

Go Fish!

Grade Level(s): 3-5
Time: 30 - 45 minutes
Group Size: 20-35

Summary

This lesson introduces students to the fish families indigenous to New York State by playing I FISH NY's card game, "Go Fish". Students will also learn about the classification system and the external anatomy features of fish.

Objectives

- Students will be able to identify basic external anatomy of fish and the function of each part
- Students will be able to explain why it is important to be able to tell fish apart
- Students will be able to name several different families of fish indigenous to New York

NYS Learning Standards Core Curriculum MST

Standard 4: Living Environment

Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

- *Key Idea 1:* Living things are both similar to and different from each other and nonliving things.
- *Key Idea 2:* Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.
- *Key Idea 3:* Individual organisms and species change over time.

Materials

- Freshwater or Saltwater Fish models/picture
- *Lemon Fish worksheet*
- I FISH NY Go Fish cards

Vocabulary

- **Anal Fin-** last bottom fin on a fish located near the anal opening; used in balance and steering
- **Caudal/Tail Fin-** fin on end of fish; used to propel the fish
- **Dorsal Fin-** top or backside fin on a fish; used for balance and protection
- **External Anatomy-** the outside body parts
- **Gills-** organ a fish uses to obtain oxygen from the water
- **Inferior Mouth-** a mouth that opens downward (usually bottom feeders)
- **Lateral Line-** organ a fish uses to "feel" low vibrations; tiny pores
- **Nares-** organ a fish uses to smell; similar to nostrils
- **Operculum-** flexible bony plate that covers the gills
- **Pectoral Fin-** chest fins on a fish; used for balance
- **Pelvic Fin-** aka ventral fin, bottom or belly fins on a fish; used in balance and steering

Vocabulary continued on page 2

Vocabulary continued

- **Scales-** protective cover on a fish; similar to skin
- **Scientific Classification-** systematic grouping of organisms based on similarities in structure
- **Slime Layer-** covers scales; layer protects from bacteria, parasites, etc.
- **Superior Mouth-** a mouth that opens upward (usually surface feeders)
- **Taxonomic Classification-** hierarchical system in which organisms are classified into groups based on their similarities, moves from largest and most general to smallest and most specific
- **Terminal Mouth-** a mouth located at anterior end of fish's body (mid water feeder)
- **Vertebrate-** organism with a backbone

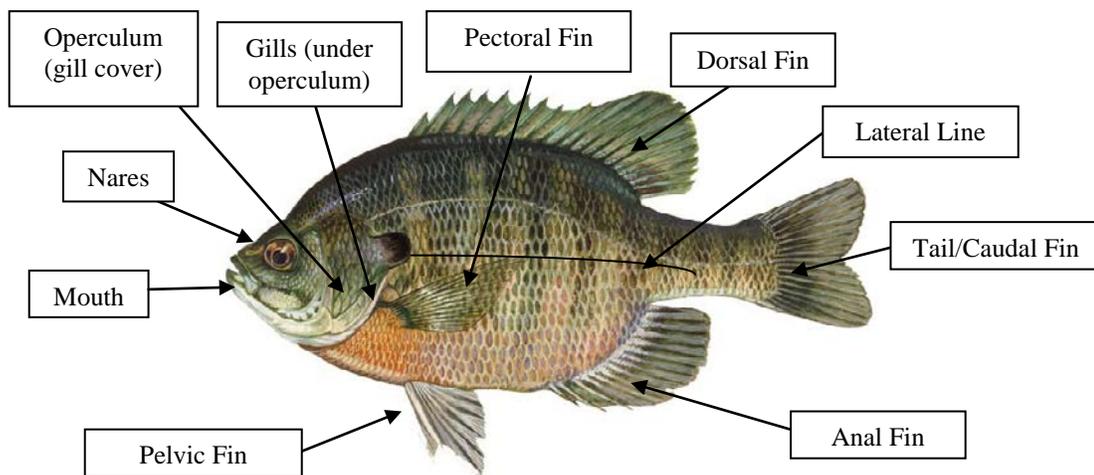


Illustration by Duane Raver

Background

It is important to be able to identify fish for many reasons: to follow the rules and regulations, for protection against sharp teeth or protruding spines, for the safety of the fish, and for consumption or eating purposes. When identifying fish, scientists and anglers use specific vocabulary to describe **external anatomy** or outside body parts. These body parts are common to most fish. The difference in the body parts is what helps distinguish one fish from another, while their similarities are used to classify them into groups. There are approximately 29,000 fish species in the world. In order to identify each type of fish, scientists have grouped them according to their outside body parts, specifically the number and location of fins, and body shape.

Classification

Using **scientific classification**, scientists arrange all organisms into groups based on their similarities. Carolus Linnaeus proposed the first system of classification in 1753. Linnaeus believed that each organism should have a binomial name, genus and species, with species being the smallest organization unit of life. Using Linnaeus' system as a guide, scientists created a

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hierarchical system known as **taxonomic classification**, in which organisms are classified into groups based on their similarities. This hierarchical system moves from largest and most general to smallest and most specific: kingdom, phylum, class, order, family, genus, and species. For example, fish belong to the kingdom Animalia, the phylum Chordata, and from there are grouped more specifically into several classes, orders, families, and thousands of genus and species. A sample classification of the largemouth bass, *Micropterus salmoides* is shown below {See Figure 1: Classification of the Largemouth Bass}.

Figure 1: Classification of the Largemouth Bass

Taxon	Latin Name
Kingdom	Animalia
Phylum	Chordata
Class	Osteichthyes
Order	Perciformes
Family	Centrarchidae (Sunfish)
Genus	Micropterus
Species	Salmoides

External Anatomy Features

Common external anatomy features of fish include: **dorsal fin, anal fin, caudal fin, pectoral fins, pelvic fins, gills, lateral line, nares, mouth, scales, and body shape.**

Fins

All fish have external appendages called fins. Like human limbs, fins provide fish with balance, steering, and protection. Fins are either single along the centerline of the fish: the dorsal fin, anal fin, and tail fin; or paired fins: the pectoral fins and pelvic fins. **Pectoral fins** help fish balance. The back fin or **dorsal fin** is typically used for balance and protection and in some fish families (pike and gar) it is used for propulsion. The **pelvic fin** and **anal fin** are located on the bottom or belly of fish and help with steering as well as balance. The tail fin, also called the **caudal fin**, helps propels fish forward.

Gills

Located on either side of fish, gills transfer oxygen to fish from the water. The gills are covered by a flexible bony plate called the **operculum**. Some fish have spines located on the operculum as a defense mechanism to protect them from predators.

Lateral Line

Running down the length of a fish's body is the **lateral line**. This organ is used to feel low vibrations in the water. The lateral line is made up of a series of tiny holes located just under the scales of a fish.

Nares

All fish can smell. Located on a fish's snout are paired holes, or **nares**, used for detecting odors in the water. Nares are similar to nostrils but are not used for breathing. Some fish, like catfish and eels, have a heightened sense of smell.

