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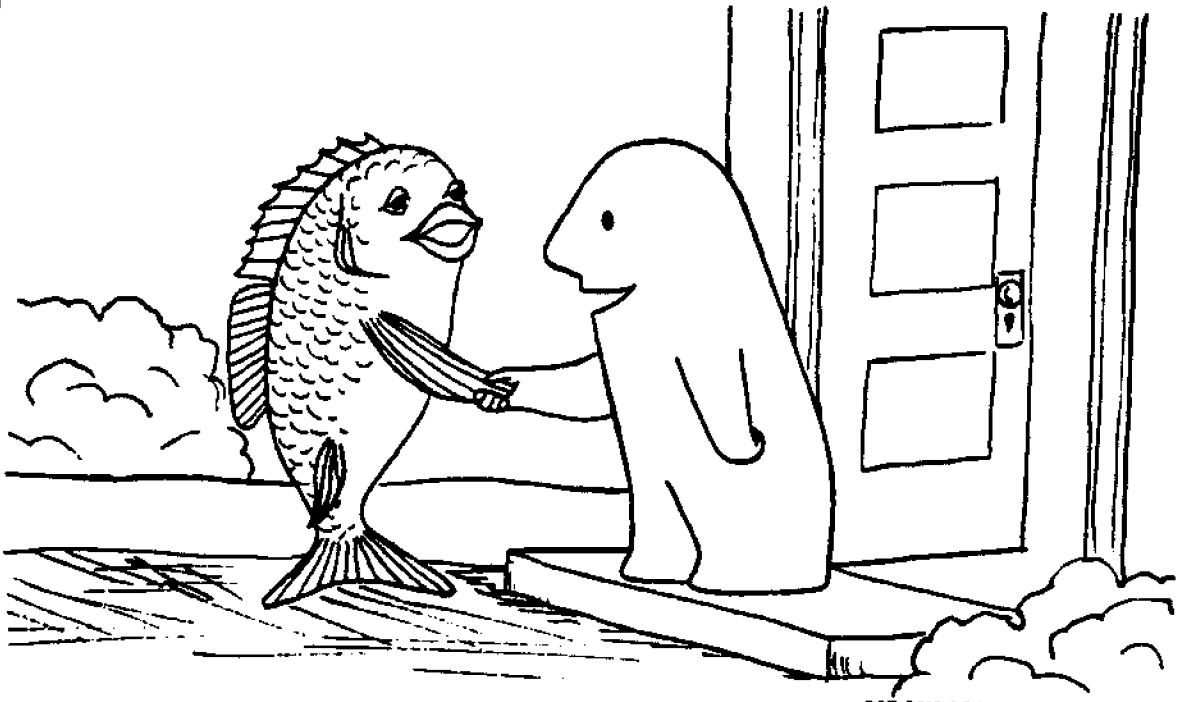
Getting to Know Your Local Fish

by
Suzanne M. Hartley, Center for Lake Erie Area Research
and
Rosanne Fortner, The Ohio State University



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TEACHER GUIDE

OEAGLS-Oceanic Education Activities for Great Lakes Schools

OEAGLS Investigation #19

Completed August 1980
Revised June 1982 and May 1987

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TEACHER GUIDE

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TEACHER GUIDE
GETTING TO KNOW YOUR LOCAL FISH

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OVERVIEW

This investigation consists of three activities. Activity A is designed to teach students how to make and use a dichotomous key. Common classroom items are used in this introductory section.

In Activity B, students use their new skill to construct a key to five or six families of Lake Erie fish, and the class can pool results to make a key to all 27 families of fish found in the lake.

Finally, Activity C is a creative art and writing experience. Based on the common name of an ocean or lake fish, each student draws a funnny picture of the fish and writes a story about how it got its name.

PREREQUISITE STUDENT BACKGROUND:

None.

MATERIALS: For every group of 4-5 students: one paper clip, pen, pencil, rubber band, pair of scissors, and two different coins.

OBJECTIVES

When students have completed this investigation, they should be able to:

1. Develop and use a dichotomous key;
2. List some characteristics of fish in general; and
3. List some ways in which the 27 families of Lake Erie fish are different from each other.

SUGGESTED APPROACH

The "keying out" process is a difficult one for many middle school students to grasp. You should go over the procedure for Activity A step by step with your students, then divide them into groups of 4 or 5 to complete the activity. Activity A will take about one hour.

The same groups from Activity A should work on Activity B. This part will take longer because of the time needed to report to the class on fish family characteristics. If you choose to make a key for all the Lake Erie fish familes, count on a total of two hours for Activity B.

Activity C is done individually and could be assigned for homework or completion during spare time. Displaying the art work and sharing clever stories may create further interest in the origin of names.

An enjoyable film related to this topic is "Classification," from the University of Utah *. The 29 minute film shows different ways of classifying familiar objects. It provides an excellent introduction to this investigation. Other films that discuss classification of animals are also available. Ask a biology teacher at your local high school.

Note: Information to teachers is enclosed in boxes in this guide.

* University of Utah
Salt Lake City, Utah 84112

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by

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INTRODUCTION

Lake Erie has a larger variety of fish life than any of the other Great Lakes. Scientists believe this is because of the southern position of the lake and because it is shallow. Lake Erie has 138 species of fish. These species can be grouped into 27 families. All of the fish in a given family share certain characteristics. In this exercise you will learn how to use these characteristics to identify the 27 families.

ACTIVITY A: HOW DOES A DICHOTOMOUS KEY WORK?

KEYWORDS: dichotomous, key, classify.

This activity will introduce you to a **dichotomous** (die-caht'-uh-mus) **key**. A dichotomous key is a key in which things are divided into two groups each time a characteristic is considered. The prefix "di" means two, and the whole word "dichotomous" refers to something with two parts or branches. Scientists use "keys" to identify things and put them into groups on the basis of how they are alike.

MATERIALS: Paper clip, pen, pencil, two different coins, rubber band.

PROCEDURE

Look at the example of a dichotomous key shown on page SG2. At the top are pictures of four items to be classified. The maker of the key looked at the items and decided that they were different in a number of ways. These differences are listed as pairs of characteristics on the left side of the key. The right side of the key identifies the item or tells you what step to go to next if an item has a certain characteristic.

Let's classify the second item as an example. Look at Step 1 of the key and decide if the pictured item is a living or nonliving thing. Since the picture shows a living thing, read across line 1A to the right hand column to find the next step or the identification. You are told to go to Step 2.

In Step 2, from what you know about the thing you are classifying, decide if the thing has a brain or not. Since it does, read across line 2A, which tells you to go to Step 3.

In Step 3, you must decide if the thing has fur or not. Since it does, reading across line 3A brings you to the identification, <u>cat</u>.

Please work with the students closely on this activity to help insure their understanding. Activity B will fail if Activity A is only marginally understood.

Follow the procedure carefully, emphasizing that only <u>one</u> characteristic at a time is used to classify items, and <u>two</u> groups are constructed based on that one characteristic. The two groups are subdivided further and further until only one item remains in a group. That item is then identified.

By looking back through the steps used to key out an item, you can get a list of the item's characteristics. <u>Cat</u>, for example, is living, has a brain, and has a body covered with fur.

Key

Characteristic	Next step or identification
1A. Living	2
B. Nonliving	Block
2A. Has a brain	3
B. No brain	Plant
3A. Body covered with fur	Cat
B. No fur	Duck

Now try making a dichotomous key yourself using the six items listed in the MATERIALS section. Look at the items and decide how they are different and alike. Statement one is given as an idea to get started. Fill in other pairs of characteristics for other statements until you have identified all six items.

Characteristic	Next step or identification
1A. Will make a mark on paper	2
B. Will <u>not</u> make a mark on paper	3
2A.	
B.	

SCHOOL SUPPLIES KEY
(POSSIBLE)

Characteristic		Next step or identification
1A.	Will make a mark on paper	2
B.	Will not make a mark on paper	3
2A.	Made mostly of wood	pencil
B.	Made mostly of plastic	pen
3A.	Made of metal	4
B.	Not made of metal	rubber band
4A.	Disc shaped	5
B.	Not disc shaped	paper clip
5A.	Silver color	dime
B.	Brown color	penny

If necessary, key out all four items in the example to assure that students understand. You may also have to lead them through several steps in construction of a key to identify the 6 items listed in the materials section of the Student Guide. It is helpful to have the students physically group the items as they are discussed--one pile for writing implements, one pile for "everything else." Then separate the writing implements by color of mark made, plastic or wood, color of the implement, or other characteristics, and identify each. Step 3 will be a way to divide "everything else" into two groups, and so on.

An example of one possible key is shown here. Many variations are possible. The best way to check a key is to give the key and one item to someone else. That person should be able to list the steps followed to reach an identification of the item.

ACTIVITY B: WHAT ARE THE CHARACTERISTICS OF SOME LAKE ERIE FISH?

Now that you know how to construct a dichotomous key, let's try making one that classifies real organisms, the fish in Lake Erie. For this activity you will work in groups of 4 or 5. Your group will construct a key to identify some fish families and learn something about them.

MATERIALS: Fish pictures and information about fish families.

PROCEDURES

Regardless of whether they live in an ocean, lake or stream, all fish are alike in some ways. A typical bony fish has scales embedded in its skin. These scales have concentric growth rings. The rings can be counted to determine the age of the fish.

A few fish do not have any scales.

Fish also have gills. The fish's mouth and cheeks act as a pump to push water over the gills. As water passes over the gills, oxygen dissolved in the water is exchanged for carbon dioxide from the fish's blood.

Fish differ from each other in several characteristics. Study the following diagrams so you can recognize differences when you get your fish pictures from your teacher. Refer to the GLOSSARY on page SG5 to find definitions of terms you do not understand from the pictures.

Go over the fish characteristics on page SG4 with students to make sure they are aware of what differences to look for. Remind them of the glossary (page SG5), not only for looking up unfamiliar words, but for choosing descriptive words to use in their key.

The procedure in the Student Guide is self-explanatory. The Teacher Guide includes two pages (one with pictures of fish, one with descriptions) for each of five teams. Please look over the fish pictures to be sure that you can point out different characteristics of fish if students have difficulty. Both the pictures and the written descriptions can be used to describe differences.

1. Look at the fish pictures with your group. List the names of the fish you are working with on your answer sheet.

2. How are your fish different from each other? List four general ways (head shape, spines, etc.).

Answers to questions 1 and 2 will differ from team to team. The questions are given mainly as advance organizers and to guide you if you are giving a grade for this activity.

3. Cut your picture sheet into sections so that each piece contains only one fish. With your team, decide how to divide the fish into two groups based on one characteristic. Put the fish pictures into piles according to that characteristic, which will be Statement 1 of your key. On your answer sheet, fill in 1A and B, with the next steps or identification on the right side.

