“Niches for Everyone” Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article “Niches for Everyone” by Christine Petersen, with illustrations by Vera Ming Wong. Published in the Sept.–Oct. 2014 Minnesota Conservation Volunteer, or visit www.mndnr.gov/mcvmagazine.

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 https://www.surveymonkey.com/s/JQ9M9LH.

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.

“Niches for Everyone” introduces young readers to a complex concept, the ecological niche. How an animal (or plant) gets the resources it needs to survive and how it interacts with other animals and plants that occupy the same geographic area defines its niche. Readers will learn how squirrels, woodpeckers and monarch butterflies have adapted to survive and thrive within a community of other organisms.

Summary

Primary through middle/junior high school grades

KWL organizer, index cards, paper, poster board, colored pencils, crayons, pens, markers, print and online resources your media specialist may provide

One to two hours, not including time for extension activities

One or two 50-minute class periods (not including extensions)
“Niches for Everyone”—Teachers Guide

Minnesota Academic Standards

Applications:

“Niches for Everyone” 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
- 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
- Range of Writing

Science Grades 3, 4, 5, and 7
- Life Science
  3.4.1.1.1; 3.4.1.1.2; 3.4.3.2.2;
  5.4.1.1.1; 5.4.2.1.1; 5.4.2.1.2;
  7.4.2.1.1; 7.4.2.1.2; 7.4.2.2.2;
  7.4.3.1.3; 7.4.3.2.3; 7.4.3.2.4

Social Studies

Grade 4
- Geography
  4.3.4.9.1

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.
“Niches for Everyone”—Teachers Guide

Preview

(1) See curiosity.discovery.com/question/difference-between-niche-habitat for background for a discussion of habitat vs. niche. Students may use the terms interchangeably if not prepped before reading. (2) You may follow with a KWL (Ogle, 1986) activity. To find out what your students already know (K), divide the class into small groups and have each group brainstorm ideas about squirrels, woodpeckers, or monarch butterflies. Give each student a copy of the organizer (see www.teach-nology.com/web_tools/graphic_org/kwl) and encourage each to make notes during the group discussion. Repeat step one by asking students what they would like to learn, or what questions they have, about their groups’ topic (W) and then have them identify at least one niche-related question from their (W) lists. Record their questions on poster board for reference. As you read and discuss the article you will begin to compile the (L) lists, or what they learn while reading the article and related materials, and participating in extension activities. KWL gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. If you use the article in science, social studies, or art class, you may wish to focus your pre-reading activity on academic standards that apply for that class. (3) See www.teachervision.fen.com/tv/printables/TCR/0743932080_007.pdf for a brainstorming web download.

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).

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

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 the niches of different kinds of squirrels, different kinds of woodpeckers, and monarchs and other insects using milkweed. See compare and 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 create posters that combine visual art, writing, and oral presentations. Posters may be combined with the compare-and-contrast activity above. Students may work in small groups or as individuals.
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 the niches of different kinds of squirrels, different kinds of woodpeckers, and monarchs and other insects using milkweed. See compare-and-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 create posters that combine visual art, writing, and oral presentations. Posters may be combined with the compare-and-contrast activity above. Students may work in small groups or as individuals.

Extension activities

Extensions are intended for individual students, small groups or your entire class. Young Naturalists articles provide teachers many opportunities to make connections to related topics, to allow students to follow particular interests, or to focus on specific academic standards.

1. “Will Redheads Return?,” “Shadow Tail,” and “Pollination Partners” (see Related Articles) make great companion pieces for “Niches for Everyone.” You may encourage students to include content from related articles in evaluation and/or extension activities.

2. Do people occupy niches? Challenge your students to compare and contrast how humans and animals adapt to changing environments.

3. Why are biologists so concerned about invasive plants and animals? What do invasive species have to do with the concept of niches?

4. How is climate change affecting plants and animals in Minnesota? Does a changing climate challenge plants and animals to find new niches? Hint: How has the opossum adapted to winters in Minnesota?

5. Take a field trip to your school forest, a state park, or a scientific and natural area. Contact a naturalist at your state park to plan a program for your class.

6. Engage your class in a citizen science project. Monitor monarch butterfly migration, join Project Squirrel, or plant a butterfly garden.

