

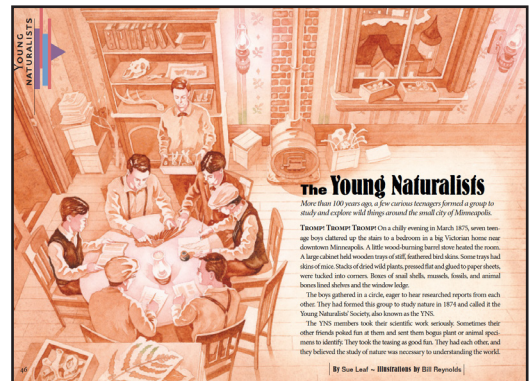
Teachers Guide

Prepared by **“The Young Naturalists” Multidisciplinary Classroom Activities**

Jack Judkins, Curriculum Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf.

Connections Published in the May–June 2014 Minnesota Conservation Volunteer.

Minnesota 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 www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html.

***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

“The Young Naturalists” tells the true story of a group of boys from 19th century Minneapolis who formed the Young Naturalists’ Society (YNS) for the purpose of increasing understanding of the natural world. The boys collected and preserved plant and animal specimens, some of which are in the Bell Museum of Natural History collection. YNS members made observations of birds, mammals, and plants and studied various topics, including aquatic biology, geology, and evolution.

Suggested reading levels:

Third through middle school grades

Total words:

1,780

Materials:

The Birds of Minnesota by Thomas S. Roberts (out of print, but may be available through your media center or public library), 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)

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Minnesota Academic Standards applications:

“The Young Naturalists” may be applied to the following Minnesota Department of Education standards:

Language Arts

Reading Benchmarks

Informational Text 4–8

Key Ideas and Details

Craft and Structure

Integration of Knowledge and Ideas

Range of Reading and Level of Text Complexity

Writing Benchmarks 4–8

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

Mathematics

Grades 4, 5, 6

4.1.1.5; 4.1.2.6; 5.1.1.3; 5.1.1.4;

5.1.3.1; 6.1.1.4; 6.1.1.3; 6.1.3.4;

Science

Grades 4, 5, 7 and 8

Content from this article may be applied broadly to standards from:

The Nature of Science and Engineering

Earth and Space Science

Life Science

Social Studies

Grades 4, 6, 7, 8

4.3.4.9.1; 6.3.4.10.1; 6.4.4.20.1;

(7.4.4.20.1 through 7.4.4.20.8);

8.3.2.3.1

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*.

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Preview (1) If available, share Roberts’ *The Birds of Minnesota*. Share how the author got his start as a member of YNS. Ask what clubs or organizations your students belong to. Why do they belong? What are the benefits of membership? Ask students to think about how the young naturalists may have benefited from their membership in YNS. (2) Another preview strategy is **KWL** (Ogle, 1986). To find out what your students already know (**K**) about natural science ask small groups to brainstorm their ideas, then combine the groups’ data to make a class list. Next, ask what students would like to learn (**W**). As you read and discuss the article you will begin to compile the (**L**) list, or what they learn while reading the article and related materials and participating in extension activities. Display your **K** and **W** ideas on poster board or paper. See www.teach-nology.com/web_tools/graphic_org/kwl for a KWL generator that will produce individual organizers for your students. KWL gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. If you use the article in science, math, or art class, you may wish to focus your prereading 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). Italicized words are not generally included on the list or in the study cards.

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 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) Students may write multiple-choice, true-false, or short-answer questions. Select the best items for a class quiz. (2) Students may retell orally or in writing the main events of the story. (3) Students may create posters that combine visual art, writing, and oral presentations.

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Assessment continued

Posters may depict one or more scenes from the story, such as a comparison of one of the main characters as a boy and as an adult. Students may work in small groups or as individuals.

Extension activities

1. “Whoooo’s Watching?,” “Nature’s Calendar,” and “Counting Critters” are three of many previous Young Naturalists articles that make great companion pieces for “The Young Naturalists.” You may encourage students to include content from related articles in evaluation and/or extension activities.
2. Ask students to imagine how technology has changed the way we learn. How would television, computers, smartphones, and the Internet have changed the way the YNS gathered, organized, and worked with information? What aspects of the study of natural science have been unaffected by technology?
3. See Clare Walker Leslie’s resources for young naturalists in References. Record phenological events in a naturalist’s notebook. Encourage students to make predictions about what they may observe based on previous observations.
4. Why is evolution (specifically, natural selection) essential for understanding how plants and animals adapt to their surroundings? Why were YNS members so excited by the recently published work of Charles Darwin? Try the peppered moth lab in Web Resources. Challenge your students to learn about the extinction of the passenger pigeon.
5. Learn how to press and display plant specimens. Create your own classroom herbarium. *Watch out for hazardous plants, such as poison ivy or poison oak.*
6. This article may be used to introduce students to the field of taxonomy (see Web Resources). What if your class discovered a new species of treefrog near your school? What would you choose for its common and scientific names?

