Young Naturalists

Teachers Guide

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"Tree Guardians" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "Tree Guardians" by Mary Hoff. Published in the Sept.–Oct. 2008 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/tree_guardians.

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

Summary

"Tree Guardians" describes the work life of several foresters as they fight fire, supervise the planting of seedlings, and work with a logger to ensure proper harvest of mature trees. In the final section of the article, readers learn how foresters also work in the private sector to assist landowners manage forests wisely.

Suggested reading levels:	third through middle grades
Total words:	2,214
Materials:	Paper, poster board, pencils, pens, markers, and print resources from your media center
Preparation time:	One to two hours, not including time for extension activities

Estimated instructional time:

Two to three 50-minute class periods (not including extensions)

Minnesota Academic Standards applications:

"Tree Guardians" 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
Grades 3 and 4
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
Grades 5 and 8
IV. Life Science
F. Flow of Matter and Energy
Grades 7
IV. Life Science
B. Diversity of Organisms
C. Interdependence of Life
F. Flow of Matter and Energy

Social Studies
Grades 4¬–8
II. Minnesota History
C. Early settlement and statehood 1810–1860: The student will know and understand the factors that led to rapid settlement of Minnesota in the 19th century and the changes the new Minnesotans brought with them.
E. Industrial Era 1865–1914: The student will know and understand Minnesota's major industries and economic, social, political and technological changes that accompanied industrialization.

Arts
All grades
Artistic Expression
D. Visual Arts

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

Preview

Before you read, ask students to survey the article. Examine the photos. Use the KWL strategy (Ogle, 1986) to find out what your students already know (K) about foresters, what (W) they would like to learn, 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 about what foresters do. 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 social studies, science, or art, you may ask students to review their KWL for concepts that are specific to those disciplines.

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. 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).

Connections to vocabulary in the article may also be made during KWL. If students are not familiar with some of the terms, include them in the W list. Other terms may be added to the W list as they read the article. Eventually they can be moved to the L list. You may write vocabulary from the article in green ink, while other ideas are written in black. Notes: Some of the words in the vocabulary list definitions may require further explanation. Also, preview the study questions for unfamiliar terms.

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 4, 5, 8, 12, and 14 and the Challenge require varying degrees of analytical thinking.

Adaptations

Read aloud to special needs students. Abbreviate the study questions or highlight priority items to be completed first, for example, items 1, 2, 3, 6, 7, and 11. 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 how foresters help manage Minnesota forests. (2) Students may write multiple-choice, short answer or true-false questions to test their classmates' understanding of the story. Student-generated questions may be then used as an alternative to study questions. (3) Students may write a letter to a classmate or the teacher with advice on how to prepare for a career in forestry. (4) Poster presentations may describe one or more of the roles foresters play.

Extension activities

1. Investigate one or more environmental issues associated with Minnesota forests. See Web sites below.
2. Invite a DNR forester to your classroom. Possible topics may include tree identification, forest harvesting and management, disease and pest control, and fire prevention/fighting.
3. Visit one of Minnesota's state parks (http://www.mndnr.gov/state_parks/list.html). Park naturalists are eager to work with teachers on activities and presentations that connect

Extension activities

with your curriculum.

4. Encourage students to explore more deeply the history of logging in Minnesota. The legend of Paul Bunyan is a good introduction to this topic.
5. To help students understand the relationship of Native Americans with trees and how it differs from Europeans, read the Ojibwe legend "Winaboju and the Birch Tree" (http://www.nativetech.org/brchbark/winabojo.htm). See Web sites below that further explore this topic.
6. Students may explore the relationship of trees with climate change. How do logging of vast areas of land and growing new forests affect levels of carbon dioxide in the atmosphere?
7. Ask students to read about the great Hinckley fire of 1894 (http://www.mnhs.org/library/tips/history_topics/21hinckley.html). Wildfires are still a concern. Can students make a connection between climate change and fires?
8. Is your school part of the Minnesota School Forest Program? The School Forest Program is the Minnesota DNR's outdoor classroom program. Students can learn about a variety of natural resources topics, such as forestry, in a real-world, hands-on context. DNR assistance is available to establish and maintain your school forest site. Find more information at www.mndnr.gov/schoolforest.