Scales and Slime

Most fish have scales covering the length of their body. Scales protect fish from injury, much like skin on the human body. On top of these scales is a mucus covering known as the **slime layer**. Slime protects fish from bacteria and parasites in the water. Anglers should be careful not to remove the slime layer when handling a fish.

Body Shape

A fish's body shape as well as the shape and size of certain external features can tell you a lot about that fish. For example, the body shape of a fish can indicate where that fish lives in the water and what type of swimmer it is.

Mouth

The mouthparts of a fish will vary in size. Some fish have very small mouths while some have large gaping mouths. Some fish have teeth, depending on what the fish eats. The location of the mouth on a fish's body can also give us a clue as to what the fish eats. A **superior mouth** (a mouth pointing upward) means the fish will usually eat food located above it, whereas a fish with an **inferior mouth** (a mouth pointing downward) will usually eat food located below it. Fish with a **terminal mouth**, located at anterior end of fish's body, are usually mid water feeders.

Main Activity

Introduction

1. Introduce yourself
2. Introduce day's activities:
 - a. Fish identification, external body parts of a fish, classification system
 - b. Create your own fish; lemon fish worksheet
 - c. Go Fish! Card game

Fish Anatomy

1. Ask students why is it important to be able to tell fish apart:
 - a. To identify a fish
 - b. To follow rules and regulations
 - c. For personal safety, and safety for the fish
 - i. Teeth/spines and other protective structures
 - d. For consumption
 - i. Poisonous, toxin accumulation
2. Ask students how we tell fish apart.
 - a. Analogize by asking students how they tell their friends apart. Have them be specific regarding differences in hair color, eye color, height, etc.
 - b. Say: We have vocabulary to talk about human anatomy. Scientists and anglers need vocabulary to describe different parts of fish. These body parts are common to most fish. You can use differences in these body parts to help distinguish one fish from another.

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3. Identify external anatomy features.
 - a. Using a fish model or picture go over fish body parts and their function.
 - b. Hand out *Lemon Fish worksheet*.
 - c. Draw a lemon fish on the board. Depending on your students' level of knowledge, label external anatomy features.
 - d. Have students create their own lemon fish using the external anatomy features that they just learned. Be sure students label features.
 - e. Have a few students share their worksheet
 - f. Collect worksheet
4. Ask students what a species is.
 - a. Fish have the most species of any vertebrate on earth; there are over 29,000 different species of fish.
 - b. Review the concept of families with students.
 - i. Guide students to understand that family is one way to group species with similar traits.
 - c. Certain fish families have specific traits.
 - i. Flounders have both eyes on one side of their head
 - ii. Sunfish have a spiny dorsal fin

Go Fish! Card Game

1. Bring out the Go Fish! cards.
2. Ask students how many have ever played Go Fish!
3. Explain the rules.
4. Show a card and mention that the fish are in a family of 4 and, that when playing, students must collect all 4 fish before laying cards down as a set.

Fish Identification

1. Time permitting, identify other local fish species using models.
2. Review safety information for each fish.
 - a. Discuss slime layer and proper handling techniques with each fish.

Wrap up

Relation to fishing

End with a brief discussion on why it is important to be able to tell fish apart

- to be able to identify them
- to follow fishing rules and regulations
- for our safety and the safety of the fish
- for human consumption



Review

- Ask the students to name families of fish they recall from the game and the similarities

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between species in that family.

- Ask the students to explain why it is important to be able to tell fish apart
- Have the students name several different families of fish indigenous to New York
- Pointing out specific body parts of a fish, have students identify the name and function of the anatomy feature

Questions for Discussion

Q: How do scientists classify fish into groups?

A: based on their structural similarities (fin shape, body shape, etc.)

Q: Can you name a family of fish that is native to NY?

A: Answers can vary: Salmon, Flounder, Sunfish, Pike, etc.

Q: Can you name a species of fish that is native to NY?

A: Answers can vary: Brook trout, largemouth bass, bluegill sunfish, striped bass, bluefish

Q: Can you name two fish that belong to the same family of fish?

A: Answers can vary: rainbow trout and brook trout, largemouth bass and bluegill sunfish, redbfin pickerel and chain pickerel, four spot flounder and summer flounder

Q: What is the function of a dorsal fin?

A: Protection and balance

Q: What organ do fish use to sense vibrations in the water?

A: Lateral line

Q: How many species of fish are there on Earth?

A: over 29,000

Q: How many species of fish can you name?

Q: How many families of fish can you name?

Teachers can use *Lemon Fish worksheet* for additional assessment.

Related Materials

Freshwater Sportfish of New York Brochure available on the NYSDEC website:

<http://www.dec.ny.gov/docs/administration_pdf/commonfish.pdf>.

Nearshore Saltwater Sportfish of New York Brochure available on the NYSDEC website:

<http://www.dec.ny.gov/docs/wildlife_pdf/nearshorefish.pdf>.

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Web Resources

“Fisheries Biology and Management,” Maryland Department of Natural Resources (MD DNR).
<<http://www.dnr.state.md.us/education/envirothon/FISH%20ANATOMY.pdf>>.

MD DNR site provides background information on external and internal fish anatomy with illustrations.

Freshwater Fish,” NYSDEC.

<<http://www.dec.ny.gov/animals/269.html>>

NYSDEC’s Freshwater Fish site provides information on a variety of species, with over ten series on fish including: true bass, common minnows, common prey fish, sunfish, and trout.

“Marine Fish,” NYSDEC.

<<http://www.dec.ny.gov/animals/69149.html>>.

NYSDEC’s Marine Fish site provides information on a variety of species: scup, shortfin mako, striped bass, summer flounder, tautog, weakfish, and winter flounder.

Help this lemon to become a fish!

Name: _____

- Draw the body parts listed below onto the fish's body.
- Label each body part.

