Young Naturalists

Teachers Guide

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"Ubiquitous* Conifers" Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalists article "Ubiquitous* Conifers" by Mary Hoff. Published in the January–February 2009 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/conifers.

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. Please note that if you are downloading articles from the Web site only the Young Naturalists article is available in PDF.*

Summary

"Ubiquitous* Conifers" introduces the reader to 10 conifer trees native to Minnesota. Students learn physical characteristics, where species are most commonly found in Minnesota, plants and animals sharing a tree's habitat, and commercial uses for several species.

Suggested reading levels:	intermediate through middle grades
Total words:	1,643
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:

"Ubiquitous* Conifers" 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 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

Grade 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.

V. Geography

C. Physical Features and Processes: The student will identify and locate geographic features associated with the development of Minnesota.
D. Interconnections: The student will describe how humans influence the environment and in turn are influenced by it.

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. Look up the word *ubiquitous*. Predict how it will apply to this story. Use the KWL strategy (Ogle, 1986) to find out what your students already know (K) about the conifers, 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 the native conifers. 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.

If you have a school forest or are within walking distance of a wooded area, walk through the woods. Identify different species of conifers. How are conifers different from deciduous trees? How are they similar? What do different species of conifers have in common? How do they differ? During your walk add items to the K and W categories.

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.

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, 4, 8, and 13 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 (e.g., items 1, 3, 5, 6, 7, 9, and 10). 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 on a teacher-selected or self-selected topic from the article, such as: (a) How have certain species of conifers contributed to the development and current health of our state's economy? (b) What habitat conditions do specific conifers require to thrive? (c) How do conifers provide food and shelter for specific species of animals? (d) Describe unique characteristics of at least three species of conifers. (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) Take students into a forest with several species of conifers and ask them to identify each species. (4) Poster presentations may describe one or more species of native conifers.

Extension activities

1. Investigate one or more environmental issues associated with Minnesota conifers. Insect pests are a big concern. 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 (www.mndnr.gov/state_parks/list.html). Park naturalists are eager to work with teachers on activities and presentations that connect with your curriculum.
4. Investigate the Minnesota Christmas tree industry at the sites below. More than 500,000 Christmas trees were harvested in Minnesota in 2008. Which species are preferred? Are they native to Minnesota? Set up a class debate about natural vs. artificial trees and which are better for our environment.
5. Students may explore the relationship of trees with climate change. How does logging of vast areas of land affect levels of carbon dioxide in the atmosphere?
6. Use "Tremendously Marvelous Trees" (see link below) as a companion piece for "Ubiquitous Conifers."
7. Use the Latin names for conifers to introduce your students to the science of taxonomy. See links below.

Web resources

Minnesota DNR Division of Forestry
www.dnr.state.mn.us/forestry/education/primer/index.html
www.mndnr.gov/forestry/index.html
www.mndnr.gov/faq/mnfacts/forests.html

Minnesota conifers
www.extension.umn.edu/distribution/naturalresources/DD0486.html
www.50states.com/tree/minnesota.htm
www.rook.org/earl/bwca/nature/trees

University of Minnesota Department of Forest Resources
www.forestry.umn.edu

Minnesota Christmas Tree Industry
www.mda.state.mn.us/food/minnesotagrown/qlist-xmastrees.htm
www.mncta.com
www.mda.state.mn.us/protecting/sustainable/mfo/christmas_trees.htm

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

Conifer Pests
www.entomology.umn.edu/cues/dx/conifer.htm
www.mndnr.gov/fid/may97/conred.html

Taxonomy
www.mahalo.com/Scientific_Classification
teachers.net/lessonplans/posts/1228.html

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

Related articles

Many related *Minnesota Conservation Volunteer* articles are available online at www.dnr.state.mn.us/volunteer/articles/index.html, including:

March–April 1999
"Tremendously Marvelous Trees" (YN article with Teachers Guide)
www.mndnr.gov/young_naturalists/trees/index.html

November–December 2004
"Balsam fir (Abies balsmea)"
www.mndnr.gov/volunteer/novdec04/mpbalsamfir.html

March–April 2005
"True Wilderness"
www.mndnr.gov/volunteer/novdec07/old_woods.html

Related articles continued

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

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

September–October 2008
"Wildly Adaptable Trees"
www.mndnr.gov/volunteer/sepoct08/trees.html

September–October 2008
"Tree Guardians"
www.dnr.state.mn.us/young_naturalists/tree_guardians/index.html

Note: Hundreds of articles about forestry and forests have been published in the Volunteer and are available in hard copy at: www.dnr.state.mn.us/volunteer/article_index/subject.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 "Ubiquitous* Conifers" by Mary Hoff. Published in the January–February 2009 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/conifers.

Name_____Period_____Date_____

1. Conifer leaves are called _____. Cones are a protective covering for _____.

2. The author describes conifers as "tough characters of the tree world." Why? _____ ___

_____

_____

3. Describe three characteristics that conifers share. _____

_____

_____

4. Why are conifers an important member of the habitats they occupy? _____

_____

_____

5. Match the terms with the conifer species.

_____ red pine	a. porcupines eat the bark
_____ eastern white pine	b. needles coated with whitish wax
_____ jack pine	c. also known as arborvitae
_____ black spruce	d. also known as Norway pine
_____ white spruce	e. only dedicuous Minnesota conifer
_____ balsam fir	f. popular for Christmas wreaths
_____ white cedar	g. needles in clusters of five
_____ eastern red cedar	h. root fibers used to sew birchbark canoes
_____ tamarack	i. olive-sized cones
_____ eastern hemlock	j. male and female cones on separate trees