4. Next, take the fish in one pile and discuss how they differ from each other. Fill in Statement 2A and B.

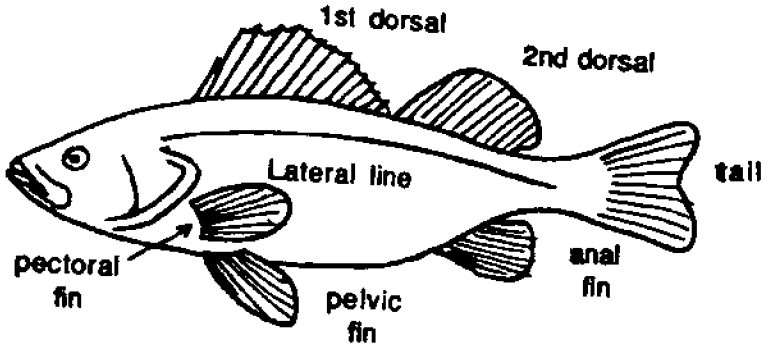
5. Continue dividing your fish in this way until each group has only one fish in it. When you reach this point, the right hand column should be filled in with the fish's name.

6. Check your finished key when all your fish have been classified. You should be able to pick up any fish picture and follow the key to find the name of the fish.

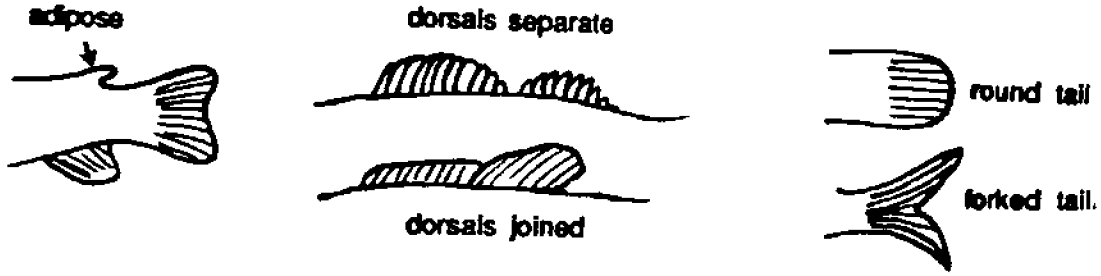
The "Key to Lake Erie Fish" will also differ from team to team. An example is given using Group III. See Appendix for sample keys to other groups.

Fish Characteristics

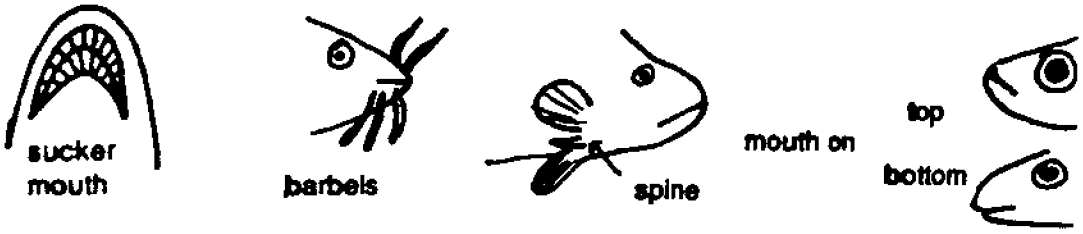
Where the fins are:



Fin types:



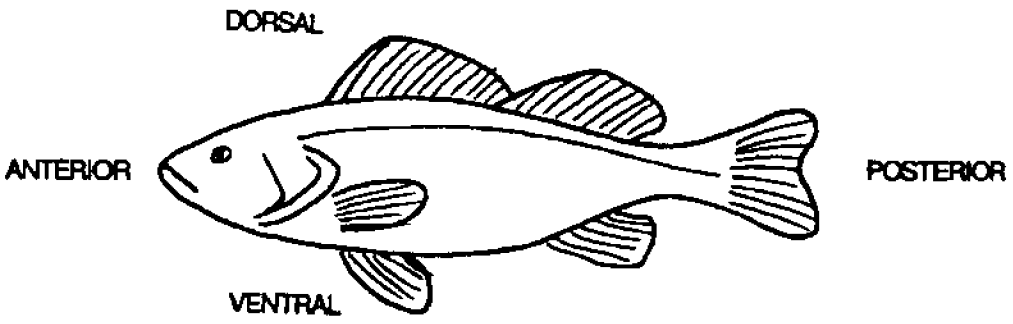
Head features:



Also look for differences in:

- Body shapes (wide, narrow; slender, fat)
- Lateral line (present or absent)
- Spines (present or absent, and location)
- Spots or stripes
- Head shapes
- Fin shapes

Glossary



Adipose Fin - fleshy fin behind the dorsal fin.

Anterior - front.

Barbels (pronounced bar-bulls) - whiskers that help the fish detect food.

Carnivore - flesh eating animal.

Commercial Fish - fish caught for commercial trade.

Concentric - having a center in common. Example: growth rings on a tree. 

Dorsal - pertaining to the back or top.

Filter Feeder - filters microscopic plants and animals from the water for food.

Forage Fish - fish used as food by larger fish.

Lateral Line - A sensory organ with a row of pores running along each side of the head and body of most fish. It looks like a dotted line.

Omnivore - an animal that eats any sort of food, plant or animal.

Parasite - an organism living in or on another organism (its host) from which it obtains food.

Posterior - rear.

Scales - flexible overlapping plates that cover the bodies of some fish. Scales help to protect the fish.

Sport fish - fish that are caught by individuals for recreation.

Ventral - pertaining to the underside or belly.

Possible Key to Group III

Characteristic		Next step or identification
1A.	Lateral line	2
B.	No Lateral line	4
2A.	Forked tail	Salmon
B.	Rounded tail	3
3A.	Long dorsal fin	Bowfin
B.	Short dorsal fin	Pirate Perch
4A.	Vertical stripes on sides	Killifish
B.	No stripes	5
5A.	Long narrow anal fin	Livebearer
B.	Short anal fin	Mudminnow

7. Exchange keys and fish pictures with another group. Do not give the list of fish names from the original sheet to the other team. See if they can identify the fish using only your descriptions in your key.

The exchange of keys and pictures with another group is a good way to find out if the keys will work. It also exposes students to other possible ways of distinguishing between fish.

8. Get your original fish pictures and key back when the other team is finished. Read the Fish Family Descriptions your teacher has given you. Tell the class how you grouped your fish and a little about each fish.

In Step 8, try to have each student tell about one family of fish. A representative of the group can then tell how the fish were keyed.

Answers to Step 9 should be filled in during the individual reports.

9. From the group reports, answer these questions.

A. What fish is covered with bony plates?

T9A. Sturgeon are covered with bony plates.

B. How do lampreys damage other fish?

T9B. Lampreys are parasites which attach to other fish with their sucker mouths and suck out their blood and body fluids.

C. How does a filter-feeding fish eat?

T9C. It filters microscopic organisms from the water by collecting the organisms on gill rakers. Then the fish swallows these food organisms.

D. Describe a major characteristic of a bowfin.

T9D. It has a long fin that arches in a bow along its back.

E. List 5 Lake Erie fish that are valuable as food for humans.

T9E. Sturgeon, Yellow Perch, White Bass, Burbot, Salmon, Freshwater Drum, White Perch, Walleye, and Catfish are valuable as human food.

F. How did the sucker family get its name?

T9F. The fish have an extendable sucker mouth for picking or sucking up organisms.

G. Name two Lake Erie fish that have no scales.

T9G. Catfish, Eel and Sturgeon have no scales.

H. How did the freshwater drum get its name?

T9H. It makes a drumming sound.

I. Name two kinds of Lake Erie fish that are used as bait for fishing.

T9I. Minnows, Shiners, and Chubs are used as bait.

10. If time permits, work with the entire class to develop a key that will classify all 27 families of Lake Erie fish.

When the students have constructed their own key and tried out the key made by another team, they should be well aware of what differences to look for. Making a key to all the fish should not be difficult at this point. If you want to try this, we suggest that you have students write the name of each fish on its picture, then tape all the pictures to the blackboard. Have students volunteer to divide the fish into groups to create a key, one step at a time.

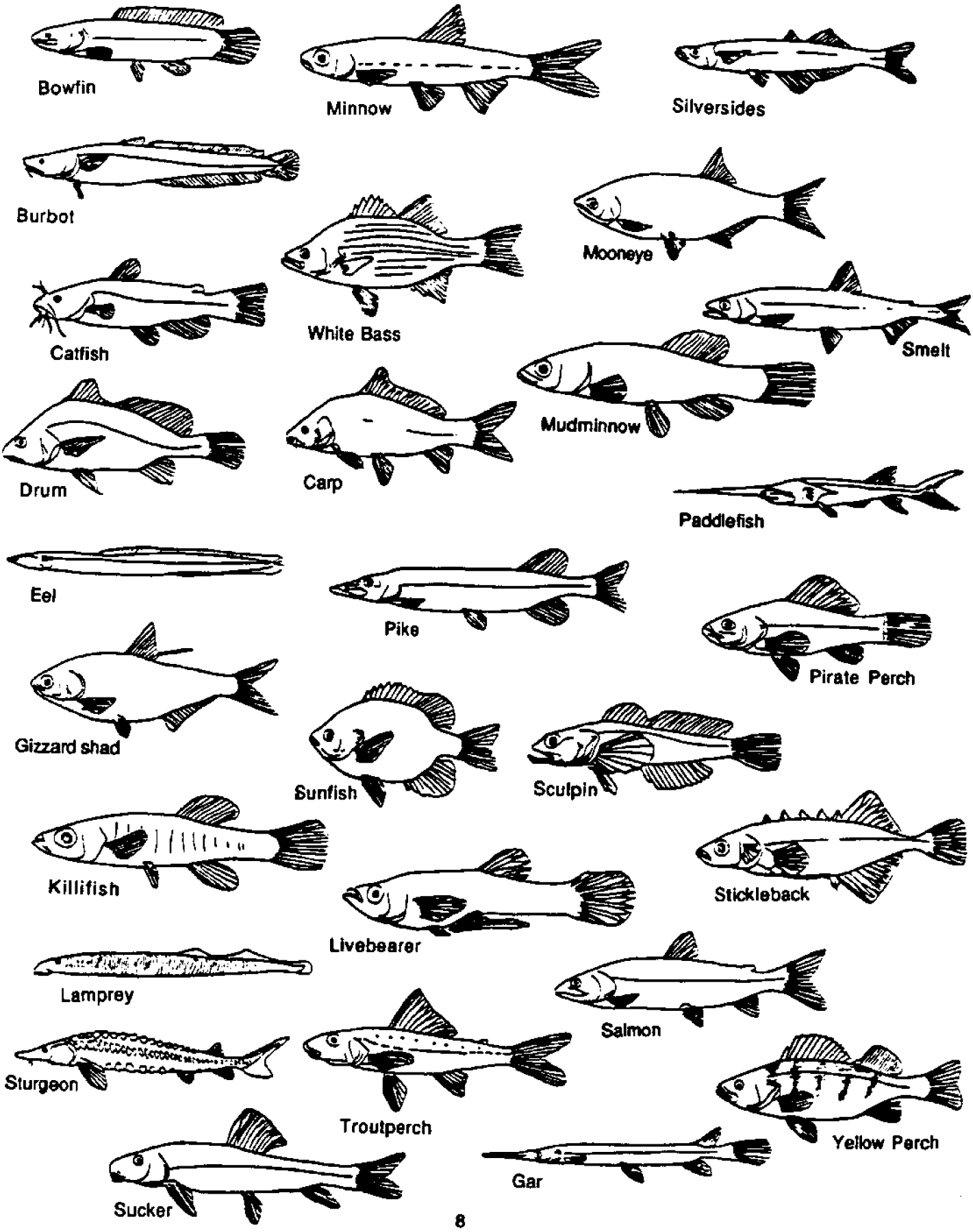
If you prefer to use the overhead projector, page 8 has pictures of all of the fish. Make a transparency of that page and cut it apart so you can physically group the fish as the key is constructed.