EYES

GILLS

MOUTH

NARES

SCALES

DORSAL FIN

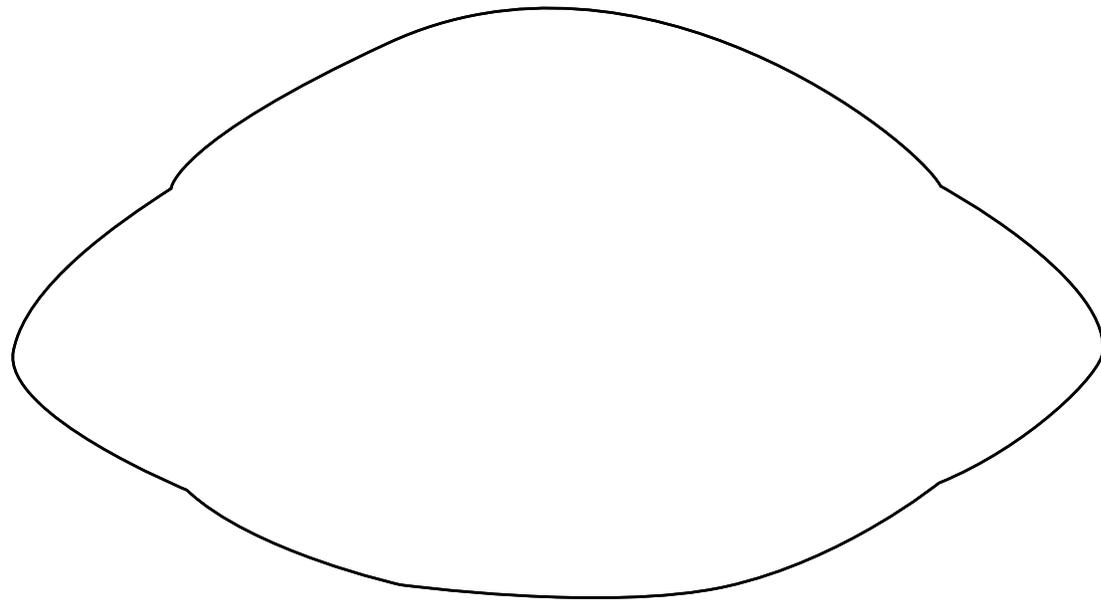
VENTRAL FIN

ANAL FIN

TAIL FIN

PECTORAL FIN

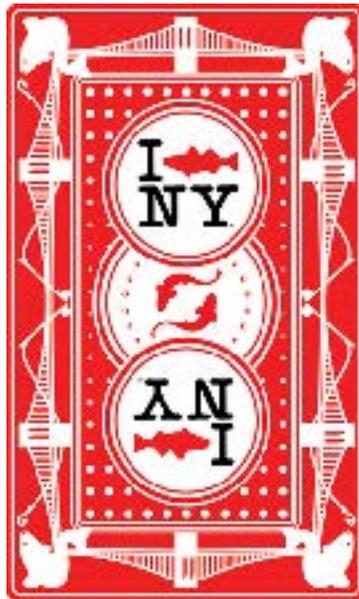
LATERAL LINE



C Catfish



channel
catfish



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

Artwork by Sarah Bruner and Nim Lee



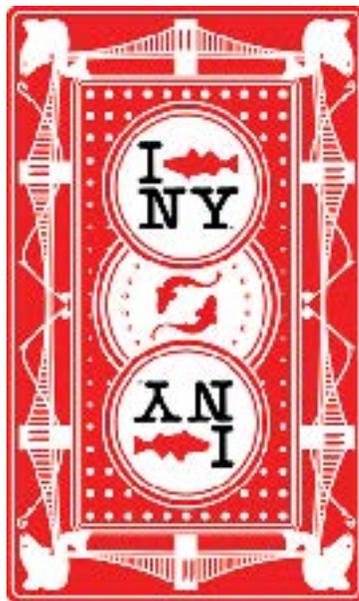
Catfish

stonecat

C Catfish



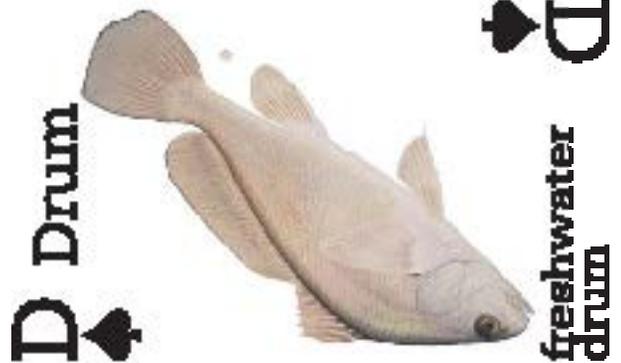
brown
bullhead



C Catfish



brindled
madtom

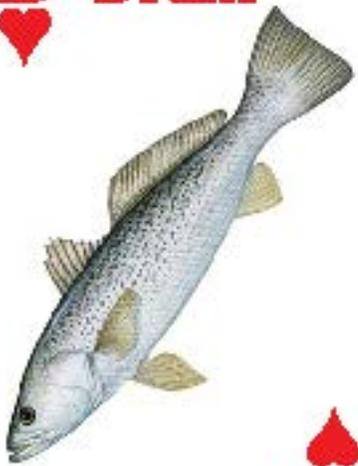


Drum

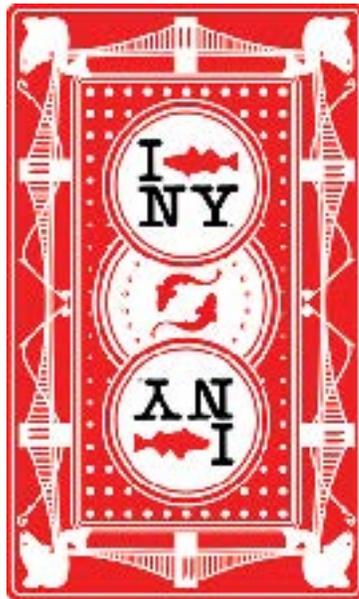
freshwater
drum



D Drum



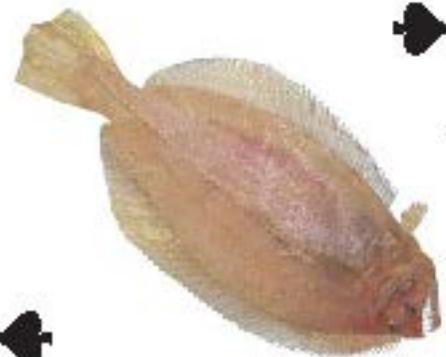
weakfish



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

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F Flounder



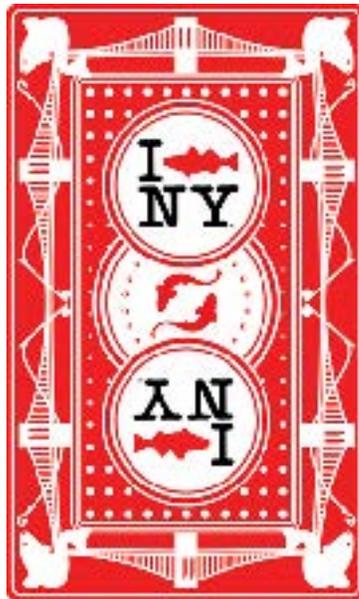
smallmouth flounder



