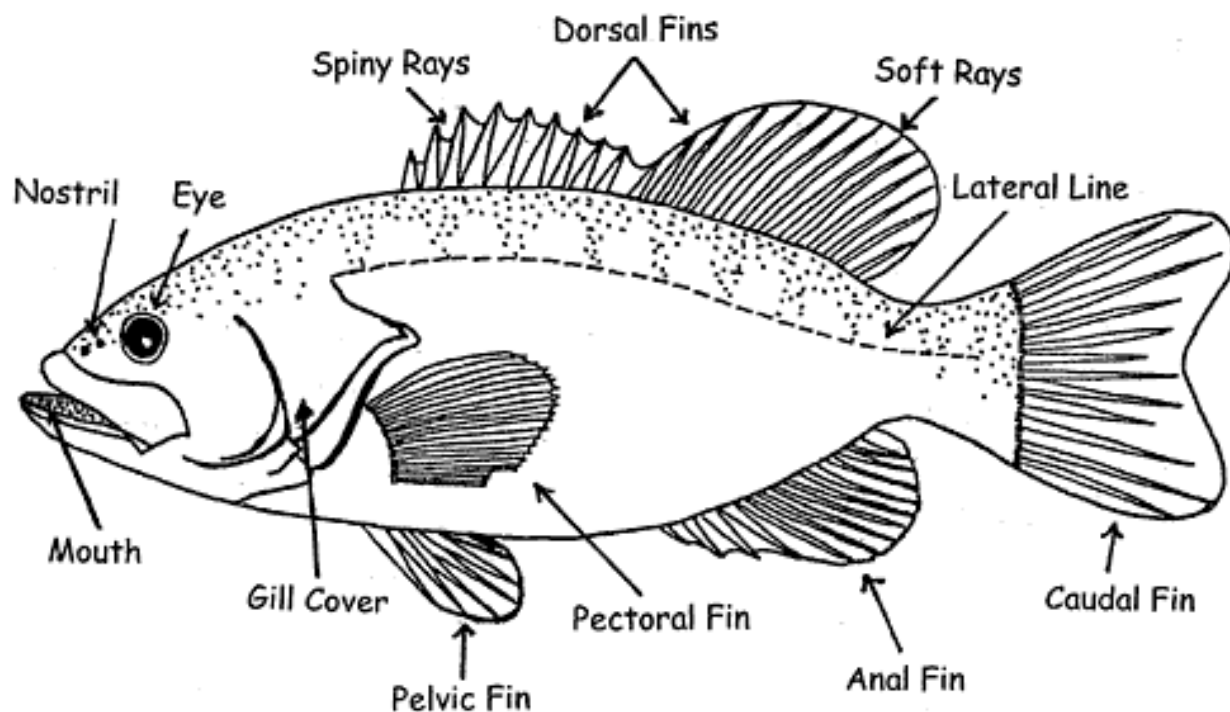
NYC K-8 SCIENCE & SOCIAL STUDIES SCOPE & SEQUENCE

- Animals, Plants in their Environments
- The Nature of Science
- Exploring Ecosystems
- Diversity of Life
- Interdependence
- Animal Diversity
- Plant and Animal Adaptations

NEXT GENERATION SCIENCE STANDARDS

- K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment
 1. Structure, Function, and Information Processing
 2. Interdependent Relationships in Ecosystems
- K-2.Engineering Design
 3. Interdependent Relationships in Ecosystems
- 3. Inheritance and Variation of Traits: Life Cycles and Traits

FISH ANATOMY TEACHER GUIDE



FISH ANATOMY TEACHER GUIDE



Dorsal Fin: Top fins which are used for steering and stabilization.

Anal Fin: Bottom fin near the tail, provides stabilization and balance.

Caudal Fin: Also known as the tail. Propels or pushes the fish forward during swimming.

Pelvic Fin: A pair of bottom fins that helps with up and down movement in the water.

Pectoral Fin: A pair of side fins behind the gills. Help the fish balance and move side to side.

