

# Teachers Guide

Prepared by **“Hundreds and Thousands and Millions of Fish”**  
 Jack Judkins, **Multidisciplinary Classroom Activities**

Curriculum Teachers guide for the Young Naturalists article “Hundreds and Thousands and Millions of Fish” by Roland Sigurdson. Published in the July–August 2013 *Minnesota Conservation Volunteer*, or visit [www.mndnr.gov/young\\_naturalists/fisheries](http://www.mndnr.gov/young_naturalists/fisheries).  
 Connections  
 Minnesota

*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 Minnesota 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](http://www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html).*

**\*All Minnesota Conservation Volunteer articles published since 1940 are now online in searchable PDF format. Visit [www.mndnr.gov/magazine](http://www.mndnr.gov/magazine) and click on past issues.**

## Summary

“Hundreds and Thousands and Millions of Fish” describes how DNR fisheries biologists monitor game fish populations in Minnesota lakes and streams. Readers learn about several fish collection methods, including electrofishing, trap nets, and gill nets. Data points, such as number of fish collected, age of fish, and new fish survival rates allow biologists to create fishing regulations that maintain sustainable fish populations. Text is enriched by famed fish artist Joseph Tomelleri’s illustrations.

## Suggested reading levels:

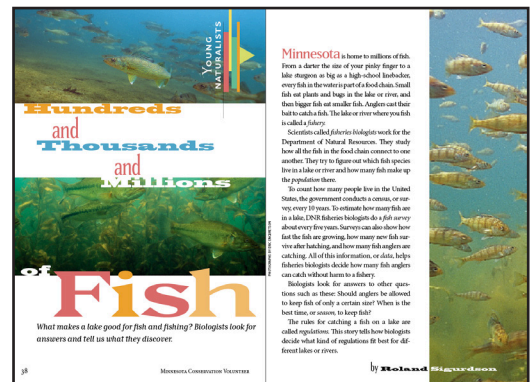
Third through middle school grades

## Total words:

1,909

## Materials:

*The Great Minnesota Fish Book and Fishing Minnesota, DNR Minnesota Fishes poster (available free from the DNR Information Center, 888-646-6367, or your local DNR Fisheries office), paper, poster board, colored pencils, crayons, pens, markers, print and online resources your media specialist may provide*



## “Hundreds and Thousands and Millions of Fish”—Teachers Guide

**Preparation time:** One to two hours, not including time for extension activities

**Estimated instructional time:** One or two 50-minute class periods (not including extensions)

**Minnesota Academic Standards applications:** “Hundreds and Thousands and Millions of Fish” may be applied to the following Minnesota Department of Education standards:

### **Language Arts**

#### **Reading Benchmarks**

##### **Informational Text 3-8**

Key Ideas and Details

Craft and Structure

Integration of Knowledge and Ideas

Range of Reading and Level of Text Complexity

#### **Writing Benchmarks 3–8**

Text Types and Purposes

Writing Process

Research to Build and Present Knowledge

Knowledge

Range of Writing

#### **Reading Benchmarks: Literacy in Science and Technical Subjects 6–8**

Key Ideas and Details

Craft and Structure

Integration of Knowledge and Ideas

Range of Reading and Level of Text Complexity

#### **Writing Benchmarks: Literacy in History/Social Studies, Science and Technical Subjects 6–8**

Text Types and Purposes

Writing Process: Production and Distribution of Writing

Research to Build and Present Knowledge

Knowledge

Range of Writing

### **Mathematics**

#### **Grades 3, 6**

Number and operation

3.1.1.1; 3.1.2.4; 4.1.1.5; 5.1.1.1;

5.1.1.4; 6.1.1.3; 6.1.1.4; 6.1.2.2;

6.1.3.3

Data analysis

3.4.1.1; 4.4.1.1

### **Science**

#### **Grades 3, 5, 7, and 8**

Life Science

3.4.1.1.1; 3.4.1.1.2; 3.4.3.2.1;

5.4.2.1.1; 5.4.4.1.1; 7.4.2.1.1;

7.4.2.1.2; 7.4.2.1.3; 7.4.2.2.2;

7.4.2.2.3; 7.4.4.1.2

The Nature and Science of Engineering

3.1.1.1.1; 3.1.1.2.2; 3.1.1.2.3;

3.1.1.2.4; 3.1.3.2.1; 5.1.1.1.1;

5.1.1.1.2; 5.1.3.4.1; 8.1.1.2.1;

8.1.3.3.2; 8.1.3.3.3

### **Arts**

#### **Grades K–12**

1. Artistic Foundations: Visual Arts

2. Artistic Process: Create or Make: Visual Arts

3. Artistic Process: Perform or Present: Visual Arts

4. Artistic Process: Respond or Critique: Visual Arts

Current, complete Minnesota Academic Standards are available at [www.education.state.mn.us](http://www.education.state.mn.us). Teachers who find other connections to standards are encouraged to contact *Minnesota Conservation Volunteer*.

