

Teachers Guide

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“Life of a Pike” Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article “Life of a Pike” by Scott Moeller. Published in the March–April 2010 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/pike_life

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 a to suit user needs. Users are encouraged to provide feedback through an online survey at www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html. If you are downloading articles from the Web site, please note that only Young Naturalists articles are available in PDF.



Summary

“Life of a Pike” describes, in text and photographs, the life cycle of the northern pike from embryo to fry, to fingerling, to reproductive adult. Readers will learn how young pike avoid predators, what they eat, how fast they grow, and the waters they travel as they mature.

Suggested reading levels:

Fifth through high school grades

Total words:

1,580

Materials:

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

Preparation time:

One to two hours, not including time for extension activities

“Life of a Pike”—Teachers Guide

Estimated instructional time:

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

Minnesota Academic Standards applications:

“Life of a Pike” 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 5

IV. Life Science

- E. Biological Populations Change Over Time
- F. Flow of Matter and Energy

Grades 7, 9-12

IV. Life Science

- B. Diversity of Organisms
- C. Interdependence of Life
- E. Biological Populations Change Over Time
- F. Flow of Matter and Energy

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

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

Preview

First, ask students to survey the article. Examine the photographs. Use the **KWL** strategy (Ogle, 1986) to find out what your students already know (**K**) about northern pike, what they would like to learn (**W**), 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 the KWL for concepts that are specific to those disciplines.

“Life of a Pike”—Teachers Guide

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). Pay particular attention to words in italics. Definitions are provided in the text.

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 2, 3, 5, 8, and 12 and the Challenge 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) Ask students to write a brief essay describing the life cycle of a pike. (2) Print and scramble the photographs on page 37. Ask students to number and/or label the photos. (3) Students may write multiple-choice, true-false, or short-answer questions. Teachers may then select the best items for a class quiz. (4) Posters may depict the life cycle, food chain, or limiting factors in the pike’s habitat. Posters may be presented to the class and/or displayed in the classroom. (5) Students may compare and contrast the life cycle or other characteristics of another native Minnesota fish to the pike in a research paper and/or poster presentation.

Extension activities

1. Invite a DNR Fisheries biologist to visit your classroom to present information about the northern pike and other game fish. See <http://www.dnr.state.mn.us/areas/fisheries/index.html>.
2. Take a field trip to a DNR Fisheries project site to see fish management in action. See <http://www.dnr.state.mn.us/areas/fisheries/index.html>.

“Life of a Pike”—Teachers Guide

Extension activities continued

3. Order a Minnesota Fish Watch: Warm Water Sport Fish Edition booklet from http://www.dnr.state.mn.us/nature_viewing/fishwatch/index.html. The booklet is an inexpensive way to introduce your students to the fish of Minnesota.
4. Students may use Lake Finder to do research on a lake that may offer a good chance to catch a northern pike. See <http://www.dnr.state.mn.us/lakefind/index.html>.
5. Challenge your advanced students to read “Fish Rearing in Wetlands” (http://files.dnr.state.mn.us/fisheries/aquaculture/fish_rearing_report.pdf). What may students conclude? What position might students take and defend?
6. Invasive species are a grave threat to Minnesota’s native aquatic plants and animals. Students may begin learning about the most common animal invaders at <http://www.dnr.state.mn.us/invasives/aquaticanimals/index.html>.
7. Limiting factors is a central concept in “Life of a Pike,” and may be used to connect this article to other topics, such as global climate change. Encourage your students to explore the sites listed below. Can they identify limiting factors for mammals, birds, reptiles, insects, and plants?

