

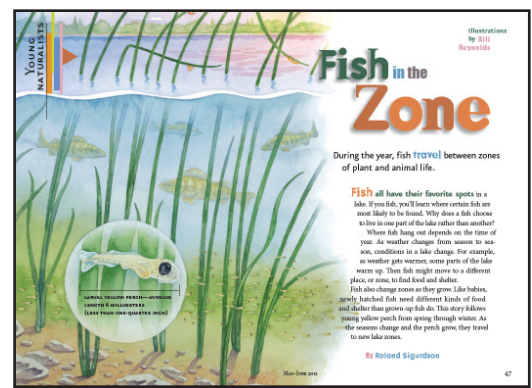
Teachers Guide

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“Fish in the Zone” Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article “Fish in the Zone?” by Roland Sigurdson, illustrated by Tom Foty. Published in the May–June 2012 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/limnology

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.

New digital archives: All *Minnesota Conservation Volunteer* articles published since 1940 are now online in searchable PDF format. Visit www.mndnr.gov/magazine and click on *past issues*.

Summary

“Fish in the Zone” introduces readers to limnology, a branch of science that studies freshwater bodies, such as lakes, rivers, and wetlands. In text and illustrations the author describes how yellow perch adapt to changing conditions in their habitat throughout the seasons. Fish inhabit different zones of a lake as water temperature and food sources change.

Suggested reading levels:

Fifth through high school grades

Total words:

1,138

Materials:

Paper, poster board, colored pencils, crayons, pens, markers, as well as print and online resources your media specialist may provide

Preparation time:

One or two 50-minute class periods (not including extensions)

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Estimated instructional time:

One or two 50-minute class periods (not including extensions)

Minnesota Academic Standards Applications:

“Fish in the Zone” may be applied to the following Minnesota Department of Education standards:

Language Arts

Reading Benchmarks

Informational Text 6-12

Key Ideas and Details

Craft and Structure

Integration of Knowledge and Ideas

Range of Reading and Level of Text Complexity

Writing Benchmarks 6–12

Text Types and Purposes

Writing Process (6–12:

Production and Distribution of Writing)

Research to Build and Present Knowledge

Range of Writing

Reading Benchmarks: Literacy in Science and Technical Subjects 6–12

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 6–12

Text Types and Purposes

Writing Process: Production and Distribution of Writing

Research to Build and Present Knowledge

Range of Writing

Science

Grade 5

5.4.2.1.1: Interdependence Among Living Systems

Grade 6

6.2.3.2.3: Energy

Grade 7

7.4.2.1.1; 7.4.2.1.2:

Interdependence Among Living Systems

Grades 9–12

9.4.2.1.1: Interdependence Among Living Systems

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. Teachers who find other connections to standards are encouraged to contact *Minnesota Conservation Volunteer*.

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Preview Ask students to examine the illustrations and to predict what the story might be about. Follow with the KWL strategy (Ogle, 1986) to find out what your students already know (K) about fish through the seasons. You might begin by asking small groups to brainstorm their ideas. Then combine the groups’ data to make a class list. Repeat step one by asking 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 Vocabulary preview). See 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 science 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.

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. For item 5 see the “Compare and Contrast” links under Web Resources below.

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 write an essay describing one or more of the main ideas in the article. For example, essays could focus on a perch’s life cycle. (2) Students may write multiple-choice, true-false, or short-answer questions. Select the best items for a class quiz. (3) Poster presentations may supplement or take the place of the

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Assessment continued

essays. Students may work in small groups with each group focusing on a different main idea. (4) Have students complete the main idea and supporting details activity found at www.teachervision.fen.com/tv/printables/scottforesman/Math_2_TTM_25.pdf. You or your students can select main ideas. If you wish to include more than two main ideas, use more than one sheet.

Extension activities

1. Two Young Naturalists articles from the archives, “Fish Sense” and “Life of a Pike,” make excellent companion pieces for “Fish in the Zone.” See Related Articles for links.
2. Two other Young Naturalists articles focus on the microscopic organisms featured in “Fish in the Zone”: “Life in a Jar” and “Spring to Life Ponds.” Both articles will expand your students’ knowledge of this critical component of freshwater ecology.
3. This article may be used in physical science in the study of thermodynamics. See Web resources for links to kid-friendly websites.
4. Explore mercury pollution and how it affects fish. See Web resources.
5. Challenge students to create posters of the food web described in the article. See Web resources for more information.