Lateral Line: Senses vibrations or movements in the water and aids fish in traveling in schools or locating predators. Found along the body from gills to tails.

Gills: Feathery organ that allows the fish to breathe. As water travels over the gills, the oxygen is pulled out.

Mouth: Used to consume food.

Eyes: Used for sight. Fish can use each eye independently, meaning each eye can focus on a different object, unlike humans.

Nostrils: Used for scent only, not breathing.

Barbel: Whisker-like sensory organ that help track prey and food.

Otolith: Bony plates inside the head that can sense sounds in the water.

Scales: Provide a layer of protection from injury and disease.

Swim Bladder: A long, skinny organ that can inflate/deflate with air allowing fish to float at different levels in the water column.

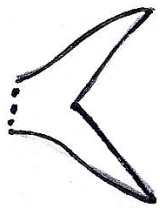
Vertebrae: The spine or backbone.

FISH MORPHOLOGY & FUNCTION

TEACHER GUIDE

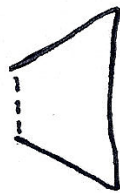
CAUDAL FINS

Most fish have 1 caudal fin (tail), 1 pelvic fin, 1 anal fin, 2 pectoral fins, and 1-3 dorsal fins. Fins help a fish balance, swim, and turn.



FORKED

Fast swimmer



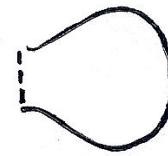
LUNATE

Long distance
cruising



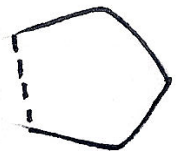
TRUNCATE

Good at turning
& acceleration



ROUNDED

Fast in short
distances



POINTED

Able to get around
tight spaces

MOUTH

The mouth shape tells us what the fish likes to eat. A fish's diet can also give insight to where the fish likes to hang out.



SUPERIOR

Catches prey from
above or eats near
the surface



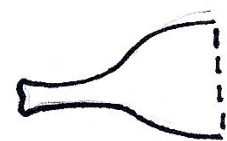
TERMINAL

Eats what is in
front of them



INFERIOR

Eats what is below
or off the bottom

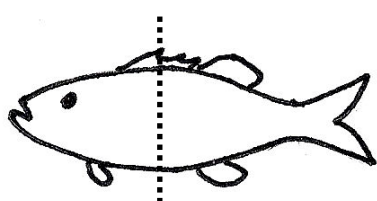


TUBULAR

Sucks in small,
floating organisms

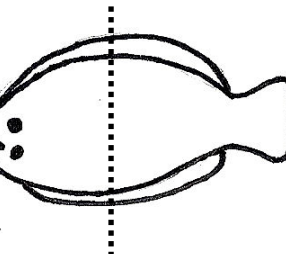
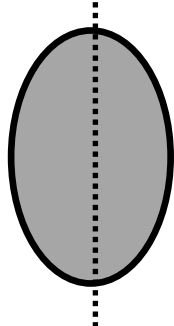
BODY SHAPE

The form of a fish influences how a fish can move, swim, and maneuver between objects. When observing a fish's body, it is important to think about the horizontal shape (mouth to tail) as well as vertical shape (top to bottom).



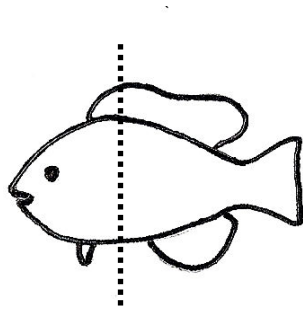
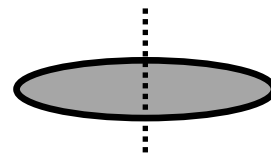
STREAMLINED

A torpedo shaped body provides speed



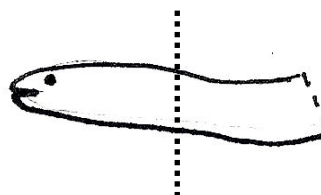
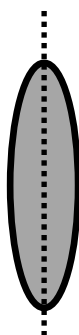
VERTICALLY COMPRESSED

Thin body designed for easy burial or bottom dwelling.



