Young Naturalists

Teachers Guide

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"Fish Sense" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "Fish Sense," by Linda Braun and C.B. Bylander. Published in the May–June 1996 *Volunteer*, or visit www.mndnr.gov/young_naturalists/fishsense

Young Naturalists teachers guides are provided free of charge to classroom teachers, parents, and students. This guide contains a brief summary of the article, suggested independent reading levels, word count, materials list, estimates of preparation and instructional time, academic standards applications, preview strategies and study questions overview, adaptations for special needs students, assessment options, extension activities, Web resources (including related Conservation Volunteer *articles), copy-ready study questions with answer key, and a copy-ready vocabulary sheet and vocabulary study cards. There is also a practice quiz (with answer key) in Minnesota Comprehensive Assessments format. Materials may be reproduced and/or modified to suit user needs. Users are encouraged to provide feedback through an online survey at www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html.*

Summary

"Fish Sense" presents examples of how fish use their five senses to survive. Understanding how fish see, hear, taste, smell, and feel increases the enjoyment of sport fishing.

Suggested reading levels:	Third through eighth grades
Total words:	1,397
Materials:	Pens, pencils, colored pencils, crayons or colored chalk, drawing paper, large pieces of paper, scissors, and glue
Preparation time:	About one hour

Estimated instructional time:

Two to three 50-minute class periods for study guide and one or two extension activities. Extension activities may be assigned as homework.

Minnesota Academic Standards applications:

"Fish Sense" may be applied to the following Minnesota Department of Education standards:

Language Arts

I.Reading and Literature
- A.Word Recognition, Analysis and Fluency
- B. Vocabulary Expansion
- C. Comprehension

II. Writing
- A. Types of Writing
- B. Elements of Composition
- C. Spelling
- D. Research
- E. Handwriting and Word Processing

III. Speaking, Listening and Viewing
- A. Speaking and Listening
- B. Media Literacy

Science

Grade 4
IV. Life Science
B. Diversity of Organisms
F. Flow of Matter and Energy

Grade 7
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
F. Flow of Matter and Energy

Arts

All grades
Artistic Expression
D. Visual Arts

Complete Academic Standards are available at www education.state.mn.us. Teachers who find other connections to academic standards are encouraged to contact *Minnesota Conservation Volunteer.*

Preview

Ask your students to share their observations of fish in natural environments or in aquariums. Do fish differ from mammals and birds in how they use their senses? If so, in what ways? Does living in water have an effect on sensation? Or, compare the human senses of touch, hearing, taste, sight, and smell to that of fish. How are they alike and different? How does a fish use its senses to survive? Use the **KWL** strategy (Ogle, 1986) to find out what your students already know (K) about fish and fishing, what (W) they would like to learn, and eventually, what they learned (L) while reading the article and related materials, and through participating in extension activities. You might begin by asking small groups to brainstorm their ideas. Then combine the groups' data to make a class list. Display your K and W ideas on poster board or paper (see Vocabulary preview). Add to your L list as you read and discuss the article. See www.teach-nology.com/web_tools/graphic_org/kwl for a KWL generator that will produce individual organizers for your students. Individual organizers may be useful as students read the article for answers to W questions. KWL also gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. For example, if you plan to use the article during science or art, you may ask students to review their KWL for concepts that are specific to those disciplines.

Vocabulary preview

See the copy-ready vocabulary list included in this guide. You may wish to modify the list based on your knowledge of your students' needs. Pretesting vocabulary individually, in small groups or with your entire class can be an effective vocabulary preview strategy. You may then post-test at the conclusion of this activity (see Assessment section below).

Connections to vocabulary in the article may also be made during KWL. If students are not familiar with some of the terms, include them in the **W** list. Other terms may be added to the **W** list as students read the article. Eventually they can be moved to the **L** list. You may write vocabulary from the article in green ink, while other ideas are written in black. Notes: Some of the words in the vocabulary list definitions may require further explanation. Also, preview the study questions for unfamiliar terms.

You may wish to use the study cards found at the end of this guide. Cut along the horizontal line, fold in the middle, and tape or staple. Study cards (see *Strategic Tutoring*, Hock, Deshler and Schumaker, 2000) can be applied to any subject area. On one side of the card, in large letters, write a key word or phrase that students are expected to know. In smaller letters frame the word or phrase in a question or statement. On the other side of the card, in large letters, write the answer to the question. Finally, in smaller letters, frame the answer in a question or statement. Blanks are provided to allow you or your students to add new words or phrases.