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**Preview** Tom Dickson’s *The Great Minnesota Fish Book*, illustrated by Joseph Tomelleri; *Fishing Minnesota*, by Greg Breining; and the Minnesota Fishes poster are excellent resources not only for your preview, but also for extension activities. Every fish species described in the article is accompanied by a Tomelleri illustration. Begin asking students to examine pictures of brook trout, walleyes, northern pike, bluegills, yellow perch, largemouth bass, black crappies and flathead and channel catfish. Follow with a **KWL** (Ogle, 1986) to find out what your students already know (**K**) about fish and fishing. Ask small groups to brainstorm their ideas. Then combine the groups’ data to make a class list. Then ask what students would like to learn (**W**). As you read and discuss the article you will begin to compile the (**L**) list, or what they learn while reading the article and related materials and participating in extension activities. Display your K and W ideas on poster board or paper. See [www.teach-nology.com/web\\_tools/graphic\\_org/kwl](http://www.teach-nology.com/web_tools/graphic_org/kwl) for a KWL generator that will produce individual organizers for your students. KWL gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. If you use the article in math or art class, you may wish to focus your prereading discussion on academic standards that apply for that class. Another strategy for accessing prior knowledge is a brainstorming web. You may download a printable web at [www.teachervision.fen.com/tv/printables/TCR/0743932080\\_007.pdf](http://www.teachervision.fen.com/tv/printables/TCR/0743932080_007.pdf).

**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 or the subject you are teaching. 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). Italicized words are not generally included on the list or in the study cards.

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 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 with an asterisk require varying degrees of critical thinking.

**Adaptations** Read aloud to special needs students. Abbreviate the study questions or highlight priority items to be completed first. If time allows, remaining items may be attempted. Peer helpers, paraprofessionals, or adult volunteers may lend a hand with the study questions. With close teacher supervision, cooperative groups can also offer effective support to special needs students, especially for extension activities.

**Assessment** You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Students may compare and contrast two of the sampling methods (electrofishing vs. gill nets) in the article. See compare and

## “Hundreds and Thousands and Millions of Fish”—Teachers Guide

### Assessment continued

contrast tools in Web Resources. (2) Students may write multiple-choice, true-false, or short-answer questions. Select the best items for a class quiz. (3) Students may write essays about one or more of the sampling methods described in the article. What are the advantages/disadvantages of the method(s)? (4) Poster presentations may supplement or take the place of essays. Students may work in small groups with each group focusing on a different species or other main idea from the article. (5) Ask students to analyze a Lake Finder data sheet. Data sheets are available at Lake Finder on the DNR website.

### Extension activities

1. “Fish Sense,” “Fish in the Zone,” “Life of a Pike,” and “Monsters of the Deep” are excellent companion pieces for the article. All are YN articles with guides. See Related Articles for links.
2. Introduce your students to binomial nomenclature. Each species featured in the article is identified with its common and scientific names. See Web resources for links to student-friendly sites.
3. Encourage your students to make their own drawings of fish species featured in this article. See “Fish Decoys as Art” in Related Articles for inspiration. The food chain in Minnesota lakes and rivers also makes an interesting subject for poster art.
4. Encourage students to access the Lake Finder Lake Information Reports for two lakes of their choice. Compare and contrast numerical and narrative data for selected species. Which lake would they suggest for a fishing trip?
5. Plan a field trip to a state park near you. DNR naturalists will plan activities to complement your curriculum.
6. Play the Fish Game ([cloudinstitute.org/fish-game](http://cloudinstitute.org/fish-game)). Then take your kids fishing!
7. MinnAqua (see Web Resources) is a DNR program “designed to teach angling recreation and stewardship as well as the ecology and conservation of aquatic habitats.” Fishing in the Neighborhood (FIN, see Web Resources) is a Twin Cities Metro DNR program “aimed at increasing angling opportunities, public awareness, and environmental stewardship within the seven-county metro region.” Check the website for programs and events.