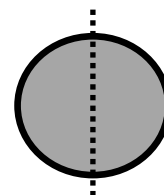
LATERALLY COMPRESSED

Hard for predators to swallow, but easy to move through narrow areas



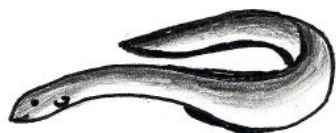
ELONGATED

Ideal for moving in and out of small spaces



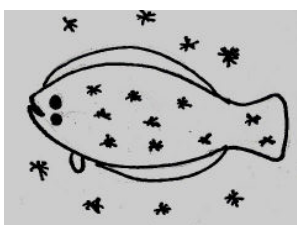
COLORATION AND CAMEOFLAUGE

A fish's color and patterns help them avoid predators.



COUNTERSHADING

Dark top and light belly helps the fish blend in when seen above by prey above or below by predators



CYRPTIC COLORATION

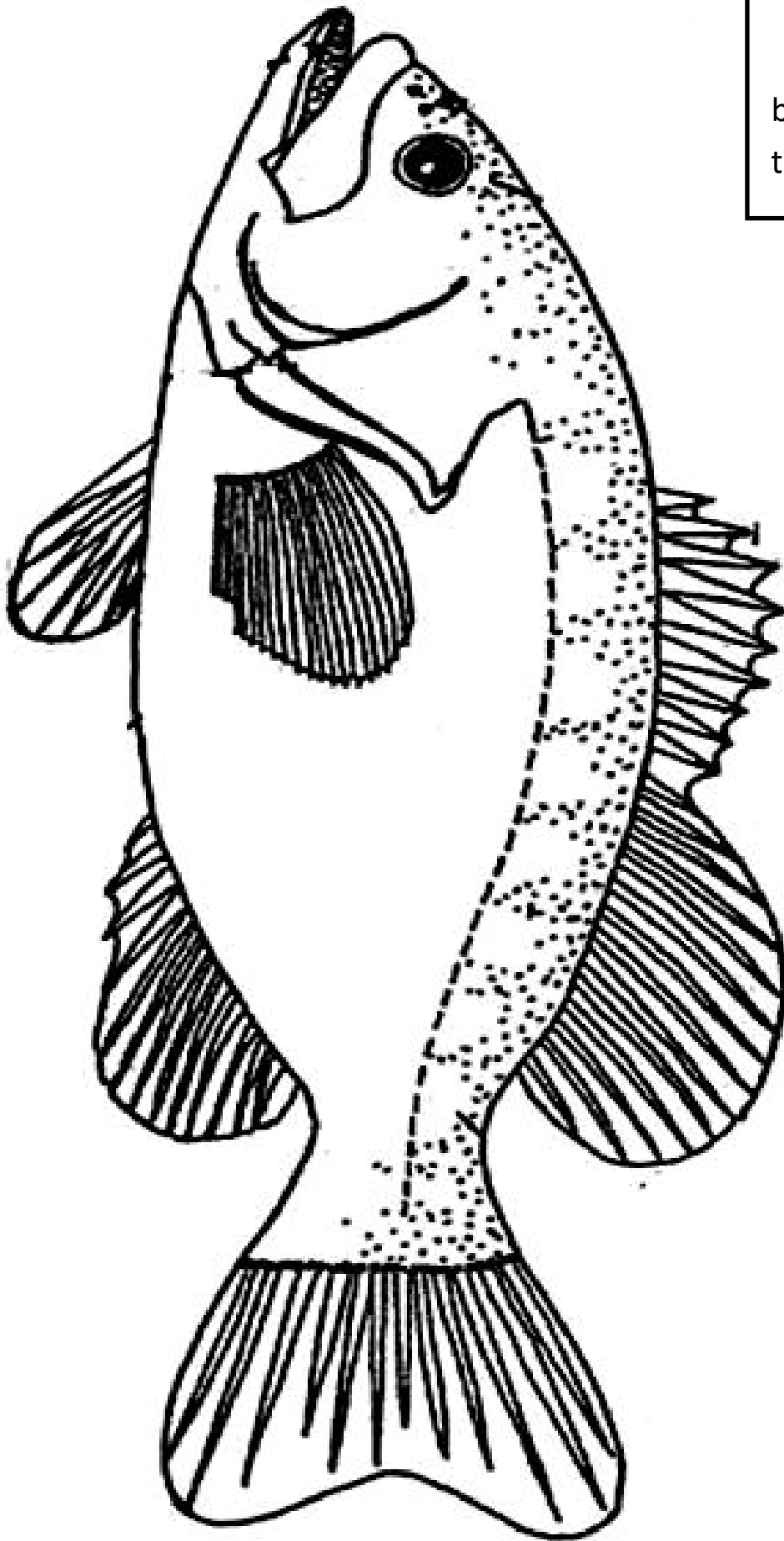
Lives in an environment that matches their natural color or can change color to match the surroundings