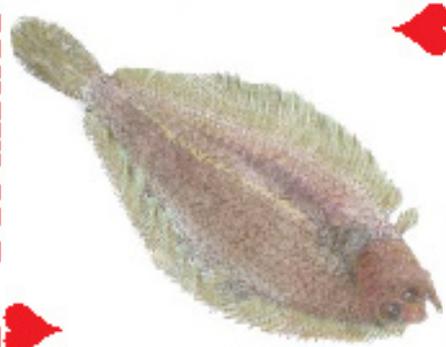
D Drum



Atlantic croaker



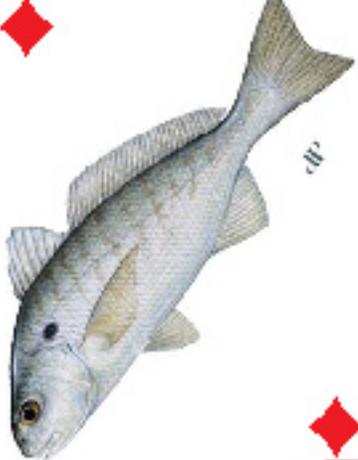
F Flounder



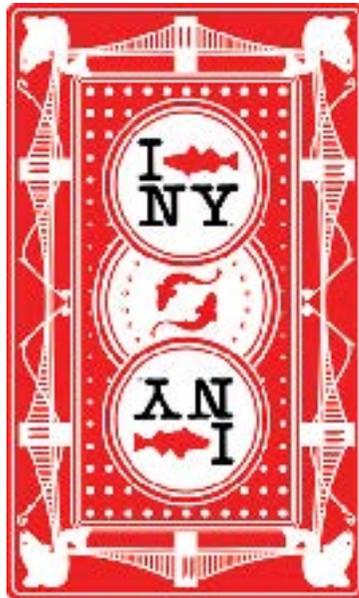
Gulf Stream flounder



D Drum



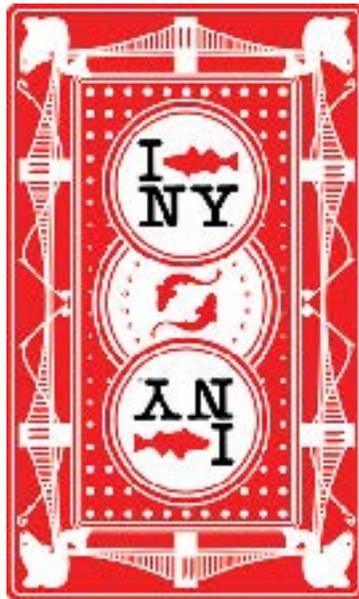
spot



F ♣ **Flounder**

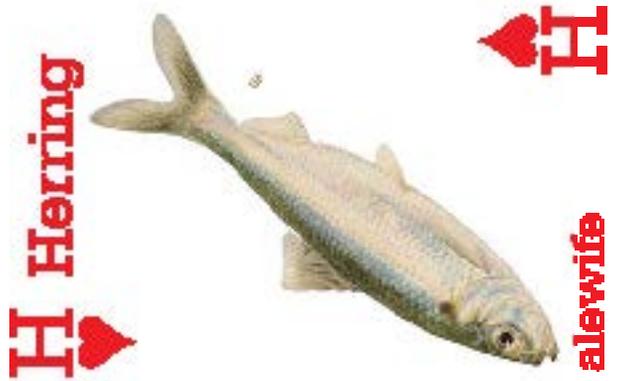


summer
flounder



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

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H Herring

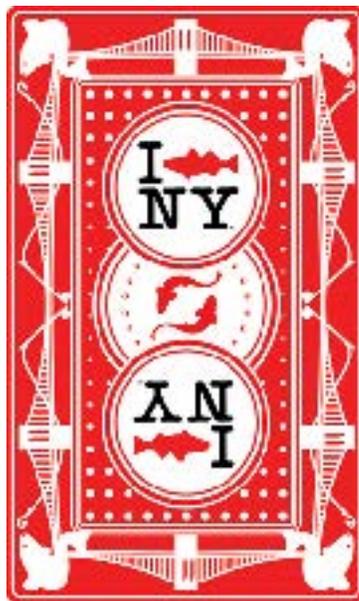


alewife

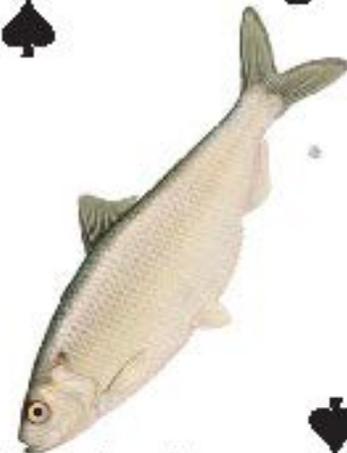
F ♦ **Flounder**



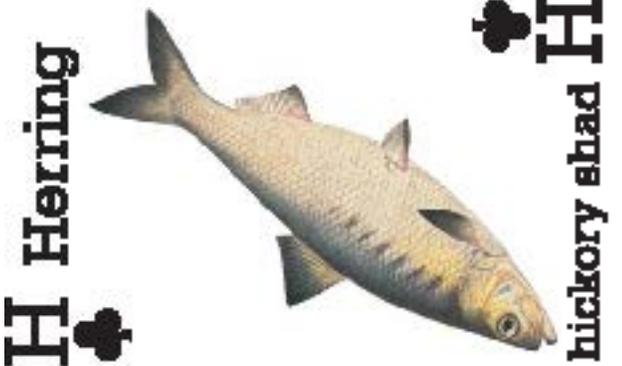
four spot
flounder



H ♠ **Herring**



blueback
herring



H Herring



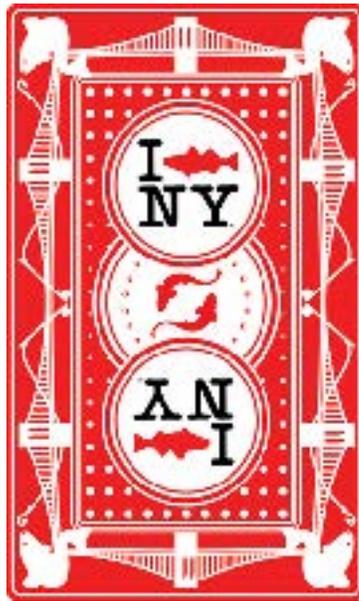
hickory shad



H Herring



gizzard shad

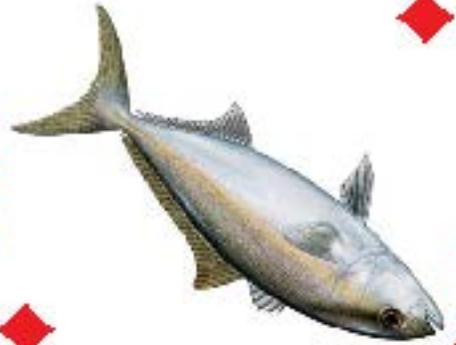


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J