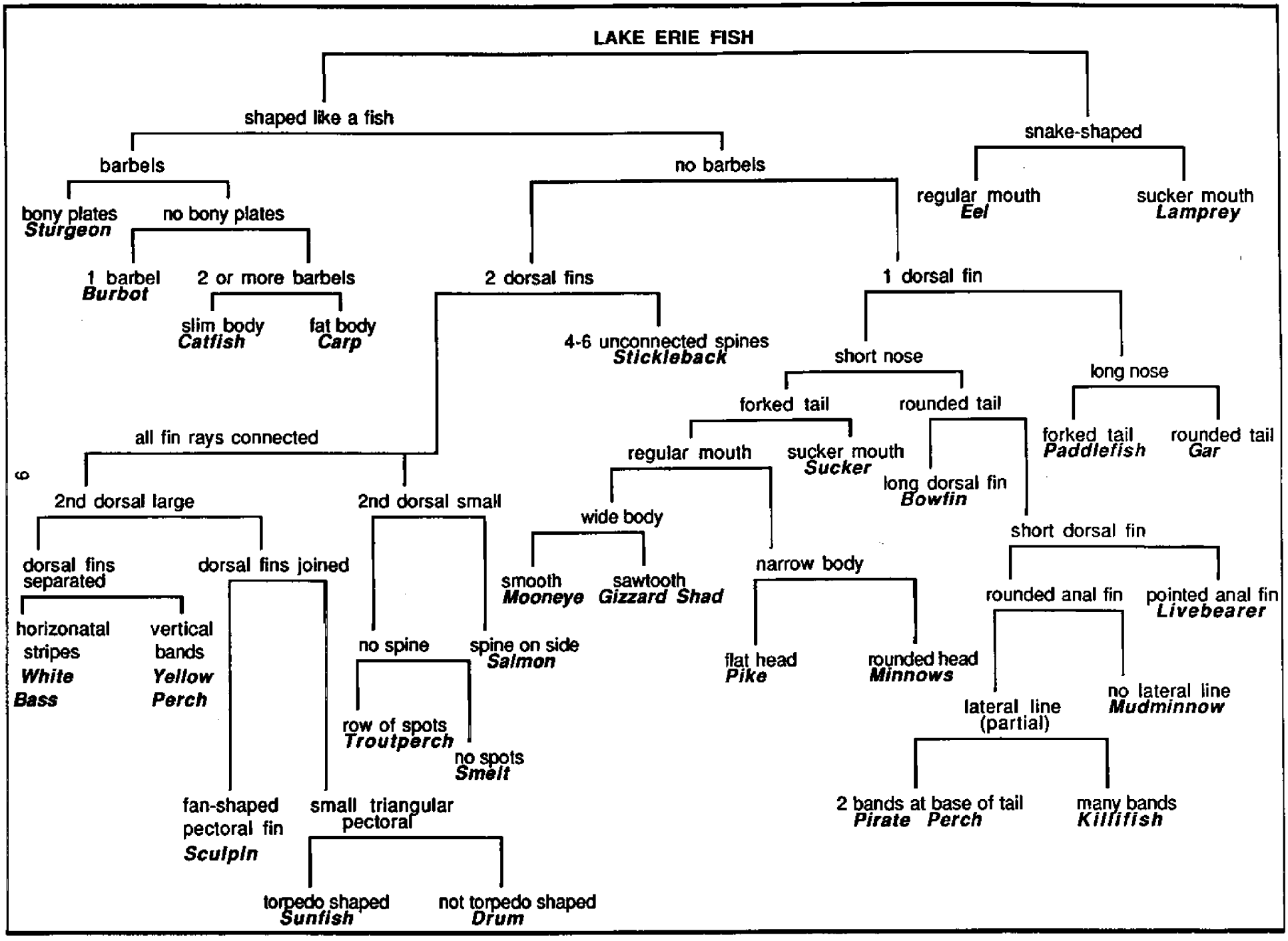
One possible way to group all the fish is shown on this page. A graphic way to show the same classification scheme is on page 7.

Lake Erie Fish
(Possible Key)

Characteristic		Next step or identification
1A.	Snake-shaped	2
B.	Shaped like a fish	3
2A.	Sucker mouth	Lamprey
B.	No sucker	Eel
3A.	Barbels	4
B.	No barbels	7
4A.	Bony plates	Sturgeon
B.	No bony plates	5
5A.	One barbel	Burbot
B.	Two or more barbels	6
6A.	Slim body	Catfish
B.	Fat body	Carp
7A.	Two dorsal fins	8
B.	One dorsal fin	17
8A.	All fin rays connected	9
B.	Four to six unconnected spines	Stickleback
9A.	Second dorsal fin large	10
B.	Second dorsal fin small	15
10A.	Dorsal fins separate	11
B.	Dorsal fins joined	12
11A.	Horizontal stripes	White Bass
B.	Vertical color bands	Yellow Perch
12A.	Fan-shaped pectoral fin	Sculpin
B.	Small triangular pectorals	13
13A.	Skinny body	Silverside
B.	Round body	14
14A.	Mouth on top	Sunfish
B.	Mouth on bottom	Drum

15A.	No spines	16
B.	Spine on side	Salmon
16A.	Row of spots	Trout-perch
B.	No spots	Smelt
17A.	Short nose	19
B.	Long nose	18
18A.	Forked tail	Paddlefish
B.	Rounded tail	Gar
19A.	Forked tail	20
B.	Rounded tail	24
20A.	Regular mouth	21
B.	Sucker mouth	Sucker
21A.	Wide body	22
B.	Narrow body	23
22A.	Smooth belly	Mooneye
B.	Sawtooth belly	Gizzard Shad
23A.	Flat head	Pike
B.	Round head	Minnows
24A.	Long dorsal fin	Bowfin
B.	Short dorsal fin	25
25A.	Short anal fin	26
B.	Long anal fin	Livebearer
26A.	Lateral line (partial)	27
B.	No lateral line	Mudminnow
27A.	Two bands at base of tail	Pirate Perch
B.	Many bands	Killifish


Bowfin
Minnow
Silversides
Burbot
Mooneye
White Bass
Catfish
Smelt
Mudminnow
Drum
Carp
Paddlefish
Eel
Pike
Pirate Perch
Gizzard shad
Sunfish
Sculpin
Killifish
Stickleback
Livebearer
Lamprey
Salmon
Sturgeon
Troutperch
Yellow Perch
Gar
Sucker


LAKE ERIE FISH
shaped like a fish
snake-shaped
barbels
no barbels
regular mouth
Eel
sucker mouth
Lamprey
bony plates
Sturgeon
no bony plates
1 barbel
Burbot
2 or more barbels
2 dorsal fins
1 dorsal fin
slim body
Catfish
fat body
Carp
4-6 unconnected spines
Stickleback
short nose
long nose
forked tail
rounded tail
forked tail
Paddlefish
rounded tail
Gar
all fin rays connected
regular mouth
sucker mouth
Sucker
long dorsal fin
Bowfin
2nd dorsal large
2nd dorsal small
wide body
short dorsal fin
dorsal fins separated
dorsal fins joined
smooth
Mooneye
sawtooth
Gizzard Shad
narrow body
rounded anal fin
pointed anal fin
Livebearer
horizonatal stripes
White Bass
vertical bands
Yellow Perch
no spine
spine on side
Salmon
flat head
Pike
rounded head
Minnows
lateral line (partial)
no lateral line
Mudminnow
row of spots
Troutperch
no spots
Smelt
fan-shaped pectoral fin
Sculpin
small triangular pectoral
2 bands at base of tail
Pirate Perch
many bands
Killifish
torpedo shaped
Sunfish
not torpedo shaped
Drum

ACTIVITY C: HOW DO FISH GET THEIR NAMES?

You have discovered that some fish in Lake Erie are named for the way they look (stickleback, bowfin, and others). For others, it is difficult to determine how they got their common names. In this activity, you will make up stories and draw pictures about how a fish might have gotten its name.

MATERIALS: Paper and pencil.

This activity is designed to stimulate imagination and creativity. Expect a wide range of answers, and maybe consider preparing a booklet of class results that could serve as an idea bank for future classes.

PROCEDURE

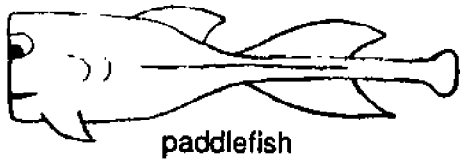
You have seen pictures of how the fish in Lake Erie really look. But suppose you had never seen a fish and only knew its common name. You might guess that the fish's name had something to do with how it looks, how it behaves, or maybe where it lives.

1. Listed here are some common names of Lake Erie fish and ocean animals. Choose one name from either list. What animal did you choose?

Lake Erie Fish	Ocean Animals
1. Freshwater drum	1. Hammerhead shark
2. Madtom	2. Hatchetfish
3. Catfish	3. Swordfish
4. Mudminnow	4. Dogfish
5. Walleye	5. Starfish
6. Pirate-perch	6. Pipefish
7. Sunfish	7. Jellyfish
8. Paddlefish	8. Parrotfish
9. Mooneye	9. Queen triggerfish
10. Bigmouth buffalo	10. Porcupinefish
11. Silverside	11. Sea robin
12. Bullhead	12. Toadfish
13. Mosquitofish	13. Clownfish

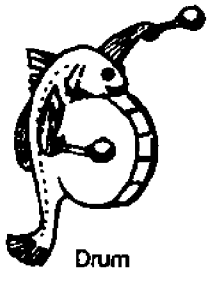
2. On your own paper, draw a funny picture about how that animal might look, based on its name. If you chose a fish, your drawing needs to have some basic fish characteristics: pair of eyes, tailfin, mouth and some normal fin arrangement.