### Web resources

#### DNR fish and fishing information

[www.dnr.state.mn.us/fishing/trout\\_streams/trout\\_species.html](http://www.dnr.state.mn.us/fishing/trout_streams/trout_species.html)

[www.dnr.state.mn.us/fish/walleye/index.html](http://www.dnr.state.mn.us/fish/walleye/index.html)

[www.dnr.state.mn.us/fishing/index.html](http://www.dnr.state.mn.us/fishing/index.html)

[www.dnr.state.mn.us/minnaqua/index.html](http://www.dnr.state.mn.us/minnaqua/index.html) (MinnAqua)

[www.dnr.state.mn.us/fishing/fin/index.html](http://www.dnr.state.mn.us/fishing/fin/index.html)

[www.dnr.state.mn.us/faq/mnfacts/fishing.html](http://www.dnr.state.mn.us/faq/mnfacts/fishing.html)

[www.dnr.state.mn.us/fishing/staterecords.html](http://www.dnr.state.mn.us/fishing/staterecords.html)

[www.dnr.state.mn.us/fish/index.html](http://www.dnr.state.mn.us/fish/index.html)

[www.dnr.state.mn.us/lakefind/index.html](http://www.dnr.state.mn.us/lakefind/index.html) (Lake Finder)

[mndnr.gov/mobile/lakefinder](http://mndnr.gov/mobile/lakefinder)

[files.dnr.state.mn.us/publications/fisheries/investigational\\_reports/417.pdf](http://files.dnr.state.mn.us/publications/fisheries/investigational_reports/417.pdf) (Lake Classes)

[www.dnr.state.mn.us/areas/fisheries/montrose/creelsurvey.html](http://www.dnr.state.mn.us/areas/fisheries/montrose/creelsurvey.html)

#### Minnesota fish photos and illustrations

[www.dnr.state.mn.us/fish/index.html](http://www.dnr.state.mn.us/fish/index.html)

#### Joseph Tomelleri

[www.americanfishes.com/](http://www.americanfishes.com/) (Includes interactive fish quiz)

[www.americanfishes.com/about.htm](http://www.americanfishes.com/about.htm)

## “Hundreds and Thousands and Millions of Fish”—Teachers Guide

### Web resources continued

#### Trout

[www.dnr.state.mn.us/fish/trout/index.html](http://www.dnr.state.mn.us/fish/trout/index.html)  
[nationaltroutcenter.org/](http://nationaltroutcenter.org/)  
[animals.nationalgeographic.com/animals/fish/rainbow-trout/](http://animals.nationalgeographic.com/animals/fish/rainbow-trout/)

#### Walleye

[www.dnr.state.mn.us/fish/walleye/index.html](http://www.dnr.state.mn.us/fish/walleye/index.html)

#### Perch

[www.dnr.state.mn.us/fish/yellowperch.html](http://www.dnr.state.mn.us/fish/yellowperch.html)  
[www.dnr.state.mn.us/minnaqua/speciesprofile/yellowperch.html](http://www.dnr.state.mn.us/minnaqua/speciesprofile/yellowperch.html)  
[www.youtube.com/watch?v=pNZQEmGp11k](http://www.youtube.com/watch?v=pNZQEmGp11k) (Perch dissection video)

#### Food Chains/Food Webs

[www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm](http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain.htm)  
(includes interactive game)  
[www.enchantedlearning.com/subjects/foodchain/](http://www.enchantedlearning.com/subjects/foodchain/) (includes excellent video)  
[library.thinkquest.org/11353/food.htm](http://library.thinkquest.org/11353/food.htm)

#### Binomial Nomenclature

[animaldiversity.ummz.umich.edu/animal\\_names/scientific\\_name/](http://animaldiversity.ummz.umich.edu/animal_names/scientific_name/)  
<http://nature.ca/notebooks/english/scinames.htm>

#### Compare and Contrast

[www.readwritethink.org/files/resources/interactives/compcontrast/](http://www.readwritethink.org/files/resources/interactives/compcontrast/)  
[www.manatee.k12.fl.us/sites/elementary/samoset/rcccon1.htm](http://www.manatee.k12.fl.us/sites/elementary/samoset/rcccon1.htm)  
[www.readingquest.org/strat/compare.html](http://www.readingquest.org/strat/compare.html)

#### Teacher Resources

[www.mndnr.gov/education/teachers/index.html](http://www.mndnr.gov/education/teachers/index.html)  
[www.mndnr.gov/dnrkids/index.html](http://www.mndnr.gov/dnrkids/index.html)  
[www.seek.state.mn.us/res\\_dir.cfm](http://www.seek.state.mn.us/res_dir.cfm)

\*Note: All websites were active at the time of this guide's publication. However, some may no longer be active when this guide is accessed.