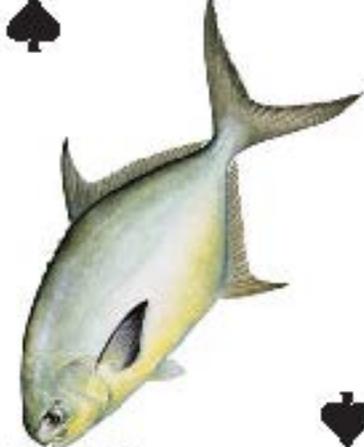
Jack



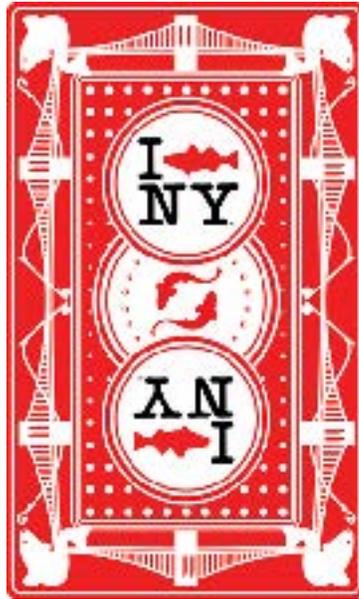
**lesser
amberjack**

J

J Jack



**Florida
pompano**



M Mackerel



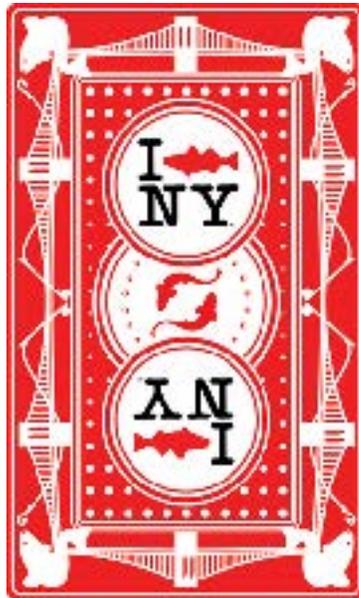
cero

M

J Jack



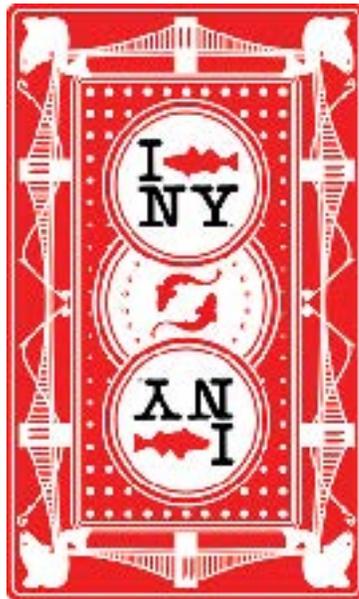
permit



M Mackerel



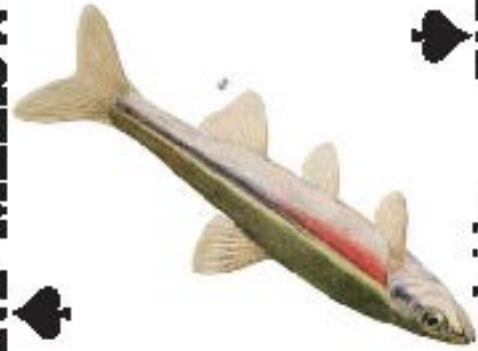
little tunny



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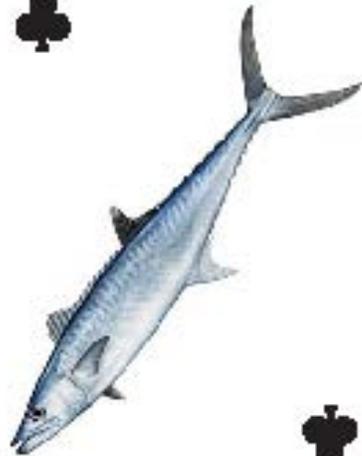
Artwork by Sarah Bruner and Nim Lee

M[♠] Minnow

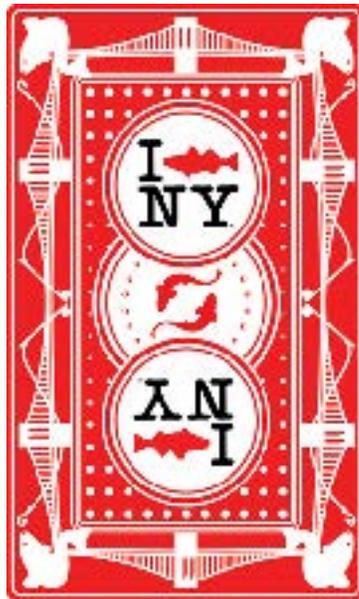


reside dace

M Mackerel



king mackerel



M[♥] Minnow



river chub

M Mackerel



yellowfin tuna



Mⁿ Minnow



stoneroller **Mⁿ**



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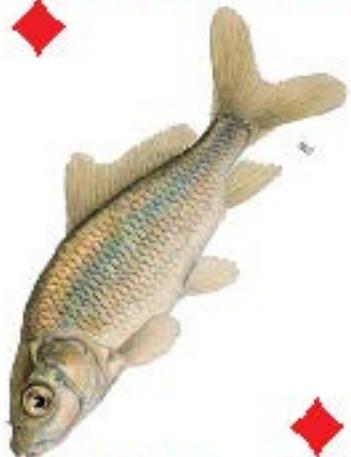
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P^k Pike