3. Write a short story (one or two paragraphs) about how the animal you chose got its name.



paddlefish

Below are some examples of drawings that might result from completing Step 2.



Drum

Madtom

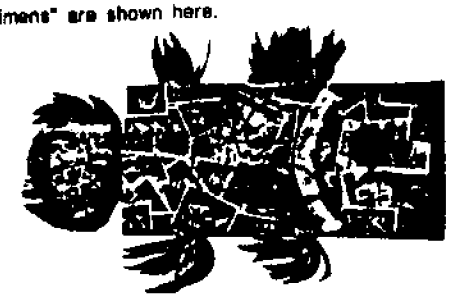
Silver Bass

Bullhead

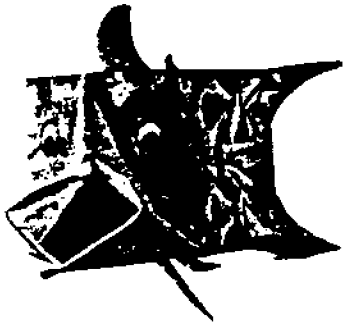
(Reproduced from "Fish Recipes for Lent," U. S. Department of the Interior, Bureau of Commercial Fisheries, 1961. FMB 24 15 60.)

EXTENSIONS

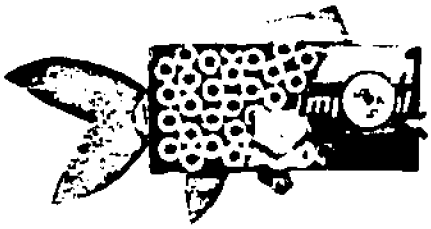
This activity is adapted from a "Fishical Education" exercise developed by teacher Dottie Wendt at Waipahu High School, Waipahu, Hawaii. Ms. Wendt had her students write stories about the origin of some local fish names. She also had them construct a "boxfish" out of found materials from home. You may want to use her idea as an extension of this investigation. A few of her prize "specimens" are shown here.



Featherfinned philatelist



Psychedelic grinner



False butterfish

Blackfinned cookiefish

REVIEW QUESTIONS

1. How do scientists use a dichotomous key?

R1. The key is used to classify and identify organisms based on pairs of characteristics.

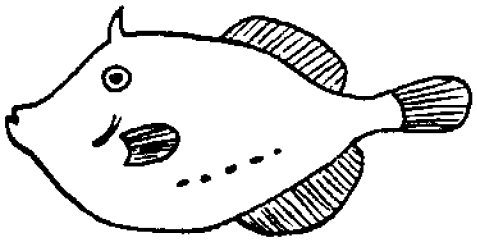
2. List three characteristics of fish in general.

R2. Fish have gills and fins and live in water. Most have scales.

3. List five ways in which the families of Lake Erie fish differ from each other.

R3. Mouth position, number of dorsal fins, fin shape, barbels, spines, body markings, head shapes, lateral line, and body shapes differ.

4. Identify this fish using the key provided here.



Key

1A. Rounded tail..... 2
B. Forked tail..... Reef Fish

2A. Mouth on top..... 3
B. Mouth on bottom..... Toadfish

3A. Wide vertical stripes..... Spadefish
B. No stripes..... 4

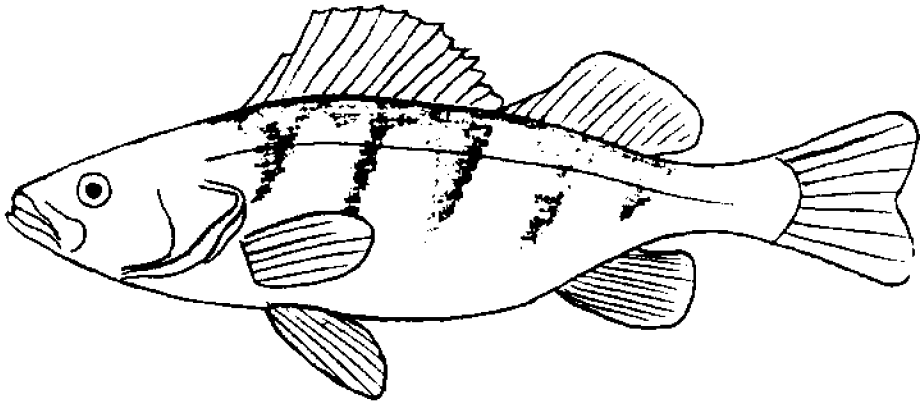
4A. Spine on head..... Filefish
B. No spine..... Tripletail

R4. Filefish

REFERENCES

Milton B. Trautman, Fishes of Ohio, 2nd Edition, 1980.

EVALUATION ITEMS



Characteristic		Next step or identification
1A.	Lateral line	2
B.	No lateral line	Sunfish
2A.	Dorsal fins joined	Sculpin
B.	Dorsal fins separate	3
3A.	Rounded tail	Burbot
B.	Notched tail	Yellow Perch

Questions 1-3 refer to the box above.

1. The material inside the box is called a

   a. category chart.
   b. fish test.
   *c. dichotomous key.
   d. crosslisting guide.

2. Using the information in the box, you can

   a. find out some characteristics of all the fish named.
   b. find out some characteristics of the fish pictured.
   c. identify the fish pictured.
   *d. do all of the above.

3. The name of the fish pictured in the box is

   *a. Yellow Perch.
   b. Burbot.
   c. Sculpin.
   d. Sunfish.

4. Dorsal fins are found on a fish's

   a. ventral side.
   b. sides.
   *c. back.
   d. underside.

5. A lateral line is a

   a. mark that shows where the gills are located.
   b. line in a fin that helps make the fin stiff.
   c. dark stripe running all the way around a fish.
   *d. sense organ along the side of some fish.

6. About how many families of fish live in Lake Erie?

   *a. 25-30
   b. 50
   c. Hundreds
   d. Thousands

7. A parasitic fish found in Lake Erie is the

   a. sculpin.
   b. livebearer.
   *c. lamprey.
   d. sucker.

8. An adipose fin is

   a. the thick flap that covers the gills.
   b. another name for the tail fin.
   *c. an extra fleshy fin on the back of some fish.
   d. the ventral fin nearest a fish's tail.

9. Barbels are sometimes found on a fish's

   a. back.
   b. sides.
   c. tail.
   *d. head.

10. Which family of Lake Erie fish does <u>not</u> provide food for humans?

   *a. Killifish.
   b. Herring.
   c. Trout/Salmon.
   d. Temperate Basses.

11. The common name of a fish may be based on

   a. a sound it makes.
   b. where it lives.
   c. what it looks like.
   *d. any of the above.

APPENDIX

The following are possible keys for groups of fish labelled I, II, IV and V. There are many possibilities not given here that are equally good. Please be aware of this and use these keys only as a guide.

Group I

1A.	sucker mouth	sucker
B.	no sucker mouth	2
2A.	head flat (or long snout)	3
B.	head not flat (or no long snout)	5
3A.	head flat like a duck's bill	pike
B.	head with long snout	4
4A.	mouth under long snout	paddlefish
B.	mouth in long snout	gar
5A.	saw belly	gizzard shad
B.	belly smooth	mooneye

Group II

1A.	tail notched	2
B.	tail round	sculpin
2A.	pectoral fin pointed	3
B.	pectoral fin round	yellow perch
3A.	anal fin long	silversides
B.	anal fin short	4
4A.	deep notch in dorsal fin	white bass
B.	dorsal fin continuous	sunfish

Group IV

1A.	adipose fin present	2
B.	adipose fin absent	3
2A.	rough scales	trout-perch
B.	smooth scales	smelt
3A.	tail round	4
B.	tail notched	minnow
4A.	separate sharp spines in first dorsal fin	stickleback
B.	no separate sharp spines in first dorsal fin	drum

Group V

1A.	snakelike body	2
B.	fish shaped body	3
2A.	sucker mouth	lamprey
B.	regular mouth	eel
3A.	adipose fin	catfish
B.	no adipose fin	4
4A.	round tail	burbot
B.	notched tail	carp

I.

A. Mooneye Family - Hiodontidae

These fish are silver or gold in color. They eat insects, insect larvae, and small minnows. They prefer to feed in swiftly moving water, but live in calm water. Mooneyes are not very good to eat.

B. Herring Family - Clupeidae

Herrings have a saw-toothed or jagged belly. They feed on plankton. Many larger fish such as walleyes often eat gizzard shad, one member of the herring family. Alewives, another member of this family, have been introduced to the Great Lakes. They have great population explosions followed by rapid die-off.

C. Pike Family - Esocidae

Pike live in lakes, ponds, and streams where the water is warm and full of weeds. They are very fierce and eat anything they can catch. Some pike grow to be 7 feet long and weigh as much as 35 pounds. Pike populations have declined because of destruction of spawning grounds.