Web resources

DNR
www.dnr.state.mn.us/birds/index.html
www.dnr.state.mn.us/invasives/index.html
www.dnr.state.mn.us/nr/index.html
www.dnr.state.mn.us/mammals/index.html
www.dnr.state.mn.us/eco/nongame/index.html
www.dnr.state.mn.us/gardens/butterfly/index.html

Niches
www.youtube.com/watch?v=xIVixvC4Jc
www.realtrees4kids.org/ninetwelve/system.htm
marinebio.org/oceans/conservation/moyle/ch7.asp

Invasive species

Climate Change
www.epa.gov/climatechange/kids/
climatekids.nasa.gov/
www.epa.gov/climatechange/impacts-adaptation/ecosystems.html
Adaptation
www.raptorresearchfoundation.org/education/raptor-world
www.pbs.org/wnet/nature/episodes/raptor-force/introduction/1109/

Ecology
idahoptv.org/dialogue4kids/season4/ecology/facts.cfm
www.stephsnature.com/lifescience/ecology/unit.html

Minnesota’s Natural Resources
www.dnr.state.mn.us/faq/mnfacts/index.html

Monarch Butterflies
www.monarch-butterfly.com/
www.monarchwatch.org/
www.learner.org/jnorth/monarch/

Squirrels
www.squirrels.org/
en.wikibooks.org/wiki/Field_Guide/Mammals/United_States/Minnesota
www.project squirrel.org/

Woodpeckers
mnzoo.org/blog/animals/pileated-woodpecker/
birding.about.com/od/birdprofiles/ig/Woodpecker-Gallery/
www.northlandoutdoors.com/event/article/id/233200/

Compare and Contrast
www.readwritethink.org/files/resources/interactives/compcontrast/
www.readingquest.org/strat/compare.html

Minnesota DNR Teacher Resources
www.mndnr.gov/education/teachers/index.html
www.mndnr.gov/dnrkids/index.html
files.dnr.state.mn.us/education_safety/education/plt/familyactivities/plt_Activity22TreesasHabitats.pdf

*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.

In addition to the related articles listed below, every Minnesota Conservation Volunteer article published since 1940 is now online in searchable PDF. See www.mndnr.gov/mcvmagazine. Young Naturalists articles and teachers guides are found at www.dnr.state.mn.us/mcvmagazine/young-naturalists.html.

November–December 1983
“Adaptation: Nature’s Secret for Winter Survival”
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=134

January–February 1985
“How Birds Survive Winter in Minnesota”
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=681

November–December 1994
“Shadow Tails” (YN article)
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=1344
“Niches for Everyone”—Teachers Guide

January–February 1995
“What's Making a Racket?” (YN article)
www.dnr.state.mn.us/young_naturalists/woodpeckers/index.html

September–October 1997
“Pollination Partners” (YN article)
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=1202

March–April 2003
“Let's Go Birding” (YN article with teachers guide)
files.dnr.state.mn.us/mcvmagazine/young_naturalists/young-naturalists-article/birding/birding.pdf

May–June 2004
“Special Delivery” (YN article with teachers guide)
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=2304

September–October 2004
Flying Squirrel (Genus Glaucomys)
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=2104

March–April 2006
“The Hole Story” (YN article with teachers guide)
files.dnr.state.mn.us/mcvmagazine/young_naturalists/young-naturalists-article/cavity_nesters/cavity_nesters.pdf

July–August 2007
“Big Bullfrog Trouble”
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=3005

May–June 2008
“Watchers of Butterflies”
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=3846

May-June 2009
“Will Redheads Return?”
https://webapps8.dnr.state.mn.us/volunteer_index/past_issues/article_pdf?id=5103

July–August 2012
“Little Habitats on the Prairies” (YN article with teachers guide)
files.dnr.state.mn.us/mcvmagazine/young_naturalists/young-naturalists-article/prairie/prairie.pdf

References
Study Questions

1. The author compares an apartment building to a ________________________________.

2. Describe the natural community in which you live. ______________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

3. An animal’s niche includes: __________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

4. What is the difference between an omnivore and a vegetarian? ______________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

5. When two species try to share the same niche they must _______________ for resources.

6. Red squirrels are fiercely territorial, which means they ______________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

7. Two species, one active during the day and the other active at night, is an example of an adaptation that relieves _________________ for niches.

8. Match the species of squirrel from List A with a term from List B.

   A
   gray squirrel
   red squirrel
   flying squirrel
   fox squirrel

   B
   northern evergreen forests
   southern Minnesota oak forests
   big old trees
   active at night
__________________________________________________________________________________________
__________________________________________________________________________________________

10. Fox squirrels are most active early in the morning. True False

11. Woodpeckers build homes for squirrels. True False

12. How can you tell a downy from a hairy woodpecker? __________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

13. Milkweed protects itself from most hungry animals and insects by______________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

14. What adaptation do monarch butterflies have to protect themselves from predators? _______________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Challenge: What are natural resources? Describe the natural resources on which you depend for survival and a high quality of life. (Hint: You may need to dig for information in other sources for this one.)
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
Study Questions Answer Key
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*1. The author compares an apartment building to a tree.

*2. Describe a natural community in which you live. Answers will vary. Encourage students to include other people, animals, and plants that they are familiar with.

*3. An animal’s niche includes: food, activity cycle, shelter (where it sleeps), and reproduction and rearing behaviors. Encourage students to deeply examine the environment to extend their description of niches. For example, how an organism interacts with competitors is an important factor in successfully finding a niche.