Study questions overview

Study questions parallel the story (the answer to the first question appears first in the article, followed by the second, and so on). Preview the entire guide with your class before you read the article. You may wish to read the story aloud and complete the study questions in class, in small groups, or as an independent activity. The questions may be assigned as homework, depending on the reading ability of your students. Inclusion teachers may provide more direct support to special needs students (see Adaptations section). The study questions may be also used as a quiz. Note: items 1, 6, 7 and 9–15 require varying degrees of critical/analytical thinking.

Adaptations

Read aloud to special needs students. Abbreviate the study guide or highlight priority items to be completed first. For example, highlight questions 1, 6, 8, 11, and 12. These questions concern a fish's five senses. Special needs students may try these first, and then, if time allows, try the others. Peer helpers, teaching assistants, or adult volunteers may lend a hand with the study guide. Study guide and/or extension activities may also be done in small groups.

Assessment

You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Students may write a paragraph summarizing the general content of the article or a specific aspect, such as comparing and contrasting a fish's sense organs with human organs. (2) Students may be asked to write their own quizzes, and exchange them with classmates. (3) Brief oral presentations on either the general content or a specific aspect of the article may be assigned.

Extension activities

1. Draw one of the species of fish mentioned in this article.
2. With a group of classmates, draw several species of Minnesota game fish. Now cut out your fish and set up an aquarium on a large piece of paper. Include plants and prey animals, such as minnows and tadpoles.
3. Design a new fishing lure. What senses does your lure appeal to? What will you call your lure, and how much will you charge for it?
4. If your classroom has an aquarium, set up an experiment to test how fish react to light. Provide a shady spot (behind a rock, plants, or other structure, such as a castle or sunken

Extension activities continued

ship). Turn off some of the lights in the classroom, wait a few minutes and then shine a bright light on the tank. Where do the fish go? Why?

5. Go to the Department of Natural Resources home page: www.mndnr.gov. Type "Lake Finder" into the search engine. Type in the name of your favorite lake. You will be surprised by what you can learn about your lake and the fish in it. Present a report to your class about your lake. Give some tips about good spots to catch fish and the species of fish you might catch.

Web resources

Minnesota fishing
www.mndnr.gov/fishing/index.html

DNR Nature Snapshots
www.mndnr.gov/snapshots/index.html

Fishes of Minnesota Quiz
www.cloudnet.com/~edrbsass/mnfish.htm

Fish of the Great Lakes Kid's Page
www.seagrant.wisc.edu/greatlakesfish/kids.html

Natural History of Minnesota Fishes
www.gen.umn.edu/faculty_staff/hatch/fishes/natural_history.html

Teacher resources
www.mndnr.gov/education/teachers/index.html

Related articles

Many related *Minnesota Conservation Volunteer* articles are available online at www.mndnr.gov/volunteer/articles/index.html, including:

July–August 2006
"Fishing for Words"
www.mndnr.gov/volunteer/julaug06/fishing.html

November–December 2005
"Fishing for a Living"
www.mndnr.gov/volunteer/novdec04/fishing.html

March–April 2004
"Fishing with Small Fry"
www.mndnr.gov/volunteer/marapr04/fishing.html

January–February 2003"
"Fishing the Ice"
www.mndnr.gov/volunteer/janfeb03/icefishing.html

May–June 2000
"Fish with a Fly" (Young Naturalists article)
www.mndnr.gov/young_naturalists/fly_fishing/index.html

January–February 2000
"Fishing by Dog"
www.mndnr.gov/volunteer/janfeb00/fishing_by_dog.html

May–June 1994
"One Fish, Two Fish, Three Fish, Go Fish!" (Young Naturalists article)
www.mndnr.gov/young_naturalists/fishing/fishing.html

Study Questions

Teachers guide for the Young Naturalists article "Fish Sense," by Linda Braun and C.B. Bylander. Published in the May–June 1996 *Volunteer*, or visit www.mndnr.gov/young_naturalists/fishsense

Name_____Period_____Date_____

1. How do fish use their five senses to survive?_____

_____

2. Where do walleye have taste buds?_____

_____

3. When a walleye "bumps" bait, what is happening?_____

_____

4. What species of fish has taste buds from its head to its tail?_____

5. Where are barbels found, and what is their purpose?_____

_____

6. Why are the senses of taste and smell more important to salmon than to other species of fish?_____

_____

7. Why should you never use hand lotion or perfume when you are fishing?_____

_____

8. How far can fish see?_____

9. In what direction can fish not see? Why not?_____

_____

10. Why do fish move to deeper water on sunny days?_____

_____

Study Questions

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11. You should be quiet when fishing. Why?_____

_____

12. Where is the lateral line?_____ How do fish use it?_____

_____

13. Which of your senses is similar to the lateral line? _____

_____

14. List three sensible fishing tips:

a. _____

b. _____

c. _____

15. Describe the MinnAqua program. _____

_____

_____

Challenge: Use the back of this sheet or attach a sheet to draw and color a picture of a Minnesota fish.