D. Sucker Family - Catostomidae

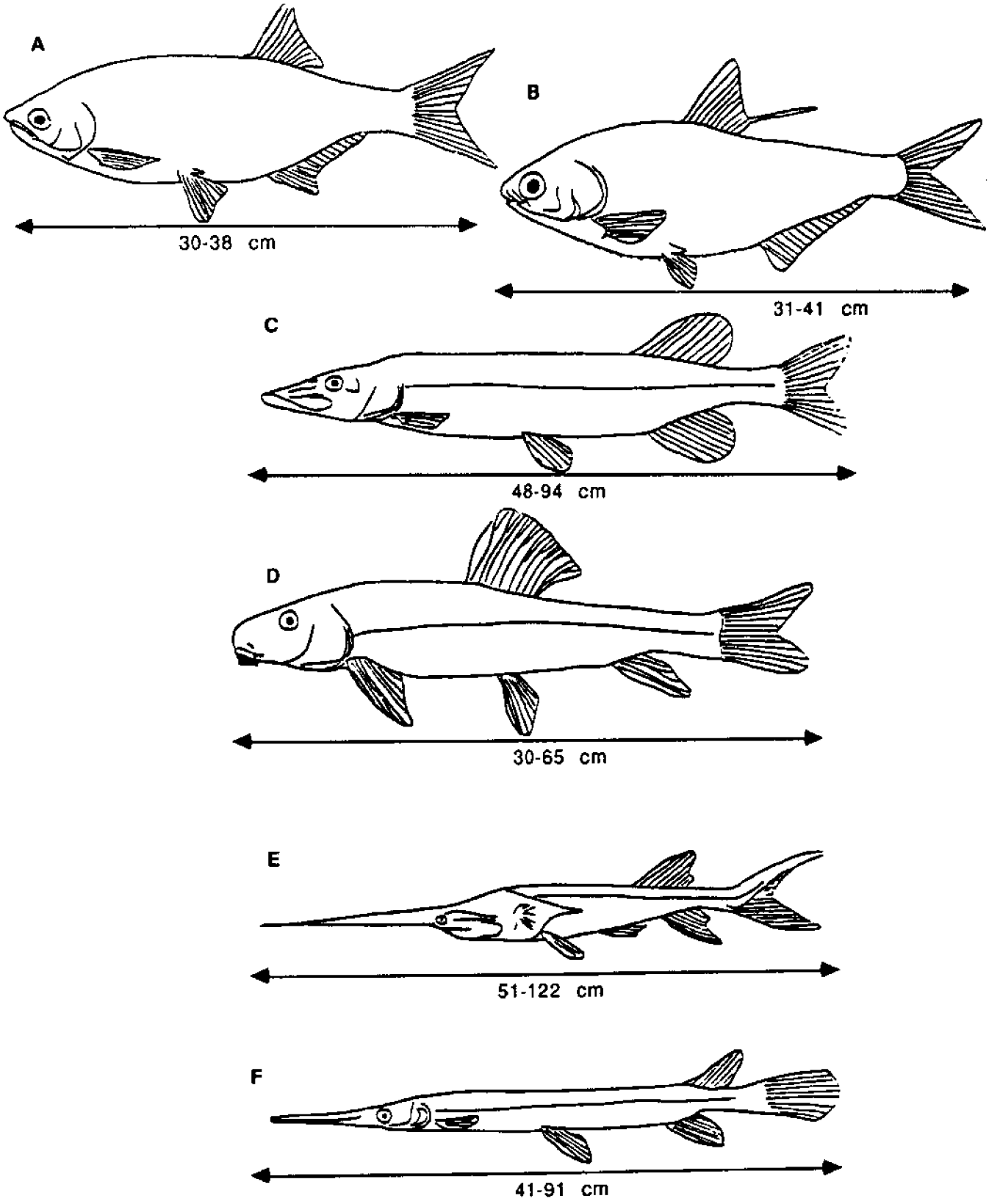
Suckers live on the bottom of lakes, ponds and streams. They have special mouths which help them to suck up small animals and plants. Some suckers, like the bigmouth buffalo, grow to be very large. Many fishermen like to catch these big fish, which are good to eat.

E. Paddlefish - Polydontidae

Paddlefish live in silty rivers and flood plain lakes. Some grow to be 6 feet long and weigh up to 150 pounds. They get their name from their paddle-shaped snouts. Paddlefish eat by swimming with their mouths open. Food washes into their mouths as they swim along. Fish that eat this way are called filter feeders. Paddlefish are rarely seen in Lake Erie, but are more often found in the Scioto and Ohio Rivers. They are endangered because dams along rivers prevent migration and spawning.

F. Gar Family - Lepisosteidae

These fish have bony plates covering their bodies. Gars have sharp, strong teeth and eat all kinds of fish, both living and dead. They are so hard to catch that fishermen have gar-rodeos and use wire snares instead of fishing poles to catch the fish. Gars prefer to live in the calm waters of bays rather than in the open lake.



A. Mooneye
B. Gizzard Shad
C. Pike
D. Sucker
E. Paddlefish
F. Gar

I

II.

A. Sculpin Family - Cottidae

Sculpins have large spiny heads. They have no scales. Sculpins live on the deep bottom, feeding on small fish.

B. Silverside Family - Atherinidae

Silversides get their name because of their very light color. They feed near the surface of the water and often skip in the air for short distances. The Silverside's numbers are decreasing.

C. Sunfish Family - Centrarchidae

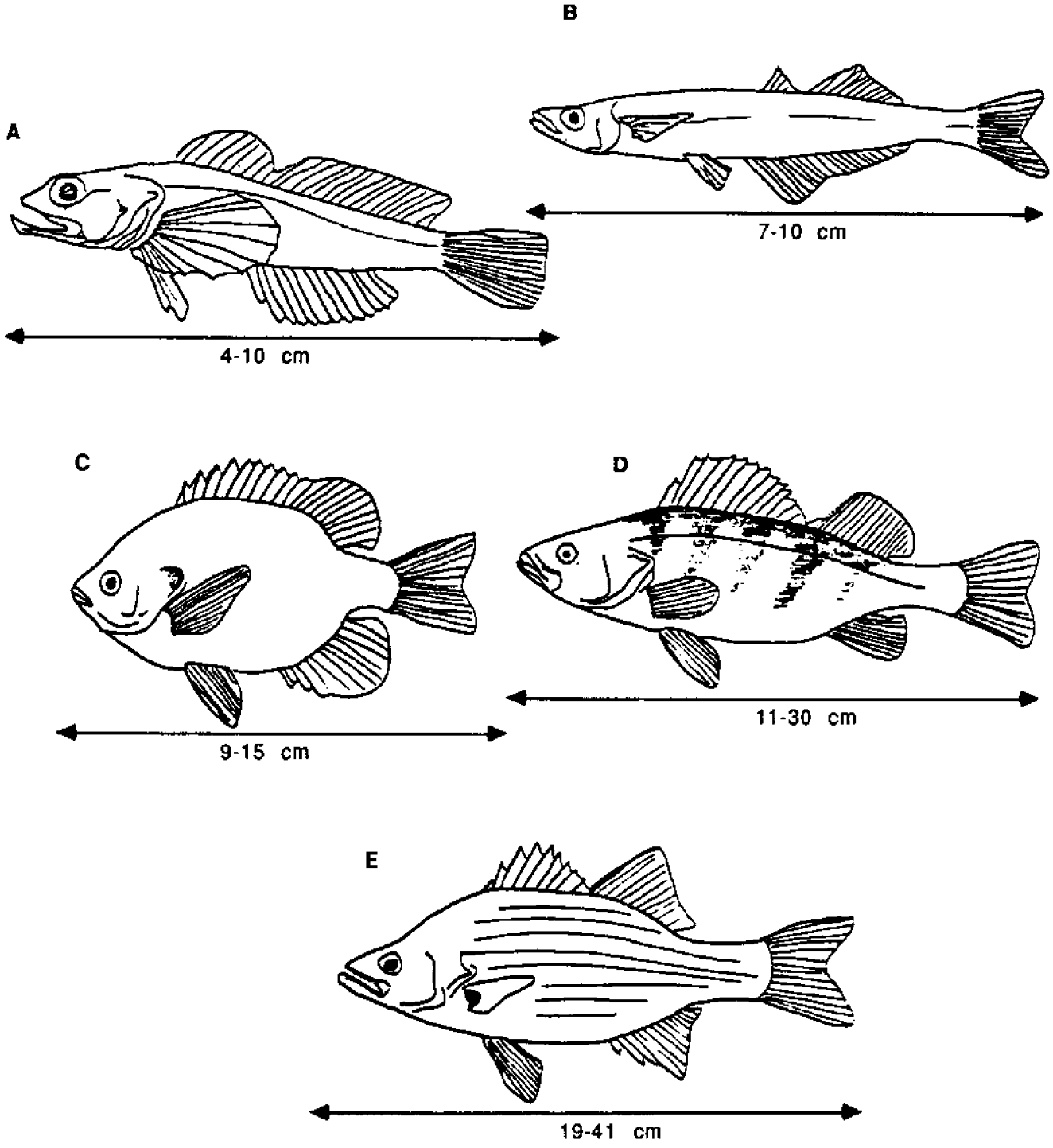
There are many types of fish in this family. Largemouth bass, smallmouth bass, and bluegills are all sunfish. They eat smaller fish, frogs, and other creatures such as crayfish. Sunfish are protected from commercial fishing.

D. Perch Family - Percidae

This group includes the walleye and the yellow perch, both of which are important in sport fishing. They are also important commercially. Walleye live in cold, clean water. Yellow perch are smaller than walleye and can live in warmer water.

E. Temperate Basses - Percichthyidae

The white bass and the white perch are the temperate basses found in Lake Erie. These fish live in quiet water over sand and gravel bottoms. Schools, or groups, of white bass are often seen just under the surface of the water. They feed on smaller fish, including their own young.



A. Sculpin
B. Silversides
C. Sunfish
D. Yellow Perch
E. White Bass

II

III.

A. Mudminnow Family - Umbridae

Mudminnows eat many kinds of food, both plants and animals living. Mudminnows will dive into the muddy bottom to escape from danger. Because other fish like to eat mudminnows, fishermen often use them as bait.

B. Killifish Family - Cyprinodontidae

Killifish have mouths that open along the upper front of their heads. This helps them feed at the surface of the water. Killifish live in clear, shallow water where there are many plants. Fishermen use killifish as live bait because many larger fish eat them.

C. Pirate Perch Family - Aphredoderidae

These are small fish, up to 4 inches long. They eat smaller fish and aquatic insects. They are rarely caught; in fact, there is no record of a pirate perch being caught between 1955-1980.

D. Bowfin Family - Amiidae

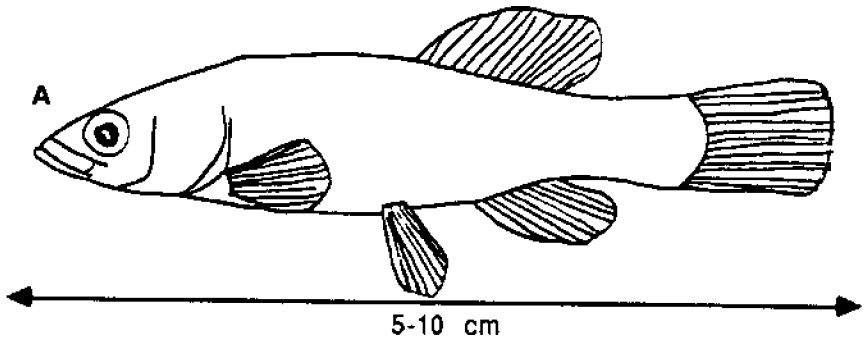
Bowfins get their name from the long fin that arches over their backs. They live in quiet water where there are many plants. Bowfins eat fish, frogs and crayfish.