redfin pickerel

Mⁿ Minnow

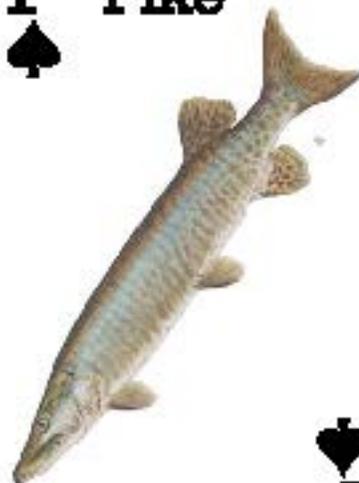


common carp

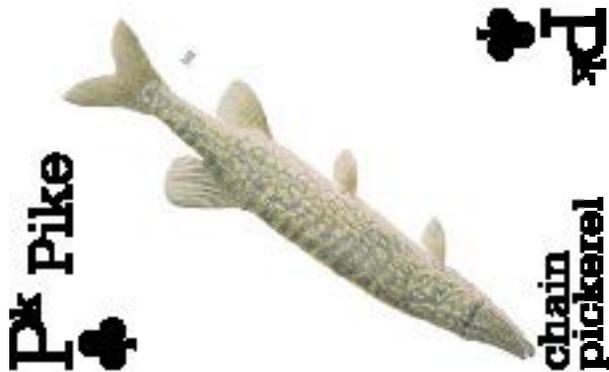
Mⁿ



P^k Pike

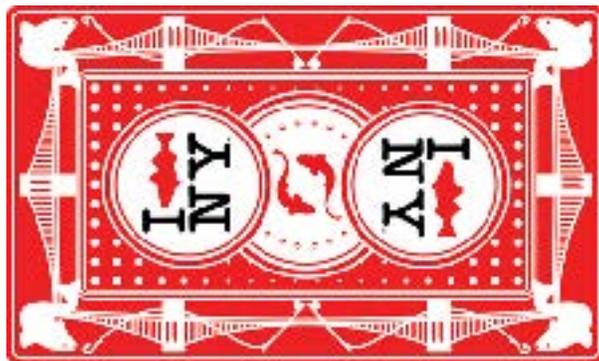


muskellunge **P^k**



P^k Pike

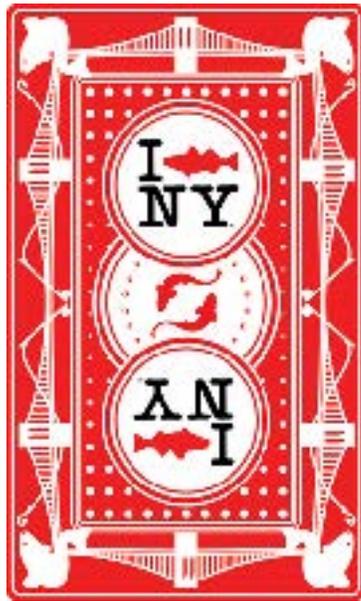
chain pickerel



P^k Pike



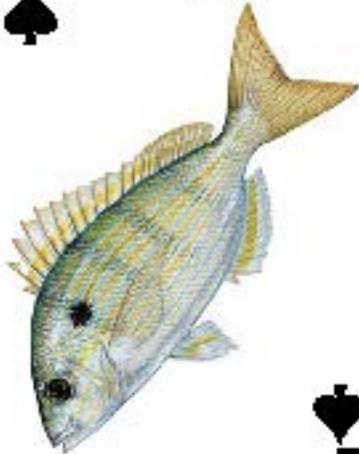
northern pike



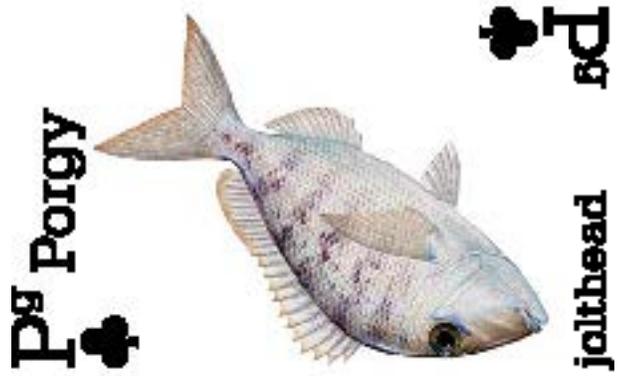
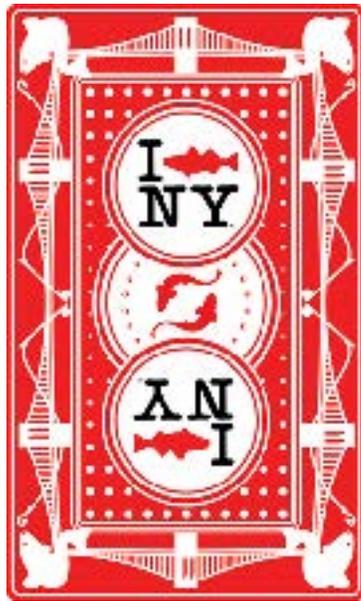
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P^g Porgy



pinfish



P^g

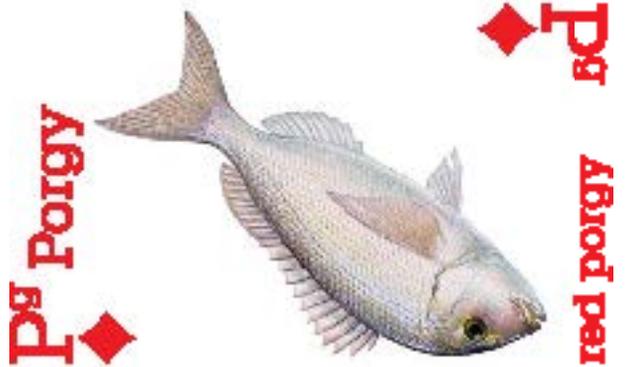
jolthead



P^g Porgy



sheephead



P^g

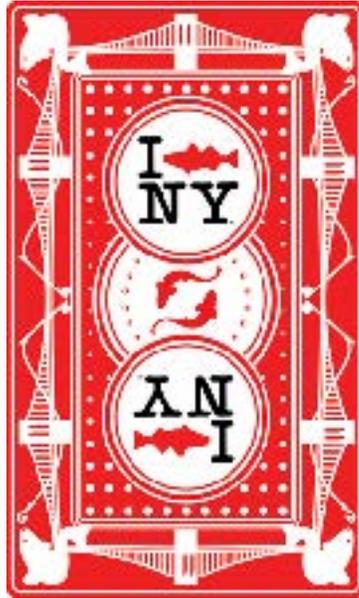
red porgy



P^r Perch
♠

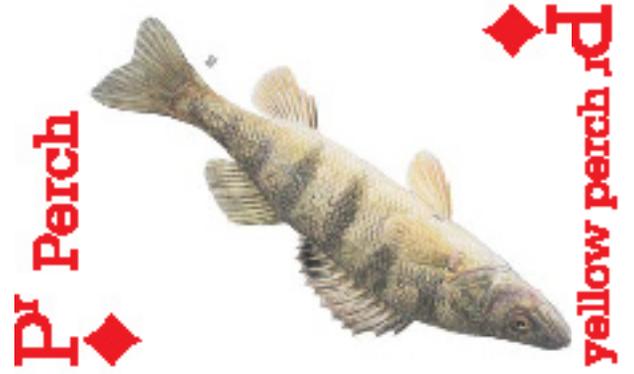


**banded
darter**



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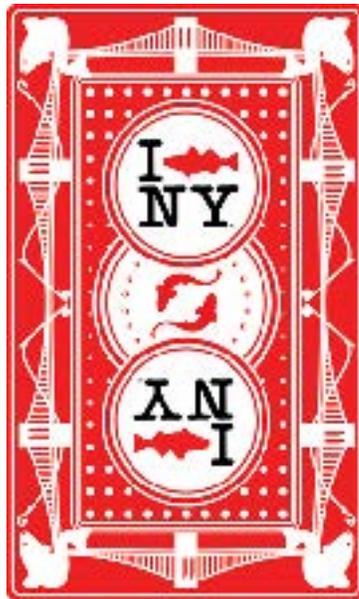
Artwork by Sarah Bruner and Nim Lee



