Young Naturalists

# Teachers Guide

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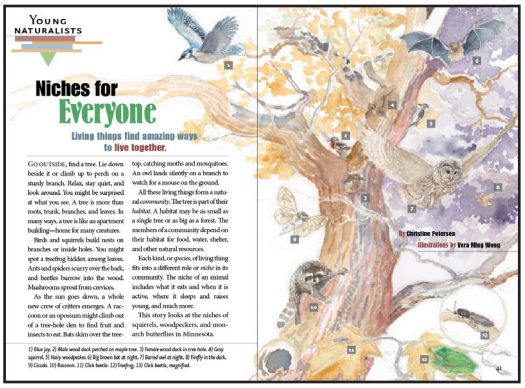
## "Niches for Everyone" Multidisciplinary Classroom Activities

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*.**

### Summary

"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.

| | |
|---|---|
| **Suggested reading levels:** | Primary through middle/junior high school grades |
| **Materials:** | KWL organizer, index cards, paper, poster board, colored pencils, crayons, pens, markers, print and online resources your media specialist may provide |
| **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:**

"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*.

## 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 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=xIVixvcR4Jc
www.realtrees4kids.org/ninetwelve/system.htm
marinebio.org/oceans/conservation/moyle/ch7.asp

**Invasive species**
www.nwf.org/Wildlife/Threats-to-Wildlife/Invasive-Species.aspx
www.brainpop.com/educators/community/lesson-plan/invasive-species-lesson-plan-the-invasion-game/

**Climate Change**
www.epa.gov/climatechange/kids/
climatekids.nasa.gov/
www.nwf.org/Wildlife/Threats-to-Wildlife/Global-Warming/Effects-on-Wildlife-and-Habitat.aspx
www.epa.gov/climatechange/impacts-adaptation/ecosystems.html

## Web resources continued

**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/ecologyunit.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.projectsquirrel.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.

## 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 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

## Related articles continued

**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

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.

## Study Questions

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.

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 | B |
|---|---|
| gray squirrel | northern evergreen forests |
| red squirrel | southern Minnesota oak forests |
| flying squirrel | big old trees |
| fox squirrel | active at night |

9. How do gray squirrels help oak forests grow? _____

_____

_____

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

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.

*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 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. |

## Vocabulary Study Cards

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.

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 does **adapted** mean? | FOLD HERE | **When an animal or plant species becomes fitted to its environment** is it said to be |
| A **crevice** is | FOLD HERE | **A crack or narrow opening** is a |
| An organism's **habitat** is | FOLD HERE | **The natural environment in which an animal or plant lives** is its |
| A **natural resource** is | FOLD HERE | **Anything people can use that comes from nature** is a |

| | | |
|---|---|---|
| What is a **predator?** | FOLD HERE | **An animal that kills and eats other animals** is a |
| A **proboscis** is | FOLD HERE | **A long, thin tube that forms part of the mouth of some insects (such as a butterfly)**is a |
| What is a **pupa?** | FOLD HERE | **The intermediate stage of a metamorphic insect, usually in a cocoon** is called a |
| What is a **rival?** | FOLD HERE | **A competitor or opponent** is called a |
| What is a **species?** | FOLD HERE | **A group of organisms that resemble each other and may reproduce** is called a |

When is an animal **territorial**?

FOLD HERE

**When an animal defends an area against intruders, especially of the same species** it is called

FOLD HERE

FOLD HERE

FOLD HERE

FOLD HERE