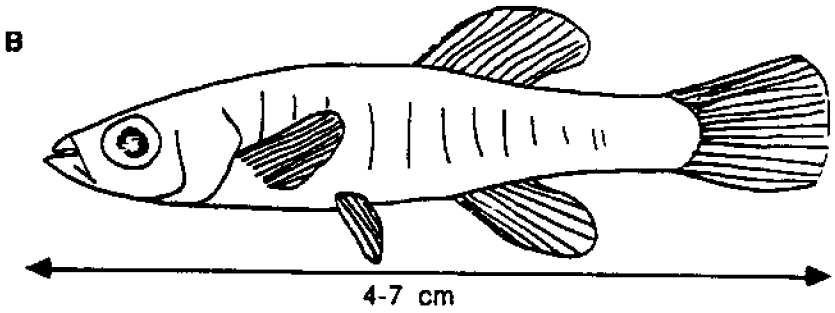
E. Livebearers Family - Poeciliidae

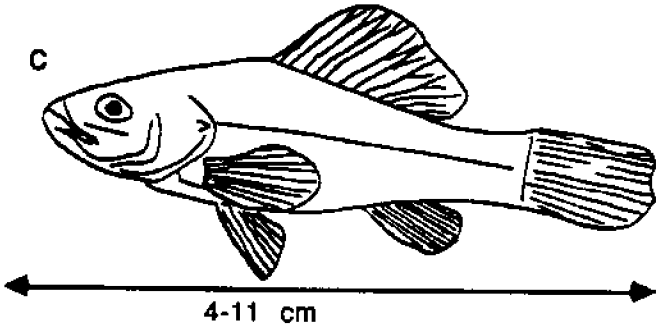
Livebearers do not lay eggs. The baby fish are born alive. The "mosquitofish" *Gambusia* feeds on the mosquito larvae which live near the surface of the water.

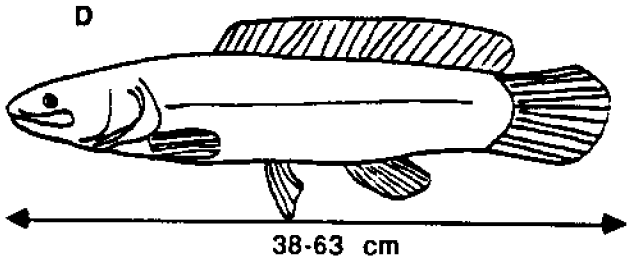
F. Trout and Salmon Family - Salmonidae

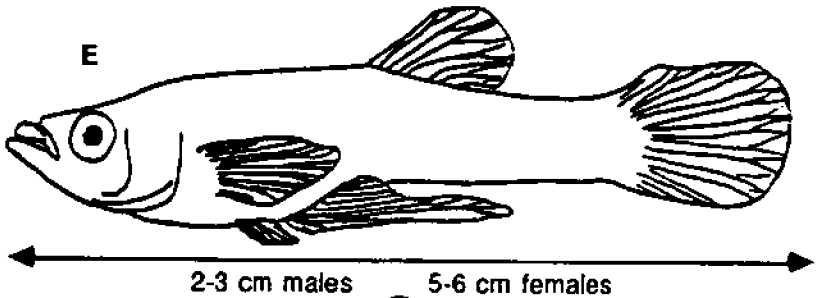
Salmon and trout belong to the same family. These fish have an extra fatty fin called the adipose fin. Fishermen like them because they are large and good to eat. Salmon do not live naturally in Lake Erie. The Department of Natural Resources stocks the lake with salmon for the fishermen to catch.

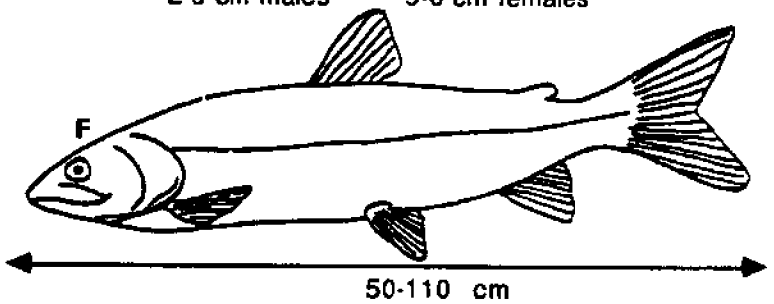












A. Mudminnow
B. Killifish
C. Pirate Perch
D. Bowfin
E. Livebearer
F. Salmon

IV.

A. Troutperch Family - Percopsidae

Troutperch have rough scales. They have an adipose fin like the trout and spiny fins like the perch. Many other fish eat the troutperch.

B. Smelt Family - Omeridae

Smelt are small fish with smooth scales. They may grow to be 9 inches long. Smelt have an adipose fin. They also have teeth on their tongues. They eat smaller fish and other creatures such as crayfish.

C. Minnow Family - Cyprinidae

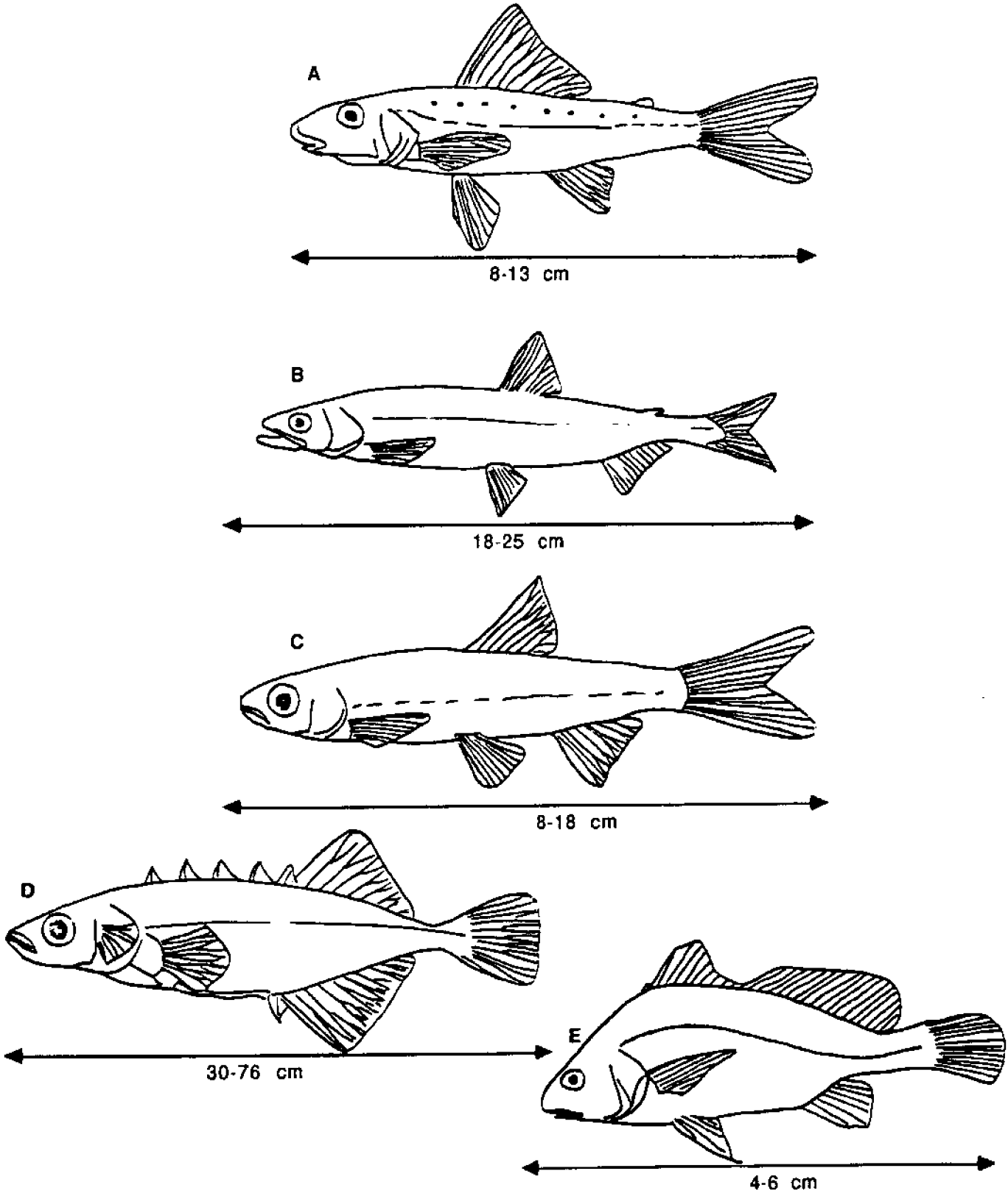
Minnows are important as food for many larger fish. They are also widely used for bait. This family also includes the carp and goldfish. Minnows live in warm, organically rich waters.

D. Stickleback Family - Gasterosteidae

Sticklebacks get their name from the stiff spines on their backs. They live in the cold, quiet waters of streams and bogs.

E. Drum Family - Scianenidae

These fish gets their name from the drumming sound they make. They have a lateral line that extends all the way across their tail fins. Some fishermen call this fish the "sheepshead." Other common names include silver bass, gray bass, and reef bass. They eat crayfish, aquatic insects and small fish.



A. Troutperch
B. Smelt
C. Minnow
D. Stickleback
E. Drum

IV

V.

A. Cod Family - Gadidae

Cod have one long feeler, or barbel, under their chins. The Great Lakes representative of the cod family is the burbot. It is not commercially valuable like its marine cousins.

B. Catfish Family - Ictaluridae

Catfish eat both plants and animals. They have feelers (barbels) near their mouths to help them find food. They have no scales. Bullheads are small catfish. They live in muddy ponds and streams. They can survive even when ponds dry up. The male bullhead watches the nest and guards the young. The flathead catfish can weigh up to 100 pounds. Fishermen like catfish because most of them are good to eat.

C. Minnow Family - Cyprinidae

Minnows are important as food for many larger fish. They are also widely used for bait. This family also includes the carp and goldfish. Minnows live in warm, organically rich waters.

D. Sturgeon Family - Acipenseridae

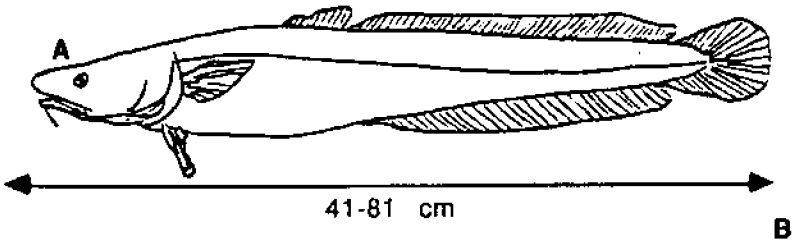
These fish have bony plates covering their bodies. Sturgeons have special mouths for sucking up food from the bottom of the water. Feelers on their mouths help them to find food. People like to eat caviar made from sturgeon eggs. Sturgeons do not spawn until they reach 20 years of age. Their numbers have decreased sharply since 1916 due to loss of spawning grounds.