P^r Perch
♥



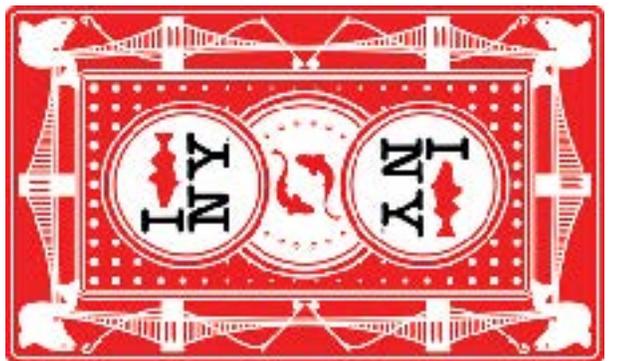
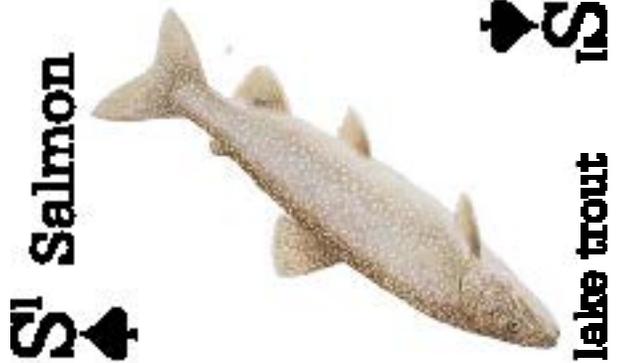
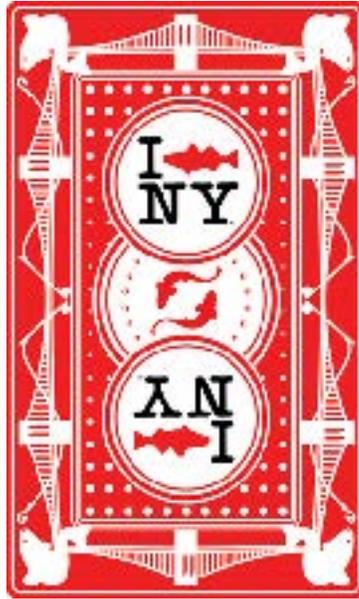
**rainbow
darter**



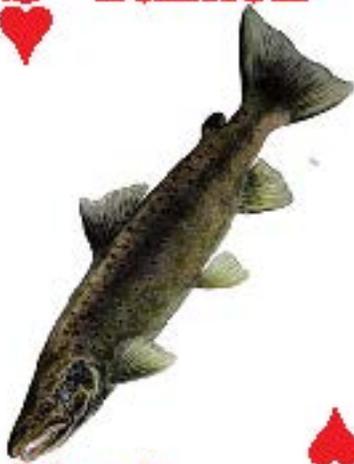
P^r Perch
♣



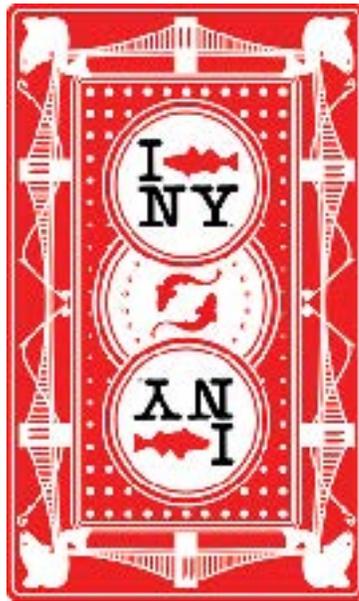
walleye



S¹ **Salmon**

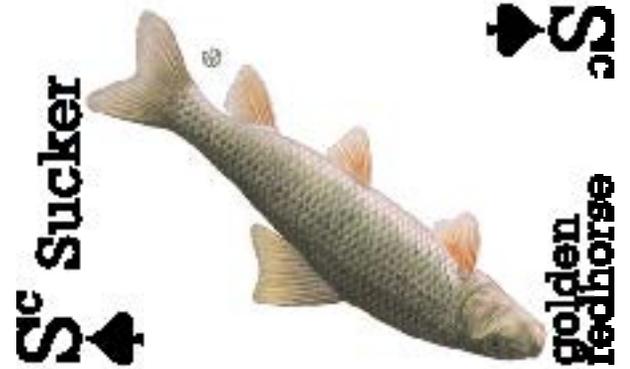


Atlantic salmon



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

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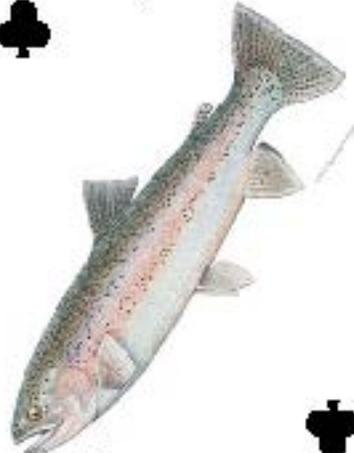


S^c **Sucker**

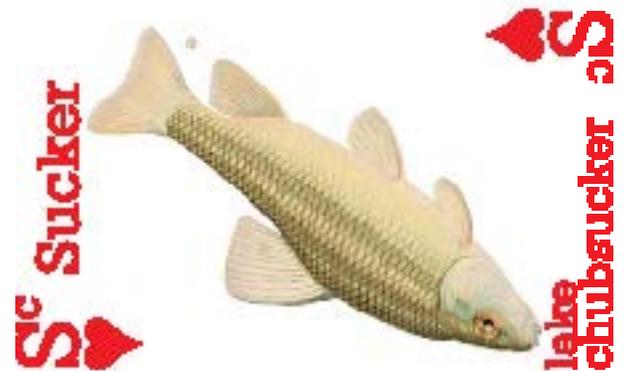
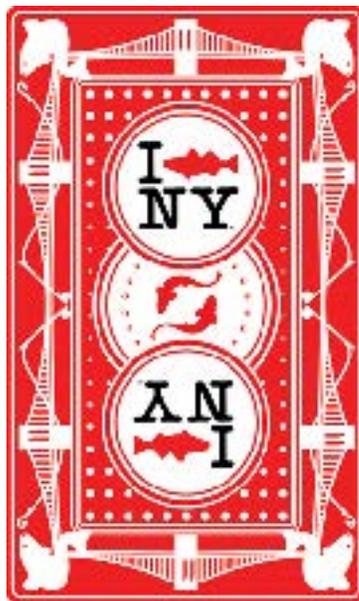