Web resources

Minnesota DNR

<http://www.dnr.state.mn.us/fish/northern/index.html>

http://www.dnr.state.mn.us/fish/muskellunge/muskie_northern.html

<http://www.dnr.state.mn.us/fish/northern/biology.html>

<http://www.dnr.state.mn.us/fish/walleye/index.html>

<http://hatch.cehd.umn.edu/research/fish/fishes/>

<http://www.dnr.state.mn.us/fish/crappie/index.html>

<http://www.dnr.state.mn.us/minnaqua/index.html>

http://www.dnr.state.mn.us/fisheries/muskiepike_2020.html

Photos and facts

http://forums.basspro.com/cgi-bin/ultimatebb.cgi?ubb=get_topic;f=1;t=006329

http://www.fishalaskamagazine.com/archives/2003/03_wolf.htm

Limiting factors

<http://www.accessexcellence.org/AE/AEPC/WWC/1995/limiting.php> (high school game)

http://www.d11.org/DOI/healthpe/ACTIVITY_SHEETS/Science/WMU_SCI_FactChallenge.pdf (elementary/middle game)

<http://www.nhptv.org/natureworks/nwep12a.htm>

Minnesota DNR Teacher Resources

<http://www.mndnr.gov/education/teachers/index.html>

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

Related articles

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

May–June 1994

“One Fish, Two Fish, Three Fish, Go Fish” (YN article)

http://www.dnr.state.mn.us/young_naturalists/fishing/index.html

“Life of a Pike”—Teachers Guide

Related articles continued

May–June 1996

“Fish Sense” (YN article with teachers guide)

http://www.dnr.state.mn.us/young_naturalists/fishsense/index.html

July–August 1996

“Damsels and Dragons” (YN article with teachers guide)

http://www.dnr.state.mn.us/young_naturalists/dragons/index.html

May–June 2000

“Fish with a Fly” (YN article)

http://www.dnr.state.mn.us/young_naturalists/fly_fishing/index.html

July–August 2002

“Life in a Jar” (YN article with teachers guide)

http://www.dnr.state.mn.us/young_naturalists/pond_life/index.html

March–April 2004

“Special Delivery” (YN article with teachers guide)

http://www.dnr.state.mn.us/young_naturalists/eggs/index.html

July–August 2006

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

http://www.dnr.state.mn.us/young_naturalists/tacklebox/index.html

May–June 2009

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

http://www.dnr.state.mn.us/young_naturalists/fishing_pole/index.html

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.

“Life of a Pike”—Teachers Guide

Study Questions

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Name _____ Period _____ Date _____

1. For a northern pike, what does “growing up” mean? _____

2. About how many eggs does one northern pike release? _____

3. Why are the eggs released in shallow water? _____

4. List the predators that eat northern pike eggs. _____

5. Describe the differences between fingerlings, swim-up fry, and sac fry. _____

6. Within what temperature range do pike eggs hatch? _____

7. List the prey of a northern pike. _____

8. How do northern pike hunt their prey? _____

9. What predators must fingerling pike watch out for? _____

10. As a pike reaches one year of age, what must it do to complete its life cycle? _____

11. What have dam engineers done to help fish travel safely? _____

12. Describe the northern pike’s spawning ritual. _____

Challenge: Why do you suppose the record for the largest northern pike caught in Minnesota has stood for more than 80 years? (Hint: Think about limiting factors.) _____

Study Questions Answer Key

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1. For a northern pike, what does “growing up” mean? **Completing its life cycle**
 2. About how many eggs does one northern pike release? **About 50,000**
 3. Why are the eggs released in shallow water? **Young fish grow more quickly in warm water.**
 4. List the predators that eat northern pike eggs. **Other fish, crayfish, frogs**
 5. Describe the differences between fingerlings, swim-up fry, and sac fry. **Answers may vary, but should include: the order of development (sac fry, swim-up fry, and fingerlings), a description of the appearance of each, and a description of the behavior of each.**
 6. Within what temperature range do pike eggs hatch? **45 F to 66 F**
 7. List the prey of a northern pike. **Pike eat other fish (including pike), frogs, crayfish, ducklings, and muskrats.**
 8. How do northern pike hunt their prey? **They *ambush* their prey, which means the pike lies still and waits for prey to come close enough for the pike to strike.**
 9. What predators must fingerling pike watch out for? **Wading birds, such as herons and egrets; flying birds, such as ospreys and kingfishers; mammals, such as mink and otter; and people**
 10. As a pike reaches one year of age, what must it do to complete its life cycle? **It must return to the waters in which was born, find a mate, and spawn.**
 11. What have dam engineers done to help fish travel safely? **Modern dams have fish passages that allow fish to safely pass over or around the dam.**
 12. Describe the northern pike’s spawning ritual. **Males return to wetlands before females. Over one to two weeks males and females pair up in heavily vegetated areas. As females release eggs, males release milt. Males thrash around to distribute the milt among the eggs. Then both male and female return to the lake or river they came from.**
- Challenge:* Why do you suppose the record for the largest northern pike caught in Minnesota has stood for more than 80 years? (Hint: Think about limiting factors.) **Answers will vary. Some limiting factors, such as pollution, wetlands drainage, and overfishing are discussed in the article. Other factors, such as dark house spearing, may affect the number of large fish in a given population. Some anglers may not report large catches, so it is possible that a larger fish has been caught and not reported.**

Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article “Life of a Pike” by Scott Moeller. Published in the March–April 2010 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/pike_life

Name _____ Period _____ Date _____

1. A benefit of limiting factors on pike population is
 - A. keeping a balance between predators and prey.
 - B. protecting anglers from large fish.
 - C. increasing the number of small fish.
 - D. none of the above.

2. Northern pike need _____ for successful spawning.
 - A. lakes with sandy, muddy, and rocky bottoms
 - B. lakes with shallow, deep, or variable depths
 - C. large, medium, and small lakes
 - D. shallow, warm wetlands

3. Would it be a good idea to limit the number and size of northern pike anglers might keep? Why or why not? _____

4. A large pike (36 inches long) may be _____ years old.
 - A. 5
 - B. 10
 - C. 15
 - D. 20

5. Northern pike stay in the sac fry stage for about _____ days.
 - A. 10
 - B. 15
 - C. 20
 - D. 25

Minnesota Comprehensive Assessments Answer Key

Teachers guide for the Young Naturalists article “Life of a Pike” by Scott Moeller. Published in the March–April 2010 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/pike_life

1. A benefit of limiting factors on pike population is **A. keeping a balance between predators and prey.**
2. Northern pike need **D. shallow, warm wetlands for successful spawning.**
3. Would it be a good idea to limit the number and size of northern pike anglers might keep? Why or why not? **Answers may vary. If a limiting factor for pike is overfishing, then limiting size and number of catch may be a good idea.**
4. A large pike (36 inches long) may be **B. 10 years old.**
5. Northern pike stay in the sac fry stage for about **A. 10 days.**

“Life of a Pike”—Teachers Guide

Vocabulary

Teachers guide for the Young Naturalists article “Life of a Pike” by Scott Moeller. Published in the March–April 2010 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/pike_life

aquatic organism an organism that lives in or near water

camouflage coloration or other traits that help a living thing blend with the environment

embryo animal in its first stage of development

food chain feeding relationships among organisms

plankton tiny floating organisms in aquatic environments

predator animal that eats other animals

ritual pattern of behavior

sibling rivalry competition between a brother or sister

species group of plants or animals that are similar enough to reproduce with one another

translucent letting light through diffusely

“Life of a Pike”—Teachers Guide

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.

An
aquatic
organism is

FOLD HERE

An organism that
lives in or near
water is

Camouflage is

FOLD HERE

Coloration or other traits that
help a living thing blend with the
environment is

An
embryo
is an

FOLD HERE

An animal in its
first stage of development
is an

What is the
food chain?

FOLD HERE

Feeding relationships
among organisms
is the

What are
plankton?

FOLD HERE

The **tiny floating organisms
in aquatic environments** are

What is a
predator?

FOLD HERE

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

A **ritual**
is a

FOLD HERE

A **pattern of
behavior** is a

What is
sibling rivalry?

FOLD HERE

**Competition between a
brother or sister** is

A **species**
is a

FOLD HERE

A **group of plants or animals that
are similar enough to reproduce
with one another** is a

What does
translucent mean?

FOLD HERE

Letting light through
diffusely means

FOLD HERE

FOLD HERE

FOLD HERE

FOLD HERE