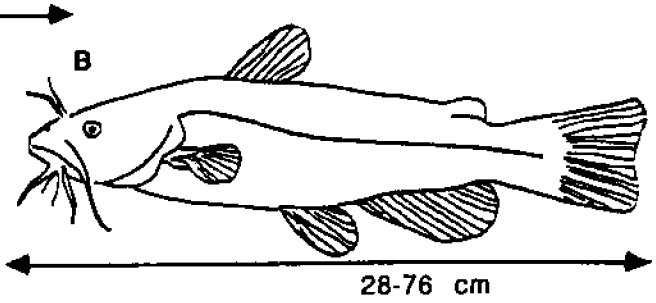
E. Eel Family - Anguillidae

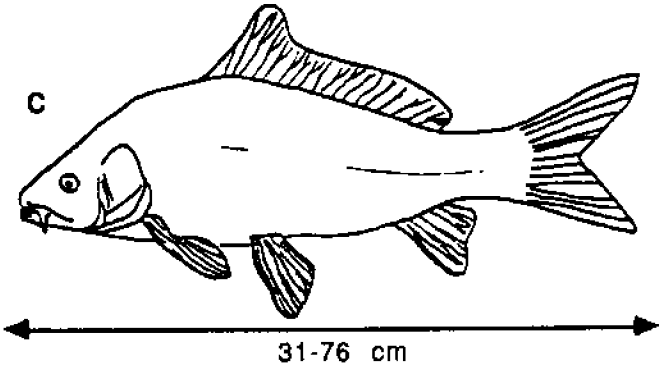
Eels eat both plants and animals. They have true jaws. They are long and thin like snakes and have no scales. Eels feed at night and hunt by sense of smell. They can survive in polluted water.

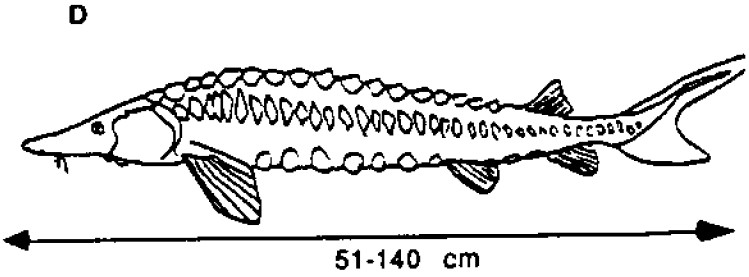
F. Lamprey Family - Petromyzontidae

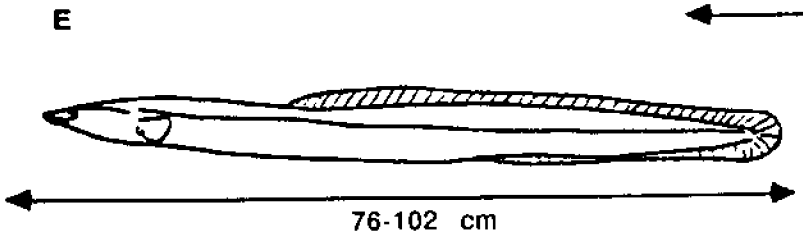
Young lampreys live in the mud on the bottom of streams. It takes up to 7 years for the young lampreys to grow up. Lampreys have sucking mouths and sharp teeth. Some adult lampreys are parasites. They use their sucking mouths to attach themselves to other fish and suck their blood. Lampreys have no jaws.

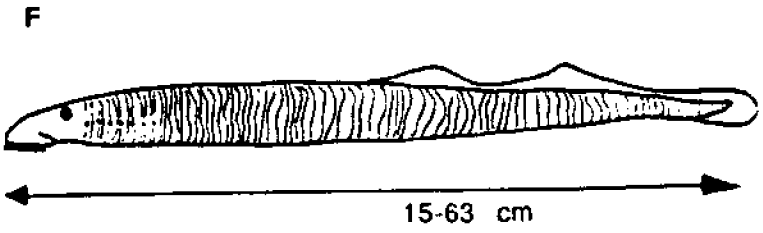












A. Burbot
B. Catfish
C. Carp
D. Sturgeon
E. Eel
F. Lamprey

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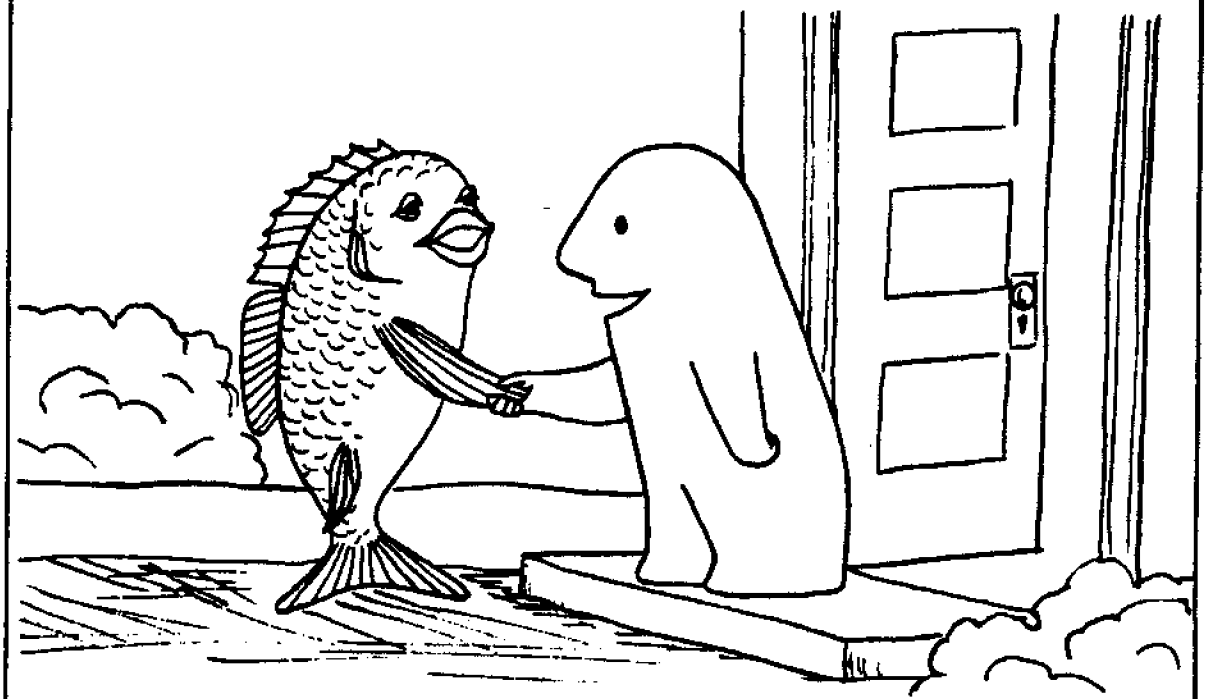
EP-19

Ohio Sea Grant

Getting to Know Your Local Fish

by
Suzanne M. Hartley, Center for Lake Erie Area Research
and
Rosanne Fortner, The Ohio State University



OEAGLS-Oceanic Education Activities for Great Lakes Schools

OEAGLS Investigation #19

Completed August 1980
Revised June 1982 and May 1987

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GETTING TO KNOW YOUR LOCAL FISH

by

Suzanne M. Hartley and Rosanne Fortner

INTRODUCTION

Lake Erie has a larger variety of fish life than any of the other Great Lakes. Scientists believe this is because of the southern position of the lake and because it is shallow. Lake Erie has 138 species of fish. These species can be grouped into 27 families. All of the fish in a given family share certain characteristics. In this exercise you will learn how to use these characteristics to identify the 27 families.

OBJECTIVES: When you have completed these activities, you should be able to:

1. Develop and use a dichotomous key.
2. List some characteristics of fish in general.
3. List some ways in which the 27 families of Lake Erie fish are different from each other.

ACTIVITY A: HOW DOES A DICHOTOMOUS KEY WORK?

This activity will introduce you to a **dichotomous** (die-caht'-uh-mus) **key**. A dichotomous key is a key in which things are divided into two groups each time a characteristic is considered. The prefix "di" means two, and the whole word "dichotomous" refers to something with two parts or branches. Scientists use "keys" to identify things and put them into groups on the basis of how they are alike.

MATERIALS: Paper clip, pen, pencil, two different coins, rubber band.

PROCEDURE

Look at the example of a dichotomous key shown on page 2. At the top are pictures of four items to be classified. The maker of the key looked at the items and decided that they were different in a number of ways. These differences are listed as pairs of characteristics on the left side of the key. The right side of the key identifies the item or tells you what step to go to next if an item has a certain characteristic.

Let's classify the second item as an example. Look at Step 1 of the key and decide if the pictured item is a living or nonliving thing. Since the picture shows a living thing, read across line 1A to the right hand column to find the next step or the identification. You are told to go to Step 2.

In Step 2, from what you know about the thing you are classifying, decide if the thing has a brain or not. Since it does, read across line 2A, which tells you to go to Step 3.

In Step 3, you must decide if the thing has fur or not. Since it does, reading across line 3A brings you to the identification, cat.

Key

Characteristic	Next step or identification
1A. Living	2
B. Nonliving	Block
2A. Has a brain	3
B. No brain	Plant
3A. Body covered with fur	Cat
B. No fur	Duck

Now try making a dichotomous key yourself using the six items listed in the MATERIALS section. Look at the items and decide how they are different and alike. Statement one is given as an idea to get started. Fill in other pairs of characteristics for other statements until you have identified all six items.

Characteristic	Next step or identification
1A. Will make a mark on paper	2
B. Will <u>not</u> make a mark on paper	3
2A.	
B.	

ACTIVITY B: WHAT ARE THE CHARACTERISTICS OF SOME LAKE ERIE FISH?

Now that you know how to construct a dichotomous key, let's try making one that classifies real organisms, the fish in Lake Erie. For this activity you will work in groups of 4 or 5. Your group will construct a key to identify some fish families and learn something about them.

MATERIALS: Fish pictures and information about fish families.

PROCEDURES

Regardless of whether they live in an ocean, lake or stream, all fish are alike in some ways. A typical bony fish has scales embedded in its skin. These scales have concentric growth rings. The rings can be counted to determine the age of the fish.

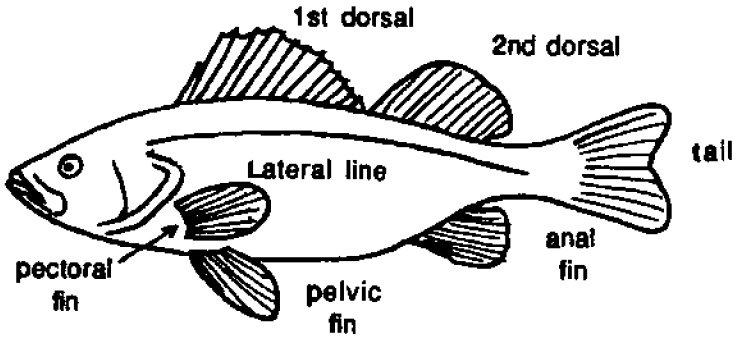
A few fish do not have any scales.