golden redhorse

S¹ **Salmon**



rainbow trout



S^c **Sucker**

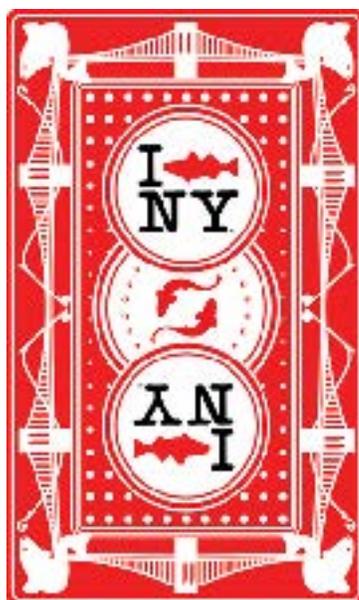


lake chubsucker

S¹ **Salmon**



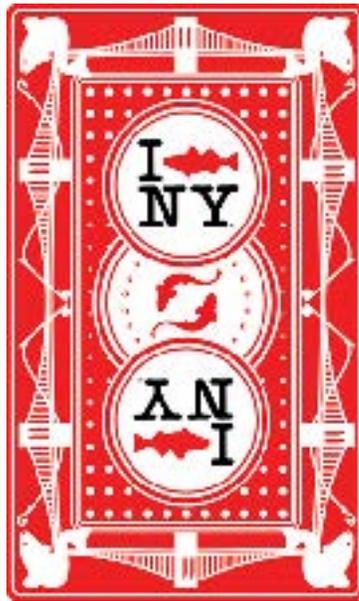
brook trout



S^c Sucker

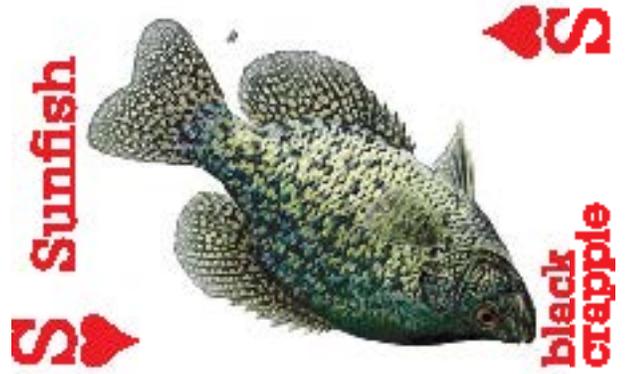


**lake
chub sucker**



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

Artwork by Sarah Bruner and Nim Lee

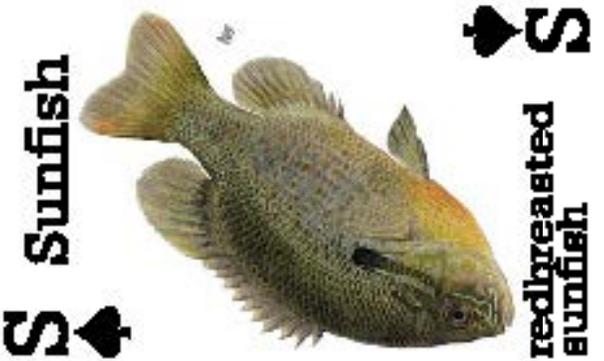
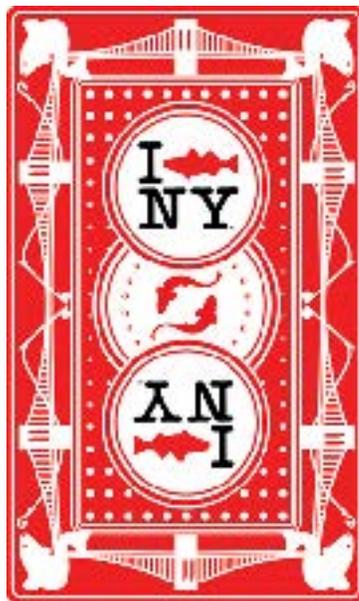


Sunfish
**black
crappie**

S^c Sucker



**creek
chub sucker**

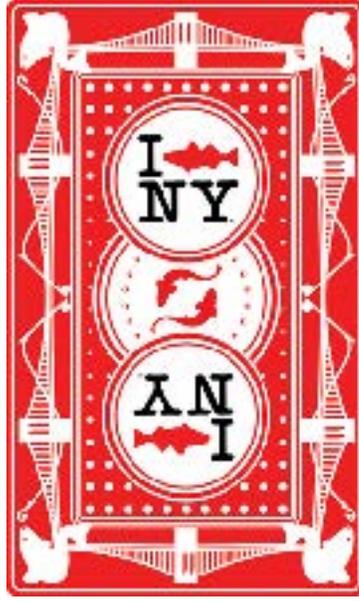


Sunfish
**redbreasted
sunfish**

S^c Sucker



**northern
hogsucker**

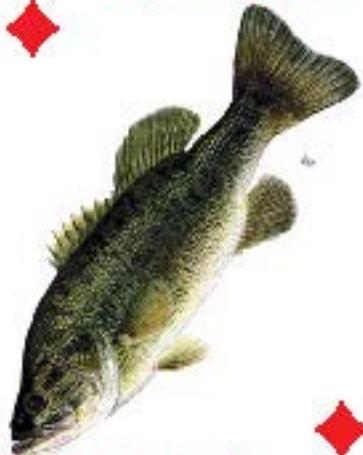


S Sunfish



pumpkinseed

S Sunfish



largemouth bass

I NY

I FISH NY is an action fishing program serving New York City and western Long Island.

All fish illustrated on these cards live in the fresh or marine waters of New York State.

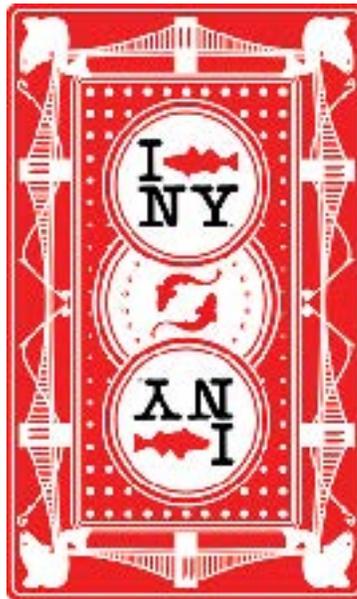
Fish Illustrations by
 Ellen Edmonson
 Diana Susan Fisher*
 Diana Neve
 Hugh E. Chapp
 Kim Lee
 Wayne Johnson

Wildlife Forecaster Bureau

*provided by the Wildlife Fish and Wildlife Conservation Commission, Division of Marine Fisheries Management.

Cards created by Kim Lee and Sarah Brown.

I FISH NY is a joint program of the New York State Department of Environmental Conservation and New York Sea Grant.



Instructions: Cut out cards along dotted line. Fold cards vertically along solid line. Laminate cards.

Artwork by Sarah Bruner and Nim Lee

Go Fish! Rules

The dealer gives each player five cards. The remaining cards are placed face down in a stock.
 The first turn goes to the person on the dealer's left. A turn consists of asking one player for a specific family of fish. The turn ends if the player does not have fish family to give. The family is then turned at the top of each card.
 For example, Sarah might ask, "Cesar, do you have any largemouth?" Only Cesar answers but not the other players.
 If Cesar holds largemouth cards, he must give all his largemouth cards to Sarah. Sarah then gets another turn.
 If Cesar does not have largemouth cards, he says, "Go fish!" Sarah then draws five top cards of the stock and the turn goes to the person on Sarah's left. If the chosen card is a largemouth, Sarah draws it and gets another turn.
 At the end of a player's turn, a complete family of five cards, the player shows the cards and places the family face down. Each family is accompanied by four spades - in reverse, so the cards are dealt. The fish's species name is at the bottom of each card.
 The game continues until either someone has 10 cards left in her hand or the stock runs out. The winner is the player who has the most families.