DISTRUPTIVE COLORATION

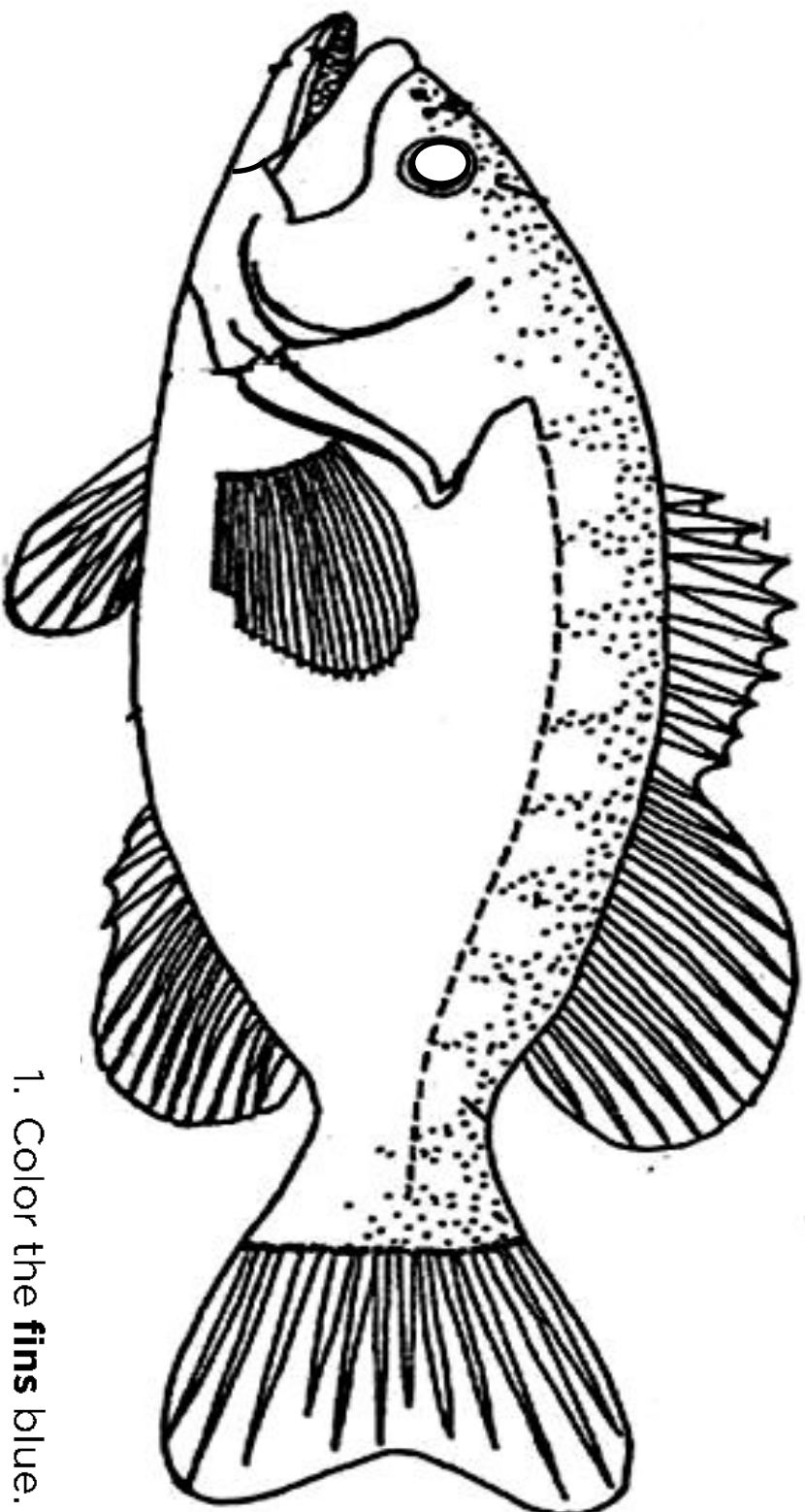
Presence of spots, lines and other patterns can confuse predators