### Related Articles

In addition to the related YN articles listed below, every Minnesota Conservation Volunteer article published since 1940 is now online in searchable PDF. See [webapps8.dnr.state.mn.us/volunteer\\_index](http://webapps8.dnr.state.mn.us/volunteer_index). C.B. Bylander and Michael Kallok have written great fishing articles. Check them out in the Author Search.

#### May–June 1994

“One Fish, Two Fish, Go Fish!” (YN article)  
[www.dnr.state.mn.us/young\\_naturalists/fishing/index.html](http://www.dnr.state.mn.us/young_naturalists/fishing/index.html)

#### May–June 1996

“Fish Sense” (YN article with teachers guide; use as companion article)  
[www.dnr.state.mn.us/young\\_naturalists/fishsense/index.html](http://www.dnr.state.mn.us/young_naturalists/fishsense/index.html)

#### September–October 1999

“Monsters of the Deep” (YN article; use as companion article)  
[www.dnr.state.mn.us/young\\_naturalists/monsters/index.html](http://www.dnr.state.mn.us/young_naturalists/monsters/index.html)



## “Hundreds and Thousands and Millions of Fish”—Teachers Guide

### Related Articles

#### May–June 2000

“Fish With a Fly” (YN article)

[www.dnr.state.mn.us/young\\_naturalists/fly\\_fishing/index.html](http://www.dnr.state.mn.us/young_naturalists/fly_fishing/index.html)

#### March–April 2004

“Special Delivery” (YN article with teachers guide)

[www.dnr.state.mn.us/young\\_naturalists/eggs/index.html](http://www.dnr.state.mn.us/young_naturalists/eggs/index.html)

#### January–February 2005

“Let’s go Ice Fishing” (YN article with teachers guide)

[www.dnr.state.mn.us/young\\_naturalists/icefishing/index.html](http://www.dnr.state.mn.us/young_naturalists/icefishing/index.html)

#### July–August 2006

“Let’s Outfit a Tackle Box” (YN article with teachers guide)

[www.dnr.state.mn.us/young\\_naturalists/tacklebox/index.html](http://www.dnr.state.mn.us/young_naturalists/tacklebox/index.html)

“Fishing for Words”

[https://webapps8.dnr.state.mn.us/volunteer\\_index/past\\_issues/article\\_pdf?id=2195](https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=2195)

#### January–February 2009

“Fish Decoys as Art”

[https://webapps8.dnr.state.mn.us/volunteer\\_index/past\\_issues/article\\_pdf?id=4910](https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=4910)

#### May–June 2009

“Let’s Make a Fishing Pole” (YN article with teachers guide)

[www.dnr.state.mn.us/young\\_naturalists/fishing\\_pole/index.html](http://www.dnr.state.mn.us/young_naturalists/fishing_pole/index.html)

#### May–June 2010

“Life of a Pike” (YN article with teachers guide; use as companion article)

[www.dnr.state.mn.us/young\\_naturalists/pike\\_life/index.html](http://www.dnr.state.mn.us/young_naturalists/pike_life/index.html)

#### May–June 2011

“Minnesota’s Wild Anglers” (YN article with teachers guide)

[www.dnr.state.mn.us/young\\_naturalists/wild\\_anglers/index.html](http://www.dnr.state.mn.us/young_naturalists/wild_anglers/index.html)

#### May–June 2012

“Fish in the Zone” (YN article with teachers guide; use as companion article)

[www.dnr.state.mn.us/young\\_naturalists/limnology/index.html](http://www.dnr.state.mn.us/young_naturalists/limnology/index.html)

#### May–June 2013

“Wading for Bass”

[www.dnr.state.mn.us/volunteer/mayjun13/wade\\_fishing.html](http://www.dnr.state.mn.us/volunteer/mayjun13/wade_fishing.html)

### References

- Breining, Greg. *Fishing Minnesota*, Minneapolis, Minn.: University of Minnesota Press, 1993.
- Dickson, Tom. *The Great Minnesota Fish Book*, Minneapolis, Minn.: University of Minnesota Press, 2008.
- Hock, M.F., Deshler, D.D., and Schumaker, J.B. *Strategic Tutoring*. Lawrence, Kan.: Edge Enterprises, 2000.
- Ogle, D.S. K-W-L Group Instructional Strategy. In A.S. Palincsar, D.S. Ogle, B.F. Jones, and E.G. Carr (Eds.), *Teaching Reading as Thinking: Teleconference Resource Guide*, pp.11–17. Alexandria, Va.: Association for Supervision and Curriculum Development, 1986.