Web resources

Minnesota DNR Division of Forestry
http://www.mndnr.gov/forestry/index.html
http://www.mndnr.gov/faq/mnfacts/forests.html

Minnesota School Forest Program
www.mndnr.gov/schoolforest

Forest Fires
http://www.mndnr.gov/forestry/fire/index.html
http://query.nytimes.com/gst/abstract.html?res=950CE0DD1730E033A2575AC1A9619C94659ED7CF
http://www.mnhs.org/library/tips/history_topics/21hinckley.html

University of Minnesota Forestry
http://www.forestry.umn.edu/

Forestry Careers
http://www.forestrycareers.org
http://www.safnet.org/aboutforestry/forestryvideo.cfm

Urban Forestry
http://www.forestry.umn.edu/extension/urban_com/index.html
http://www.treepeople.org/vfp.dll?OakTree~getPage~&PNPK=206

Forests and Climate Change
http://www.americanforests.org/resources/climatechange/
http://www.fs.fed.us/ne/delaware/atlas/#

Web resources continued

Arbor Day Foundation
http://www.arborday.org/
http://www.arborday.org/trees/whattree/

Native Americans and Trees
http://www.nativetech.org/brchbark/brchbark.htm
http://www.umaine.edu/hudsonmuseum/tree.htm
http://www.kstrom.net/isk/food/maple.html

GPS
http://www.gps.gov/

Teacher resources
http://www.mndnr.gov/education/teachers/index.html

Related articles

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

March–April 1999
"Tremendously Marvelous Trees"
http://www.mndnr.gov/young_naturalists/trees/index.html

September–October 2001
"What Should a Forest Be?"
http://www.mndnr.gov/volunteer/sepoct01/fieldnotes.html

March–April 2003
"Partners in Forest Conservation"
http://www.mndnr.gov/volunteer/marapr03/fnpartners.html

November–December 2004
"The Real Story of the Chippewa National Forest"
http://www.mndnr.gov/volunteer/novdec04/chippewanf.html

November–December 2005
"Fire Planes Pay Off"
http://www.mndnr.gov/volunteer/novdec05/fire_planes.html

May–June 2005
"The Strike Tree"
http://www.mndnr.gov/volunteer/mayjun05/spstriketree.html

January–February 2006
"Breaking Up the Forest"
http://www.mndnr.gov/volunteer/janfeb06/breaking_up.html

March–April 2006
"Green as Money" http://www.mndnr.gov/volunteer/marapr06/green_money.html

Related articles

May–June 2006
"Look Down in the Woods" (article with teachers guide)
http://www.mndnr.gov/young_naturalists/forest_floor/index.html

May–June 2006
"Stamped and Certified"
http://www.mndnr.gov/volunteer/mayjun06/forestry_certification.html

November–December 2007
"Walks in the Old Woods"
http://www.mndnr.gov/volunteer/novdec07/old_woods.html

March–April 2008
"In the Woods with. . ...Dave Epperly"
http://www.mndnr.gov/volunteer/marapr08/in_the_woods.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.

Study Questions

Teachers guide for the Young Naturalists article "Tree Guardians" by Mary Hoff. Published in the September–October 2008 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/tree_guardians.

Name_____Period_____Date_____

1. Explain how Jana Albers uses red-pine seedlings to detect disease. _____

_____

_____

2. What conditions describe a "forest-fire kind of day?" _____

_____

3. How does Jeremy Fauskee use a helicopter in fighting fires? _____

_____

_____

4. Compare/contrast a CL 215 airplane to a Hughes 500. _____

_____

_____

5. When would the CL 215 be more useful? _____

_____

6. Fires that are started on purpose are called _____.

7. How does fire keep forests healthy? _____

_____

_____

8. What do you think Jeremy means when he says he likes "the diversity" of his job? _____

_____

_____

9. Why is Patty Thielen supervising the planting of jack pine? _____

_____

10. Explain how a planting bar is used. _____

_____

11. Describe what each of these logging machines do:

(a) feller buncher _____

(b) skidder _____

(c) delimber _____

(d) slasher _____

12. Pick two or three of the jobs foresters do and explain why you might be interested in those jobs.

_____

_____

_____

13. Why does Patty Thielen like her job? _____

_____

_____

14. Why do you think foresters have to go to college? _____

_____

15. What is a clinometer, and how is it useful to foresters? _____

_____

_____

Challenge: How does Brad Gatzlaff's job differ from those of Jana Albers, Jeremy Fauskee, and Patty Thielen?

_____ _____

_____

_____

Study Questions Answer Key

Teachers guide for the Young Naturalists article "Tree Guardians" by Mary Hoff. Published in the September–October 2008 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/tree_guardians.