Use on white board,
projector, or smart
board to label parts of
the fish with the class.

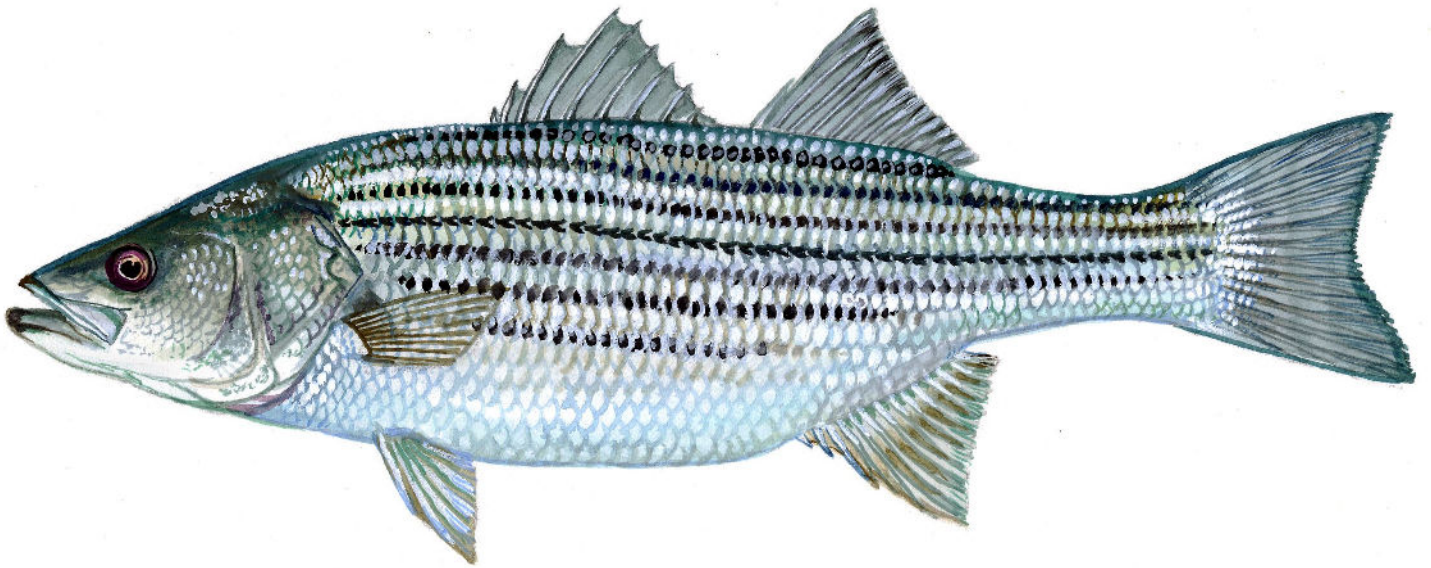


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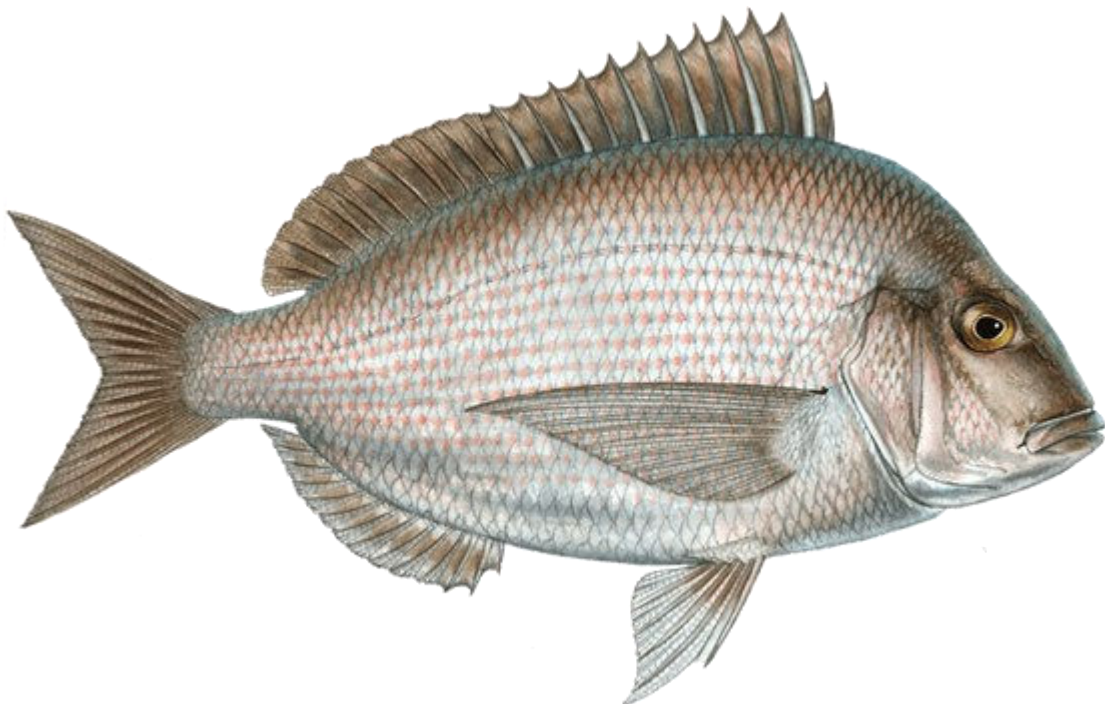
PARTS OF THE FISH COLORING SHEET



1. Color the **fins** blue.
2. Color the **body** yellow.
3. Trace the **gills** in black.
4. Trace the **lateral line** in green.
5. Color the **mouth** and **eyes** in red.