# “Hundreds and Thousands and Millions of Fish”—Teachers Guide

## Study Questions

Teachers guide for the Young Naturalists article “Hundreds and Thousands and Millions of Fish” by Roland Sigurdson. Published in the July–August 2013 *Minnesota Conservation Volunteer*, or visit [www.mndnr.gov/young\\_naturalists/fisheries](http://www.mndnr.gov/young_naturalists/fisheries).

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Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

1. What does the author mean when he writes, “...every fish in the water is part of a food chain? \_\_\_\_\_

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2. Why are fish surveys important? \_\_\_\_\_

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3. *Salvelinus fontinalis* is the scientific name for what species of fish? \_\_\_\_\_

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4. Explain how an electrofisher works. \_\_\_\_\_

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5. Why do biologists count, measure, and weigh each trout they catch? \_\_\_\_\_

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6. *Sander vitreus* is Minnesota’s \_\_\_\_\_ .

7. If anglers catch about 3.5 million *Sander vitreus* every year totaling about 4 million pounds of fish, what does the average *Sander vitreus* weigh? \_\_\_\_\_

8. What is a sample? \_\_\_\_\_

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9. Trap nets are good for catching \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

10. Compare and contrast trap net and gill net sampling. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. Where are otoliths found? \_\_\_\_\_

12. Why might an angler not welcome a creel survey? \_\_\_\_\_  
\_\_\_\_\_

13. What happened to the fish in Lake Henry, and what did the DNR do about it? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. A special regulation tells anglers \_\_\_\_\_.

15. If every hook on your trotline caught a fish, how many fish would you have? \_\_\_\_\_

16. Describe three methods for determining a fish's age. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Challenge:* This article is about sustainability. Explain what sustainability means to you and why it is an important idea. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Study Questions Answer Key

Teachers guide for the Young Naturalists article “Hundreds and Thousands and Millions of Fish” by Roland Sigurdson.  
Published in the July–August 2013 *Minnesota Conservation Volunteer*, or visit [www.mndnr.gov/young\\_naturalists/fisheries](http://www.mndnr.gov/young_naturalists/fisheries).

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- \*1. What does the author mean when he writes, “...every fish in the water is part of a food chain? **Responses will vary. The most important concept is interdependence or connectedness. What happens to one organism affects all other organisms in the chain. See links in Web Resources.**
2. Why are fish surveys important? **Surveys help biologists set sustainable limits on the number of fish anglers may keep.**
3. *Salvelinus fontinalis* is the scientific name for what species of fish? **Brook trout**
4. Explain how an electrofisher works. **An electrofisher is an electronic device that (1) attracts fish with a mild current and then (2) stuns them with a stronger current. This allows biologists to collect the fish, count and measure them, and return them to the water.**
- \*5. Why do biologists count, measure, and weigh each trout they catch? **Data collected by biologists help them improve fish habitat to produce more and bigger fish and also to set limits on how many and what size fish may be kept.**
6. *Sander vitreus* is **Minnesota’s state fish, the walleye.**
- \*7. If anglers catch about 3.5 million *Sander vitreus* every year totaling about 4 million pounds of fish, what does the average *Sander vitreus* weigh? **4,000,000 pounds ÷ 3,500,000 pounds = 1.14 pounds**
8. What is a sample? **A sample is a small catch that shows what the whole fishery is like.**
9. Trap nets are good for catching **bluegills, crappies, and bullheads.**
- \*10. Compare and contrast trap net and gill net sampling. **Responses may vary. Both catch samples of fish for scientific purposes. Trap nets do not kill the fish as gill nets do.**
11. Where are otoliths found? **Otoliths are found in fishes’ ears.**
- \*12. Why might an angler not welcome a creel survey? **If an angler has taken more than the limit or taken fish that are not the right size, he or she might not welcome a creel survey.**
13. What happened to the fish in Lake Henry, and what did the DNR do about it? **Many fish died. Why so many fish died is a mystery. The DNR stocked the lake with adult fish in hope they would spawn, thereby replacing the fish that had been lost. Later in the summer the DNR surveyed the lake and found young bass. The DNR set up a special regulation to help keep the lake’s bass population healthy.**
- \*14. A special regulation tells anglers **how many and what size of specific species of fish may be kept on certain lakes, rivers, or streams.**
- \*15. If every hook on your trotline caught a fish, how many fish would you have? **100 feet ÷ 10 feet = 10 hooks.**
16. Describe three methods for determining a fish’s age. **(1) count rings on a fish’s scale, (2) measure otoliths, which is a more accurate measure, or (3) for fish without scales, such as catfish, count rings in a pectoral fin spine.**
- \**Challenge:* This article is about sustainability. Explain what sustainability means to you and why it is an important idea. **Answers will vary. Encourage students to review food chains/food webs and to consider how human activity, in this case, fishing, affects fish populations. What is the purpose of sport angling?**

## Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article “Hundreds and Thousands and Millions of Fish” by Roland Sigurdson.

Published in the July–August 2013 *Minnesota Conservation Volunteer*, or visit [www.mndnr.gov/young\\_naturalists/fisheries](http://www.mndnr.gov/young_naturalists/fisheries).

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Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

1. Scale rings are used to

- A. hang fish on.
- B. determine how old the fish is.
- C. weigh the fish.
- D. create a beautiful sound.

2. The most popular game fish in Minnesota is

- A. *Micropterus salmoides*.
- B. *Lepomis macrochirus*.
- C. *Sander vitreus*.
- D. *Ictalurus punctatus*.

3. Describe how to determine the age of a catfish. \_\_\_\_\_

\_\_\_\_\_

4. Anglers may keep \_\_\_\_\_ catfish over 24 inches.

- A. one
- B. two
- C. four
- D. no

5. Compared to other game fish, lake sturgeon are

- A. of average size.
- B. quite small.
- C. extremely large.
- D. extinct.

## Minnesota Comprehensive Assessments Answer Key

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1. Scale rings are used to **B. determine how old the fish is.**
2. The most popular game fish in Minnesota is **C. *Sander vitreus*.**
3. Describe how to determine the age of a catfish. **Remove one of the spines from the pectoral fin. Cut a slice from the spine and count the rings under a microscope.**
4. Anglers may keep **A. one catfish over 24 inches.**
5. Compared to other game fish, lake sturgeon are **C. extremely large.**

## “Hundreds and Thousands and Millions of Fish”—Teachers Guide

### Vocabulary

Teachers guide for the Young Naturalists article “Hundreds and Thousands and Millions of Fish” by Roland Sigurdson. Published in the July–August 2013 *Minnesota Conservation Volunteer*, or visit [www.mndnr.gov/young\\_naturalists/fisheries](http://www.mndnr.gov/young_naturalists/fisheries).

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<b>angler</b>	person who fishes with a rod, line, and hook (the hook was once called an angle)
<b>biologist</b>	scientist who studies forms of life
<b>cascade</b>	series of small waterfalls
<b>data (singular or plural)</b>	factual information
<b>food chain</b>	links in a food web, starting with a species that eats no other species and ending with a species that is eaten by no other species
<b>habitat</b>	home environment of a plant or animal
<b>larva</b>	immature, wingless, worm-shaped form of many insects
<b>pectoral fins</b>	fins of a fish that correspond to the forelimbs of four-legged animals or to the arms of primates
<b>species</b>	group of organisms that resemble each other and may reproduce
<b>sustainable</b>	the ability to endure over long periods of time

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## Vocabulary Study Cards

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

What is an  
**angler**?

FOLD HERE

A **person who fishes with a rod, line and hook** is an

What is a  
**biologist**?

FOLD HERE

A **scientist who studies all forms of life** is a

A **cascade** is a

FOLD HERE

A **series of small waterfalls** is called a

The word **data** means

FOLD HERE

In science, **factual information** is called

What is a **food chain**?

FOLD HERE

The links in a food web, starting with a species that eats no other species and ending with a species that is eaten by no other species, is called a

What is a **habitat**?

FOLD HERE

The home environment of a plant or animal is called its

What is a **larva**?

FOLD HERE

The immature, wingless, worm-shaped form of many insects is a

What are **pectoral fins**?

FOLD HERE

Fins of a fish that correspond to the forelimbs of four-legged animals or to the arms of primates are

What is a **species**?

FOLD HERE

A group of organisms that resemble each other and may reproduce is a



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To be **sustainable** is to

FOLD HERE

To **endure over long periods of time** is to be

FOLD HERE

FOLD HERE

FOLD HERE

FOLD HERE