6. Which Minnesota pine species can produce over 700 cones per season? _____.

7. Forest fires actually help which species of confer to reproduce? _____

8. How long do female cones stay on eastern white pine? Why? _____

_____

_____

9. Only two tree species, _____, and _____ are more numerous than black spruce in Minnesota.

10. Black and white spruce are especially good for making _____.

11. Native Americans used black spruce for making _____.

12. How could you use the cones to identify a balsam fir? _____

_____

13. Why is the Witch Tree famous? How do you think it got its name? _____

_____

_____

14. Which of the ten conifer species native to Minnesota might be the hardest to find? Why? _____

_____

_____

_____

Challenge: Can you name five other plant or animal species that are ubiquitous in Minnesota? Explain your selections. _____

_____

_____

_____

Study Questions Answer Key

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1. Conifer leaves are called **needles**. Cones are a protective covering for **seeds**.

2. The author describes conifers as "tough characters of the tree world." Why? **Answers may vary, but should include conifers' ability to withstand extremely cold temperatures, to grow on poor or very wet soil, and to grow in many different habitats.**

3. Describe three characteristics that conifers share. **Conifers have needles, cones, and tubes called tracheids.**

4. Why are conifers an important member of the habitats they occupy? **Answers may vary, but should include their value as food and shelter for animals. Conifers also provide habitat for plants such as blueberries and are hosts for fungi and lichens.**

5. Match the terms with the conifer species.

d red pine **(also known as Norway pine)**

g eastern white pine **(needles in clusters of five)**

a jack pine **(porcupines eat the bark)**

h black spruce **(root fibers used to sew birchbark canoes)**

b white spruce **(waxy white needles)**

f balsam fir **(popular for Christmas wreaths)**

c white cedar **(also known as arborvitae)**

j eastern red cedar **(male and female cones on separate tree)**

e tamarack **(only dedicuous Minnesota conifer)**

i eastern hemlock **(olive-sized cones)**

6. Which Minnesota pine species can produce over 700 cones per season? **Red pine**.

7. Forest fires actually help which species of confer to reproduce? **Jack pine**.

8. How long do female cones stay on eastern white pine? Why? **Female cones may stay on the tree for two seasons, because after they are pollinated it may take a year to fertilize the seeds inside.**

9. Only two tree species, **quaking aspen** and **balsam fir**, are more numerous than black spruce in Minnesota.

10. Black spruce and white spruce are especially good for making **paper**.

11. Native Americans used black spruce for making **canoes**.

12. How could you use the cones to identify a balsam fir? **The cones stand up on the branches and are purple when young**.

13. Why is the Witch Tree famous? How do you think it got its name? **Answers may vary. The Witch Tree grows on a rocky cliff on Lake Superior near Grand Portage. It appears to defy gravity. It is very old**.

14. Which of the 10 conifer species native to Minnesota might be the hardest to find? Why? **Eastern hemlock. It only grows in a few places. It grows slowly**.

Challenge: Can you name five other plant or animal species that are ubiquitous in Minnesota? Explain your selections. **Answers will vary. Students may select animals such as cottontail rabbits, gray and red squirrels, and white-tailed deer, and plants such as aspen trees, oak trees, grasses, or milkweed. Students should explain where they have observed the animals and plants they select**.

Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article "Ubiquitous* Conifers" by Mary Hoff. Published in the January–February 2009 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/conifers.

Name _____Period _____Date_____

1. Explain how deciduous trees are different from conifers. _____

_____

_____

2. Which tree was most prized by loggers in the 1800s?
   A. eastern hemlock
   B. larch
   C. eastern white pine
   D. aspen

3. The black spruce grows well in _____.
   A. sand
   B. peat
   C. clay
   D. loam

4. How do its flexible boughs help the white spruce survive?
   A. They reflect sunlight.
   B. Snows slides off.
   C. Birds roost on them.
   D. All of the above.

5. Which tree reminded Minnesota's early settlers of home?
   A. red pine
   B. white pine
   C. blue spruce
   D. white oak

Minnesota Comprehensive Assessments Answer Key

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1. Explain how deciduous trees are different from conifers. **Conifers have needles, which stay green all year (the larch excepted). Conifers have cones and special tubes to protect the flow of liquids from being impaired by freezing**.
2. Which tree was most prized by loggers in the 1800s? **C. eastern white pine**
3. The black spruce grows well in **B. peat**.
4. How do its flexible boughs help the white spruce survive? **B. Snows slides off**.
5. Which tree reminded Minnesota's early settlers of home? **A. red pine**

Vocabulary

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fungi	organisms that live by absorbing nutrients from plants, animals, or dead organic matter
lichens	lichens fungi and algae growing together symbiotically on rocks or trees
peat	peat layer of partially rotted plants, usually saturated with water
Scandinavia	region in northern Europe that includes Norway, Sweden, Denmark, Finland, and Iceland
scurvy	scurvy disease caused by lack of vitamin C

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 are **fungi**?	FOLD HERE	**Organisms that live by absorbing nutrients from plants, animals, or dead organic matter** are called
What are **lichens**?	FOLD HERE	What are **fungi and algae growing together on rocks or trees** called?
What is **peat**?	FOLD HERE	**A layer of partially rotted plants, usually saturated with water** is 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.

What is **Scandinavia?**	FOLD HERE	**The region in northern Europe that includes Norway, Sweden, Denmark, Finland, and Iceland** is called
What is **scurvy?**	FOLD HERE	**A disease caused by not enough vitamin C** is called
	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