STRIPED BASS



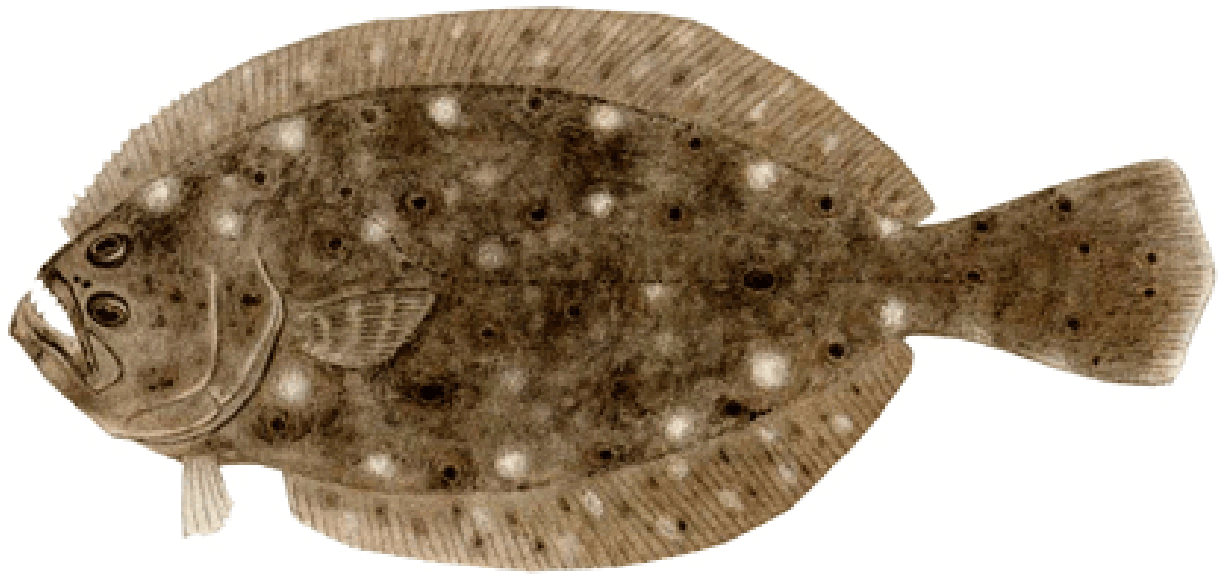
PORGY



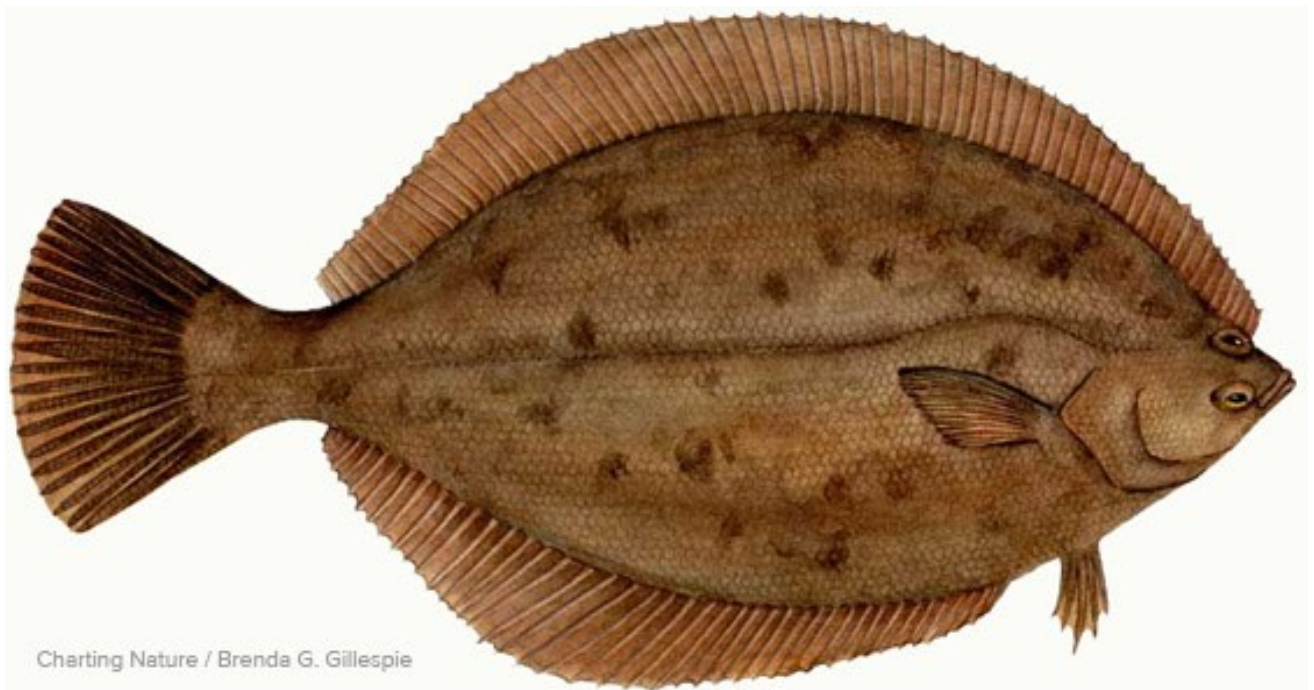
AMERICAN EEL



NORTHERN PIPEFISH



SUMMER FLOUNDER

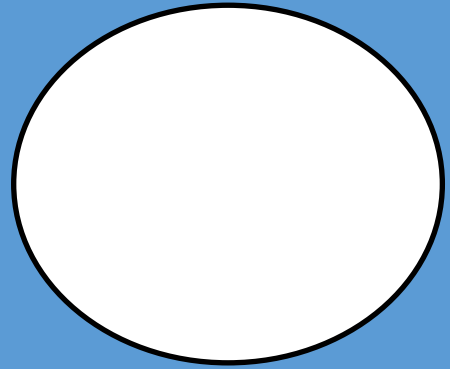


WINTER FLOUNDER



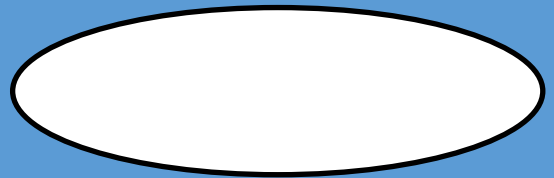
WINDOWPANE

CIRCLE SHAPED BODY



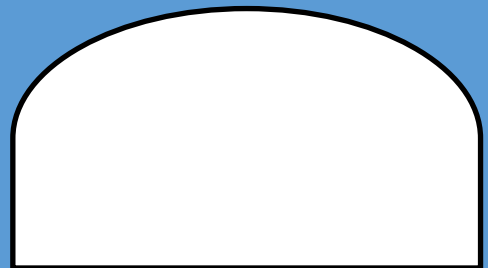
BLUEFISH

OVAL SHAPED BODY



SPOT

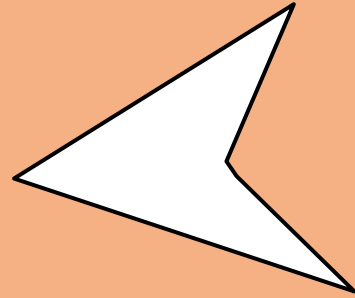
DOME SHAPED BODY