Web resources

Minnesota DNR

www.dnr.state.mn.us/faq/mnfacts/water.html
www.dnr.state.mn.us/nr/plants/aquatic/index.html
www.dnr.state.mn.us/water/index.html
www.dnr.state.mn.us/fish/index.html

Thermodynamics

www.physics4kids.com/files/thermo_laws.html
www.kids.esdb.bg/basic_principles.html
www.energykids.eu/thermodinamycslaw.html

Compare and Contrast

www.readwritethink.org/files/resources/interactives/compcontrast/
www.manatee.k12.fl.us/sites/elementary/samoset/rcccon1.htm
www.readingquest.org/strat/compare.html

Lake Ecology

www.epa.gov/owow/watershed/wacademy/acad2000/pdf/limnology.pdf
www.thewildclassroom.com/biomes/lake.html
www.lakeaccess.org/ecology/lakeecologyprim9.html

Mercury Pollution

water.usgs.gov/wid/FS_216-95/FS_216-95.html
www.usgs.gov/themes/factsheet/146-00/
www.pca.state.mn.us/index.php/component?option=com_docman/task/doc_view/gid,288
www.iwla.org/index.php?ht=a/GetDocumentAction/i/945

Yellow Perch Food Web

dnr.wi.gov/fish/lakemich/yellowperch.pdf
www.glerl.noaa.gov/pubs/brochures/foodweb/LEfoodweb.pdf
www.glwi.freshwater.uwm.edu/ourwaters/documents/FoodWebWeb.pdf
files.dnr.state.mn.us/education_safety/education/minnaqua/leadersguide/chapter_1/1_2_food_chain_tag.pdf

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Web resources

Phytoplankton and Zooplankton

www.childrenoftheearth.org/Kid's%20Entries/phytoplankton.htm

www.enchantedlearning.com/subjects/invertebrates/plankton/Planktonprintout.shtml

[www.google.com/search?q=freshwater+zooplankton&hl=en&client=safari&rls=en&prmd=i
mvns&tbnm=isch&tbo=u&source=univ&sa=X&ei=o--JT6nRF4K08ASa94XWCQ&ved=0CEMQsAQ&biw=1024&bih=936](http://www.google.com/search?q=freshwater+zooplankton&hl=en&client=safari&rls=en&prmd=i
mvns&tbnm=isch&tbo=u&source=univ&sa=X&ei=o--JT6nRF4K08ASa94XWCQ&ved=0CEMQsAQ&biw=1024&bih=936)

Minnesota DNR Teacher Resources

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

www.mndnr.gov/dnrkids/index.html

*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 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 to access hundreds of articles about birds.

May–June 1994

“One Fish, Two Fish, Three Fish, Go Fish!”

www.dnr.state.mn.us/young_naturalists/fishing/index.html (YN article)

May–June 1996

“Fish Sense”

www.dnr.state.mn.us/young_naturalists/fishsense/index.html (YN article with teachers guide)

July–August 2002

“Life in a Jar”

www.dnr.state.mn.us/young_naturalists/pond_life/index.html (YN article with teachers guide)

May–June 2008

“Spring to Life Ponds”

www.dnr.state.mn.us/young_naturalists/ponds/index.html (YN article with teachers guide)

May–June 2010

“Life of a Pike”

www.dnr.state.mn.us/young_naturalists/pike_life/index.html (YN article with teachers guide)

References

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.

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Study Questions

Teachers guide for the Young Naturalists article “Fish in the Zone?” by Roland Sigurdson, illustrated by Tom Foty. Published in the May–June 2012 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/limnology

1. Throughout the year, fish may be found in different places or _____ in a lake.
2. Fish move to find _____ and _____.
3. Fish also move as they grow because _____

4. Why do yellow perch move into the littoral zone to lay their eggs? _____

5. Look at the illustrations on pages 48–49. Compare and contrast emergent, submergent, and floating-leaf aquatic plants. _____

6. Why do you think the clarity of the water affects the depth of the littoral zone? _____

7. Larval perch move out of the littoral zone to the _____ zone to escape _____.
8. Larval perch may eat _____, but prefer to eat _____, such as _____, _____, and _____.
9. As they grow, larval perch move into the _____ zone.
10. Green plants cannot grow in deep water because _____