Study Questions Answer Key

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1. How do fish use their five senses to survive? **Fish use their senses to find their way around, to find something to eat, and to escape being eaten.**

2. Where do walleye have taste buds? **A walleye has taste buds on its tongue, lips, and face.**

3. When a walleye "bumps" bait, what is happening? **It is tasting it.**

4. What species of fish has taste buds from its head to its tail? **Catfish**

5. Where are barbels found, and what is their purpose? **Barbels are found on the lips of catfish, carp, and other whiskered fish. They drag the bottom to find food.**

6. Why are the senses of taste and smell more important to salmon than to other species of fish? **Salmon use taste and smell to locate the mouth of the river where they were born so they can travel up the river to spawn.**

7. Why should you never use hand lotion or perfume when you are fishing? **The smell will scare fish away from your bait.**

8. How far can fish see? **Fish can see only about 15 feet.**

9. In what direction can fish not see? Why not? **Fish cannot see behind them. Their eyes are on the sides of their heads. Each eye acts independently.**

10. Why do fish move to deeper water on sunny days? **The pupils of a fish's eyes do not contract, so they move to deeper (darker) water to avoid bright light.**

11. You should be quiet when fishing. Why? **Fish will know you are near if you make noise.**

12. Where is the lateral line? **The lateral line runs down a fish's side.** How do fish use it? **They use it to detect movement of objects in the water. It helps them find prey and avoid predators.**

13. Which of your senses is similar to the lateral line? **Your sense of touch is similar to a fish's lateral line.**

14. List three sensible fishing tips. **Answers will vary.**

15. Describe the MinnAqua program. **MinnAqua is an education program that teaches people about fishing.**

Challenge: Draw and color a picture of a Minnesota fish. **Answers will vary.**

Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article "Fish Sense," by Linda Braun and C.B. Bylander. Published in the May–June 1996 *Volunteer*, or visit www.mndnr.gov/young_naturalists/fishsense

Name _____Period _____Date_____

1. Compare fish taste buds and human taste buds. How are they alike and how are they different?
Alike:_____ Different:_____

2. How does a catfish taste its food?
   a. With its lateral line
   b. with its lips
   c. with its barbels
   d. b and c

3. How are a fish's pupils different from yours?
   a. They are a different color.
   b. They cannot expand or contract
   c. They are smaller.
   d. They are larger.

4. Why are underwater humps called "magnets?"
   a. They cause your compass to point north.
   b. They attract fishing boats.
   c. They attract game fish.
   d. They attract game wardens.

5. Why do you think the walleye is the Minnesota state fish? _____
_____

Minnesota Comprehensive Assessments Answer Key

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1. Compare fish taste buds and human taste buds. How are they alike and how are they different? Alike: **Located on tongue** Different: **Located on lips and face (and body)**
2. How does a catfish taste its food? **d. b and c**
3. How are a fish's pupils different from yours? **b. They cannot expand or contract**
4. Why are underwater humps called "magnets?" **c. They attract game fish.**
5. Why do you think the walleye is the Minnesota state fish? **Answers will vary.**

Vocabulary

Teachers guide for the Young Naturalists article "Fish Sense," by Linda Braun and C.B. Bylander. Published in the May–June 1996 *Volunteer*, or visit www.mndnr.gov/young_naturalists/fishsense

binocular seeing with both eyes

fertilize unite sperm with egg, causing a new fish to grow

finicky picky, fussy

lateral on the side

monocular one-eyed vision

pupils openings in the eyeballs through which light enters

stink bait fermented dough balls containing cheese and/or meat

transmitted sent

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

What is **binocular** vision?	FOLD HERE	**Seeing with both eyes** is called
To **fertilize** an egg is to	FOLD HERE	To **unite the egg with a sperm** is to
What does **finicky** mean?	FOLD HERE	Another word for **picky or fussy** is

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

The word **lateral** refers to	FOLD HERE	A word that refers to **the side** is
What is **monocular** vision?	FOLD HERE	**Seeing with one eye** is called
In vision, the **pupils** are	FOLD HERE	**Openings in the eyeballs through which light enters** are called

Vocabulary Study Cards

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Cut along the horizontal lines, fold on the dashed vertical line and tape or staple. Blanks are provided to allow you or your students to add new words or phrases.

What is **stink bait?**	FOLD HERE	**Fermented dough balls containing cheese and/or meat** is called
When a message is **transmitted** it is	FOLD HERE	When a message is **sent** it has been
	FOLD HERE	