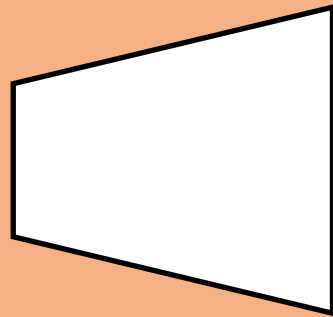
HERRING

V-SHAPED TAIL



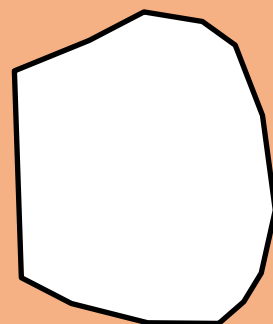
KILLIFISH

SQUARE SHAPED TAIL



OYSTER TOADFISH

CIRCLE SHAPED TAIL





CUNNER

ORANGE COLOR



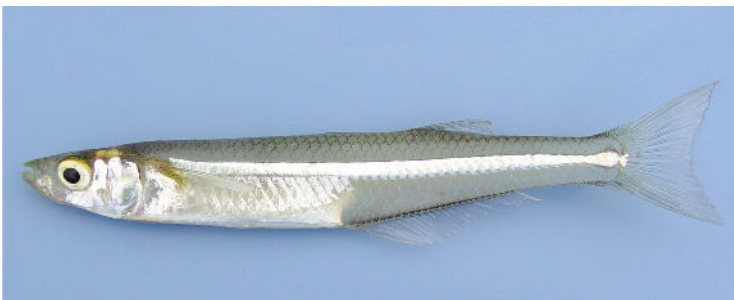
BLACK SEA BASS

BLACK COLOR



NORTHERN PUFFER

YELLOW COLOR



SILVERSIDE

SILVER COLOR





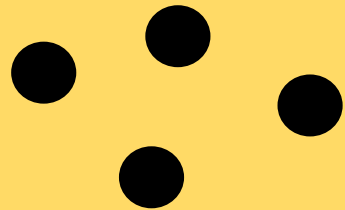
STRIPED BASS

STRIPES



MENHADEN

SPOTS



TAUTOG

BANDS