4. What is the difference between an omnivore and a vegetarian? Omnivores eat both plant and animal matter, while vegetarians eat only plants.

5. When two species try to share the same niche they must compete for resources.

6. Red squirrels are fiercely territorial, which means they try to drive out other squirrels from the area in which they live.

7. Two species, one active during the day and the other active at night, is an example of an adaptation that relieves competition for niches.

8. Match the species of tree squirrel from List A with a term from List B.
   
   A                                 B
   gray squirrel (big old trees)
   red squirrel (northern evergreen forests)
   flying squirrel (active at night)
   fox squirrel (southern Minnesota oak forests)

9. How do gray squirrels help oak forests grow? They bury lots of acorns, but don’t dig some of them up. The acorns sprout into new oak trees.

10. Fox squirrels are most active early in the morning. True False

11. Woodpeckers build homes for squirrels. True False

12. How can you tell a downy from a hairy woodpecker? Downy woodpeckers are much smaller than hairy woodpeckers.

13. Milkweed protects itself from most hungry animals and insects by producing a poisonous chemical in its sap.

14. What adaptation do monarch butterflies have to protect themselves from predators? Monarchs have adapted to the poison in milkweed sap. The poison has become a part of the monarch’s biochemistry, which protects it from predators.

*Challenge: What are natural resources? Describe the natural resources on which you depend for survival and a high quality of life. (Hint: you may need to dig for information in other sources for this one.)

Interpreted broadly, natural resources include the fundamental requirements for survival, such as soil and water, materials for shelter and other uses (wood and minerals like iron and copper), precious metals such as gold and silver, recreational lands, and waters. Encourage students to explore Minnesota’s natural resources through online and print materials.

MINNESOTA CONSERVATION VOLUNTEER
Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article “Niches for Everyone” by Christine Petersen, with illustrations by Vera Ming Wong. Published in the Sept.–Oct. 2014 Minnesota Conservation Volunteer, or visit www.mndnr.gov/mcvmagazine.

Name ___________________________________________ Period _________ Date_________________

1. Red squirrels prefer seeds from
   A. oak trees.
   B. sumac shrubs.
   C. evergreen trees.
   D. sunflowers.

2. ________________________________ eat mushrooms.
   A. Fox and gray squirrels
   B. Red and flying squirrels
   C. Red and gray squirrels
   D. Fox and red squirrels

3. There are _________ species of woodpeckers in Minnesota.
   A. eight
   B. ten
   C. five
   D. none of the above.

4. Wood ducks often live in old ____________________________ nests.
   A. owl
   B. Cooper’s hawk
   C. eagle
   D. woodpecker

5. The monarch butterfly sips nectar with a
   A. proboscis.
   B. straw.
   C. chrysalis.
   D. pupa.
Minnesota Comprehensive Assessments Answer Key

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1. Red squirrels prefer seeds from C. evergreen trees.
2. B. Red and flying squirrels eat mushrooms.
3. There are D. none of the above species of woodpeckers in Minnesota. (There are nine species of woodpeckers in Minnesota.)
4. Wood ducks often live in old D. woodpecker nests.
5. The monarch butterfly sips nectar with a A. proboscis.
Vocabulary

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adapted  (adaptation) process by which an animal or plant species becomes fitted to its environment

crevice  crack or narrow opening

habitat  natural environment in which an animal or plant lives

natural resource  anything people can use that comes from nature

predator  animal that kills and eats other animals

proboscis  a long, thin tube that forms part of the mouth of some insects (such as a butterfly)

pupa  intermediate stage of a metamorphic insect, usually in a cocoon

rival  competitor or opponent

species  group of organisms that resemble each other and may reproduce

territorial  defending an area against intruders, especially of the same species.
What does **adapted** mean?

When an animal or plant species becomes fitted to its environment is it said to be

A **crevice** is

A crack or narrow opening is a

An organism’s **habitat** is

The natural environment in which an animal or plant lives is its

A **natural resource** is

Anything people can use that comes from nature is a
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>What is a predator?</td>
<td>An animal that kills and eats other animals is a</td>
</tr>
<tr>
<td>A proboscis is</td>
<td>A long, thin tube that forms part of the mouth of some insects (such as a butterfly) is a</td>
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<tr>
<td>What is a pupa?</td>
<td>The intermediate stage of a metamorphic insect, usually in a cocoon is called a</td>
</tr>
<tr>
<td>What is a rival?</td>
<td>A competitor or opponent is called a</td>
</tr>
<tr>
<td>What is a species?</td>
<td>A group of organisms that resemble each other and may reproduce is called a</td>
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<td>When is an animal territorial?</td>
<td>When an animal defends an area against intruders, especially of the same species it is called</td>
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