11. What time of day do larval perch hunt for midge larvae? Why? _____

12. Explain where and why juvenile perch migrate in mid-June. _____

13. Where do perch spend the winter? _____

14. Use the diagram on page 52 to help explain the difference between fall and spring turnover. _____

15. The author states. "With luck, the perch might live nine more springs." What do you think he means? _____

16. If you were a limnologist, what questions might you ask? _____

Challenge: What is the difference between zones and layers in a lake? _____

Study Questions Answer Key

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1. Throughout the year, fish may be found in different places or **zones** in a lake.
 2. Fish move to find **food** and **shelter**.
 3. Fish also move as they grow because **their food and shelter needs change as they grow**.
 - *4. Why do yellow perch move into the littoral zone to lay their eggs? **The water is warmer, and they need plants to attach their eggs to so the eggs won't wash up on shore.**
 - *5. Look at the illustrations on pages 48–49. Compare and contrast emergent, submergent, and floating-leaf aquatic plants. **Responses will vary. You may wish to use one or more of the compare and contrast tools links in Web resources.**
 - *6. Why do you think the clarity of the water affects the depth of the littoral zone? **Responses may vary, but the central concept is that green plants need sunlight to grow. Cloudy water prevents sunlight from reaching greater depth.**
 7. Larval perch move out of the littoral zone to the **limnetic** zone to escape **predators**.
 8. Larval perch may eat **phytoplankton (algae)**, but prefer to eat zooplankton, such as **rotifers, daphnia, and copepods**.
 9. As they grow, larval perch move into the **profundal** zone.
 10. Green plants cannot grow in deep water because **sunlight cannot reach great depths**.
 - *11. What time of day do larval perch hunt for midge larvae? Why? **Larval perch hunt midge larvae in early morning and late evening because they can see them then.**
 - *12. Explain where and why juvenile perch migrate in mid-June. **Juvenile perch move from the profundal to the littoral zone in mid-June. They are bigger and faster than larval perch, so they can escape predators and catch bigger prey.**
 - *13. Where do perch spend the winter? **In winter, perch go back to the profundal zone.**
 - *14. Use the diagram on page 52 to help explain the difference between fall and spring turnover. **In the fall, the water on the surface cools to 39 degrees and sinks into the warmer water below. In the spring, surface warms to 39 degrees and sinks into the water below.**
 - *15. The author states, “With luck, the perch might live nine more springs.” What do you think he means? **Responses will vary. Perch are prey for other larger fish, such as walleye and northern pike. Perch are also a popular game fish for people.**
 16. If you were a limnologist what questions might you ask? **Responses will vary.**
- Challenge:* What is the difference between zones and layers in a lake? **Zones refer to places in a lake where different organisms are found and, to some extent, to water depth. Layers refer only to the temperature of the water at different depths.**

*Question involves critical thinking

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Minnesota Comprehensive Assessments Practice Items

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Name _____ Period _____ Date _____

1. Limnology is the study of
 - A. birds.
 - B. oceans.
 - C. inland waters.
 - D. trees.

2. Submergent plants include
 - A. wild onions.
 - B. asparagus.
 - C. algae.
 - D. wild celery.

3. The littoral zone is full of organisms that prey on _____.

4. Chaoborus can be found in what zone?
 - A. littoral
 - B. profundal
 - C. limnetic
 - D. A, B and C

5. Which is larger, a daphnia or a yellow perch larva? _____

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Minnesota Comprehensive Assessments Answer Key

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1. Limnology is the study of **C. inland waters**.
2. Submergent plants include **D. wild celery**.
3. The littoral zone is full of organisms that prey on **yellow perch larvae**.
4. Chaoborus can be found in what zone? **B. profundal**
5. Which is larger, a daphnia or a yellow perch larva? **yellow perch**

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Vocabulary

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algae	simple plants that live in water, ranging from single-celled phytoplankton to giant kelp (seaweed)
aquatic	living in water
bacteria	single-cell organisms with no nucleus
juvenile	not yet mature (adult)
larvae	a juvenile form in animals that morph into adults
microscopic	very small; invisible without magnification
migrate	move from one to another region and back
organism	living thing
predator	animal that kills and eats other animals
prey	animals that are killed and eaten by other animals
teem	contain an extremely large number of animals or things in one place
zooplankton	tiny organisms that drift in water bodies and are important food sources for fish and mammals

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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 are
algae?

FOLD HERE

simple plants that live in water
are called

Aquatic
organisms

FOLD HERE

Plants and animals that
live in water
are described as

Bacteria
are

FOLD HERE

Single-cell organisms with
no nucleus are called

A
juvenile
animal is

FOLD HERE

To be **not yet mature or fully**
grown (adult) is to be

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What are
larvae?

FOLD HERE

**Animals in their juvenile form
that morph into adult forms
are called**

A
microscopic
object is

FOLD HERE

An object that is
**very small; invisible without
magnification** is

To
migrate
is to

FOLD HERE

To **move from one to another
region and back** is to

What is an
organism?

FOLD HERE

A
living thing
is an

A
predator
is

FOLD HERE

An **animal that kills and
eats other animals**
is a

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A **prey**
animal is

FOLD HERE

Animals that are
killed and eaten by
other animals are called

To
teem
is to

FOLD HERE

To **contain an**
extremely large number
of animals or things in
one place is to

What are
zooplankton?

FOLD HERE

Tiny organisms drift in water
bodies and are important food
sources for fish and mammals
are called

FOLD HERE

FOLD HERE