1. Explain how Jana Albers uses red-pine seedlings to detect disease. **If the fungus is present in the adult trees, Jana will be able to see it in the seedlings.**

2. What conditions describe a "forest-fire kind of day?" **High winds and dry air make for a forest-fire kind of day.**

3. How does Jeremy Fauskee use a helicopter in fighting fires? **Jeremy helps in three ways: (1) He tells firefighters on the ground what the fire is doing; (2) He brings more firefighters to the fire; (3) He pours water on the fire.**

4. Compare/contrast a CL 215 airplane to a Hughes 500. **Answers may vary, but should include: both are aircraft; both fight fires; the CL 215 is a fixed-wing plane while the Hughes 500 is a helicopter; the plane is much bigger and faster, and can deliver more water per trip.**

5. When would the CL 215 be more useful? **On larger fires that are farther away from the base.**

6. Fires that are started on purpose are called? **Prescribed burns**

7. How does fire keep forests healthy? **Prescribed burns burn up dead plants to release nutrients into the soil, make room for new plants and prepare the soil for seeds to sprout.**

8. What do you think Jeremy means when he says he likes "the diversity" of his job? **He gets to do many interesting things.**

9. Why is Patty Thielen supervising the planting of jack pine? **She must make sure the workers do the job properly.**

10. Explain how a planting bar is used. **The shovel end is pushed into the ground and moved back and forth to make a wedge-shaped hole for the roots of the seedling.**

11. Describe what each of these logging machines do:

(a) feller buncher **Cuts the tree down**

(b) skidder **Drags the trees out of the woods to a landing area**

(c) delimber **Cuts off branches**

(d) slasher **Cuts the trunk into 8-foot pieces**

12. Pick two or three of the jobs foresters do and explain why you might be interested in those jobs. **Answers will vary. See page 40 for list of jobs.**

13. Why does Patty Thielen like her job? **Like Jeremy, she likes the variety. She also likes to ride four-wheelers and snowmobiles.**

14. Why do you think foresters have to go to college? **Answers will vary. Foresters must know a lot about plants, soils, fires, and how to work with people.**

15. What is a clinometer, and how is it useful to foresters? **A clinometer measures the height of trees. It helps foresters estimate how much wood is in a tree.**

Challenge: How does Brad Gatzlaff's job differ from those of Jana Albers, Jeremy Fauskee, and Patty Thielen? **Brad works for himself as a private businessperson. The others work for the state government (DNR).**

Minnesota Comprehensive Assessments Practice Items

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Name _____Period _____Date_____

1. Why might a landowner want to get rid of buckthorn?
   A. Buckthorn is not a beautiful plant.
   B. Buckthorn is an invasive, nonnative tree that crowds out native plants.
   C. Buckthorn has an unpleasant odor.
   D. Buckthorn has sharp thorns.

2. Why does Patty Thielen need a GPS? _____

   _____

3. A drip torch is used to _____ .
   A. make candles
   B. provide light for firefighters
   C. start prescribed burns
   D. release nutrients

4. Why are aircraft so important in fighting forest fires? _____
_____

5. Minnesota has _____ trees.
   A. 10 million
   B. 10 trillion
   C. 10 thousand
   D. 10 billion

Minnesota Comprehensive Assessments Answer Key

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1. Why might a landowner want to get rid of buckthorn? **B. Buckthorn is an invasive, nonnative tree that crowds out native plants.**
2. Why does Patty Thielen need a GPS? **She uses her GPS to locate trees that are to be harvested.**
3. A drip torch is used to **C. start prescribed burns.**
4. Why are aircraft so important in fighting forest fires? **Answers may vary, but should include that aircraft are fast and safe, and can put water precisely on fires.**
5. Minnesota has **D. 10 billion trees.**

Vocabulary

Teachers guide for the Young Naturalists article "Tree Guardians" by Mary Hoff. Published in the September–October 2008 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/tree_guardians.

diversity a variety of something

fungus an organism that lives by absorbing energy and nutrients from plants, animals, or dead organic matter

GPS GPS (global positioning system) a device for finding location using signals from satellites

habitat habitat natural conditions in which a plant or animal lives

herbicide herbicide a chemical that kills plants

nutrients nutrients Substances that provide nourishment, for example, the minerals a plant needs to grow

soil science soil science the study of soil as a natural resource

tamarack tamarack (larch) a tree that loses its needles in winter

Vocabulary Study Cards

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

What is **diversity?**	FOLD HERE	What is **a variety of something** called?
What is **a fungus?**	FOLD HERE	What is **an organism that lives by absorbing energy and nutrients from plants, animals, or dead organic matter** called?
What is **a GPS?**	FOLD HERE	What is **a device for finding location using signals from satellites** called?

Vocabulary Study Cards

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

A plant or animal's **habitat** is the	FOLD HERE	The **natural conditions in which a plant or animal lives** is called its
What is **a herbicide**?	FOLD HERE	What is a **chemical that kills plants** called?
What are **nutrients**?	FOLD HERE	**Substances that provide nourishment, for example, the minerals a plant needs to grow** are

Vocabulary Study Cards

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

What is **soil science?**	FOLD HERE	**The study of soil as a natural resource** is called
What is a **tamarack?**	FOLD HERE	Another name for **larch, a tree that loses its needles in winter,** is
	FOLD HERE	

Vocabulary Study Cards

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

FOLD HERE

FOLD HERE

FOLD HERE