Fish also have gills. The fish's mouth and cheeks act as a pump to push water over the gills. As water passes over the gills, oxygen dissolved in the water is exchanged for carbon dioxide from the fish's blood.

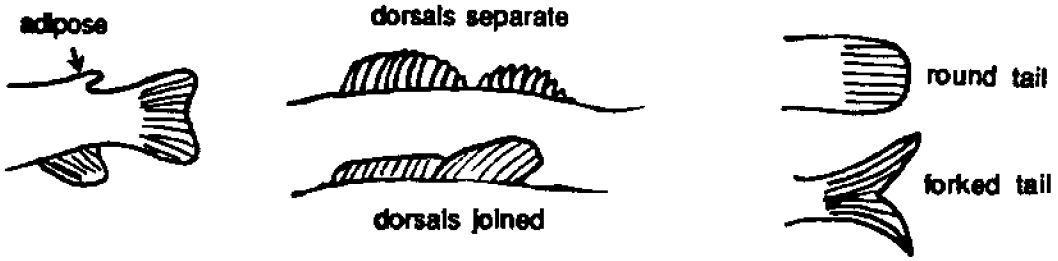
Fish differ from each other in several characteristics. Study the following diagrams so you can recognize differences when you get some fish pictures from your teacher. Refer to the GLOSSARY on page 5 to find definitions of terms you do not understand from the pictures.

Fish Characteristics

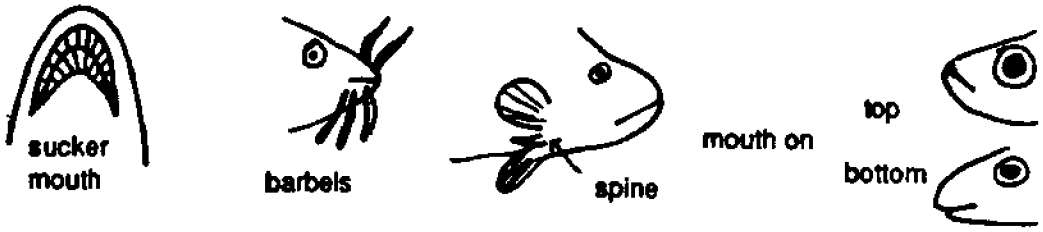
Where the fins are:



Fin types:



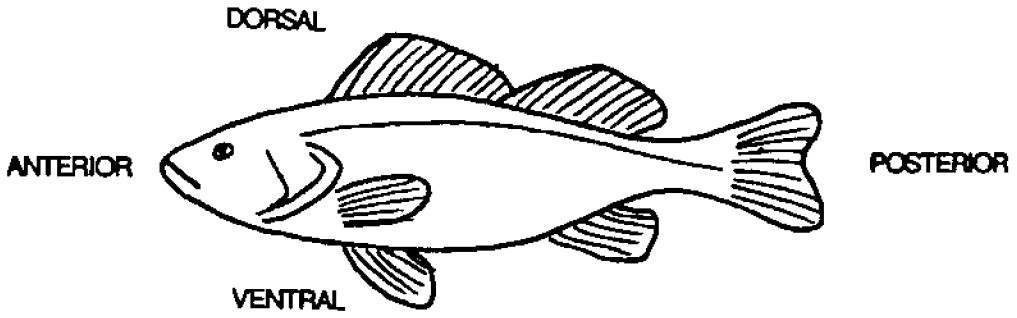
Head features:



Also look for differences in:

Body shapes (wide, narrow; slender, fat)
Lateral line (present or absent)
Spines (present or absent, and location)
Spots or stripes
Head shapes
Fin shapes

Glossary



Adipose Fin - fleshy fin behind the dorsal fin.

Anterior - front.

Barbels (pronounced bar-bulls) - whiskers that help the fish detect food.

Carnivore - flesh eating animal.

Commercial Fish - fish caught for commercial trade.

Concentric - having a center in common. Example: growth rings on a tree. 

Dorsal - pertaining to the back or top.

Filter Feeder - filters microscopic plants and animals from the water for food.

Forage Fish - fish used as food by larger fish.

Lateral Line - A sensory organ with a row of pores running along each side of the head and body of most fish. It looks like a dotted line.

Omnivore - an animal that eats any sort of food, plant or animal.

Parasite - an organism living in or on another organism (its host) from which it obtains food.

Posterior - rear.

Scales - flexible overlapping plates that cover the bodies of some fish. Scales help to protect the fish.

Sport fish - fish that are caught by individuals for recreation.

Ventral - pertaining to the underside or belly.

1. Look at the fish pictures with your group. List the names of the fish you are working with on your answer sheet.

2. How are your fish different from each other? List four general ways (head shape, spines, etc.).

3. Cut your picture sheet into sections so that each piece contains only one fish. With your team, decide how to divide the fish into two groups based on one characteristic. Put the fish pictures into two piles according to that characteristic, which will be Statement 1 of your key. On your answer sheet, fill in 1A and B, with the next steps or identification on the right side.

4. Next, take the fish in one pile and discuss how they differ from each other. Fill in Statement 2A and B.

5. Continue dividing your fish in this way until each group has only one fish in it. When you reach this point, the right hand column should be filled in with the fish's name.

6. Check your finished key when all your fish have been classified. You should be able to pick up any fish picture and follow the key to find the name of the fish.

7. Exchange keys and fish pictures with another group. Do not give the list of fish names from the original sheet to the other team. See if they can identify the fish using only your descriptions in your key.

8. Get your original fish pictures and key back when the other team is finished. Read the Fish Family Descriptions your teacher has given you. Tell the class how you grouped your fish and a little about each fish.

9. From the group reports, answer these questions.

   A. What fish is covered with bony plates?

   B. How do lampreys damage other fish?

   C. How does a filter-feeding fish eat?

   D. Describe a major characteristic of a bowfin.

   E. List 5 Lake Erie fish that are valuable as food for humans.

   F. How did the sucker family get its name?

   G. Name two Lake Erie fish that have no scales.

   H. How did the freshwater drum get its name?

   I. Name two kinds of Lake Erie fish that are used as bait for fishing.

10. If time permits, work with the entire class to develop a key that will classify all 27 families of Lake Erie fish.

ACTIVITY C: HOW DO FISH GET THEIR NAMES?

You have discovered that some fish in Lake Erie are named for the way they look (stickleback, bowfin, and others). For others, it is difficult to determine how they got their common names. In this activity, you will make up stories and draw pictures about how a fish might have gotten its name.

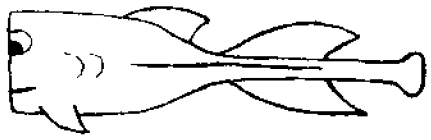
MATERIALS: Paper and pencil.

PROCEDURE

You have seen pictures of how the fish in Lake Erie really look. But suppose you had never seen a fish and only knew its common name. You might guess that the fish's name had something to do with how it looks, how it behaves, or maybe where it lives.

1. Listed here are some common names of Lake Erie fish and ocean animals. Choose one name from either list. What animal did you choose?

2. On your own paper, draw a funny picture about how that animal might look, based on its name. If you chose a fish, your drawing needs to have some basic fish characteristics: pair of eyes, tailfin, mouth and some normal fin arrangement.



paddlefish

3. Write a short story (one or two paragraphs) about how the animal you chose got its name.

Lake Erie Fish

1. Freshwater drum
2. Madtom
3. Catfish
4. Mudminnow
5. Walleye
6. Pirate-perch
7. Sunfish
8. Paddlefish
9. Mooneye
10. Bigmouth buffalo
11. Silverside
12. Bullhead
13. Mosquitofish

Ocean Animals

1. Hammerhead shark
2. Hatchetfish
3. Swordfish
4. Dogfish
5. Starfish
6. Pipefish
7. Jellyfish
8. Parrotfish
9. Queen triggerfish
10. Porcupinefish
11. Sea robin
12. Toadfish
13. Clownfish

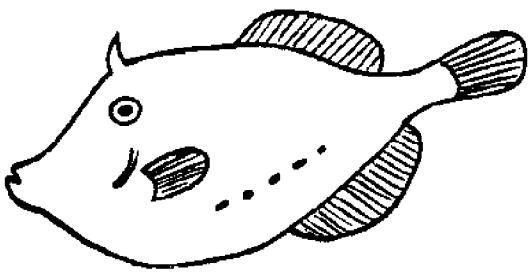
REVIEW QUESTIONS

1. How do scientists use a dichotomous key?

2. List three characteristics of fish in general.

3. List five ways in which the families of Lake Erie fish differ from each other.

4. Identify this fish using the key provided here.



Key

1A. Rounded tail..... 2
B. Forked tail..... Reef Fish

2A. Mouth on top..... 3
B. Mouth on bottom..... Toadfish

3A. Wide vertical stripes..... Spadefish
B. No stripes..... 4

4A. Spine on head..... Filefish
B. No spine..... Tripletail

Name _____

Getting to Know Your Local Fish Worksheet

Characteristic		Next step or identification
1A.	_____	_____
B.	_____	_____
2A.	_____	_____
B.	_____	_____
3A.	_____	_____
B.	_____	_____
4A.	_____	_____
B.	_____	_____
5A.	_____	_____
B.	_____	_____

ACTIVITY B

1. List the names of the fish you are working with.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

2. List four general ways your fish are different from each other.

   a. _____

   b. _____

   c. _____

   d. _____

Key to Lake Erie Fish

Characteristic		Next step or identification
1A.	_____	_____
B.	_____	_____
2A.	_____	_____
B.	_____	_____
3A.	_____	_____
B.	_____	_____
4A.	_____	_____
B.	_____	_____
5A.	_____	_____
B.	_____	_____

9. From the group reports, answer these questions.

A. What fish is covered with bony plates? _____

B. How do lampreys damage other fish? _____

C. How does a filter-feeding fish eat? _____

_____

D. Describe a major characteristic of a bowfin. _____

E. List 5 Lake Erie fish that are valuable as food for humans. _____ _____

_____ _____ _____

F. How did the sucker family get its name? _____

G. Name two Lake Erie fish that have no scales. _____ _____

H. How did the freshwater drum get its name? _____

I. Name two kinds of Lake Erie fish that are used as bait for fishing. _____ _____

ACTIVITY C (Work on your own paper.)

REVIEW QUESTIONS

1. How do scientists use a dichotomous key? _____

_____

2. List three characteristics of fish in general. _____

_____

3. List six ways in which the families of Lake Erie fish differ from each other . _____

_____

4. Fish's name _____

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