Web resources

DNR

www.minnesotamasternaturalist.org
www.dnr.state.mn.us/nr/index.html (field guides)
www.dnr.state.mn.us/wildandrare/index.html
www.dnr.state.mn.us/rsg/index.html
www.dnr.state.mn.us/education/geology/digging/index.html

Binomial nomenclature/taxonomy

www.beatricebiologist.com/2009/09/tree-of-life.html
biology.wisc.edu/documents/dichotomous_key.pdf
www.youtube.com/watch?v=M51AKJqx-7s&nooredirect=1
www.biologycorner.com/worksheets/dichoto.html
www.stanford.edu/group/lpchscience/cgi-bin/wordpress/images/Taxonomy-T.pdf

Phenology

<https://www.usanpn.org/>
www.nwf.org/Wildlife/Wildlife-Conservation/Phenology.aspx
<https://www.aldoleopold.org/Programs/phenology.shtml>
<https://www.pwrc.usgs.gov/bpp/>
naturenetwi.blogspot.com/2011/02/nature-journaling-and-phenology.html

Collecting plant specimens

msuextension.org/publications/AgandNaturalResources/MT198359AG.pdf
apps.rhs.org.uk/schoolgardening/uploads/documents/Making%20a%20herbarium%20specimen%20leaflet_1638.pdf

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Web resources continued

Evolution and extinction

darwin200.christs.cam.ac.uk/pages/index.php?page_id=j
www.sciencekids.co.nz/sciencefacts/scientists/charlesdarwin.html
www3.nd.edu/~hgberry/biology2012/mod1/1.1.3%20peppered%20moth%20lab.pdf
www.si.edu/encyclopedia_Si/nmnh/passpig.htm

Participating in research

www.dnr.state.mn.us/volunteering/frogtoad_survey/index.html
www.dnr.state.mn.us/climate/waterlevels/lakes/volunteering.html
www.dnr.state.mn.us/eco/nongame/projects/mlmp_state.html

Inflation calculators

www.davemanuel.com/inflation-calculator.php
www.westegg.com/inflation/

Minnesota DNR Teacher Resources

www.mndnr.gov/education/teachers/index.html
www.mndnr.gov/dnrkids/index.html
www.seek.state.mn.us/res_dir.cfm

*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 webapps8.dnr.state.mn.us/volunteer_index. *Almost any Young Naturalists article will connect in some way to this month’s Young Naturalists.*

March–April 2001

“Whoooo’s Watching?” (YN article with teachers guide)
www.dnr.state.mn.us/young_naturalists/owladventures/index.html

November–December 2002

“Conservation Careers” (YN article) www.dnr.state.mn.us/young_naturalists/careers/index.html

March–April 2003

“Let’s Go Birding” (YN article with teachers guide)
www.dnr.state.mn.us/young_naturalists/birding/index.html

May–June 2006

“Look Down in the Woods” (YN article with teachers guide)
www.dnr.state.mn.us/young_naturalists/forest_floor/index.html

September–October 2006

“Ready, Set, Grow” (YN article with teachers guide)
www.dnr.state.mn.us/young_naturalists/seeds/index.html

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Related articles continued

January–February 2007

“Nature’s Calendar” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/phenology/index.html

January–February 2008

“Counting Critters” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/counting_critters/index.html

May–June 2008

“Spring to Life Ponds” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/ponds/index.html

March–April 2010

“Let’s Find Out” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/scientific_method/index.html

July–August 2011

“Agate Hounds” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/agates/index.html

January–February 2013

“Ask a Rock” (YN article with teachers guide)

www.dnr.state.mn.us/young_naturalists/rocks/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.
- Walker Leslie, C. *Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You*. North Adams, Mass.: Storey Publishing, 2003.
- Walker Leslie, C. *Drawn to Nature: Through the Journals of Clare Walker Leslie*. North Adams, Mass.: Storey Publishing, 2005.
- Walker Leslie, C. *The Nature Connection: An Outdoor Workbook*. North Adams, Mass.: Storey Publishing, 2010.

“The Young Naturalists”—Teachers Guide

Study Questions

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

1. How many years ago did the Young Naturalist’s Society (YNS) begin? _____

2. Describe the room where YNS met. _____

3. How did their friends play tricks on YNS? _____

4. On one of his birding outings Thomas Roberts discovered a large flock of _____

5. Why did YNS members believe it was important to preserve plant and animal specimens? _____

6. What can you learn about the YNS from the illustration on page 49? _____

7. Who originated the YNS? _____

8. What was special about Minnehaha Falls? _____

9. Lake Johanna was interesting because _____

10. What did the YNS study that is in the news today? _____

11. What did YNS members do that would be illegal today? _____
12. If a friend had never seen an oak savanna, how would you describe it? _____

13. Describe how YNS members collected and preserved plant specimens. _____

14. What data did Thomas Roberts note when he observed birds? _____

15. Why were YNS members interested in Charles Darwin? _____

16. What did Emma and Thomas Roberts have in common? _____

17. What year did the YNS disband? _____
18. How did Rob Williams become famous? _____

- Challenge: How much did it cost to belong to the YNS? What would it cost you in today's currency for monthly YNS dues? _____

Study Questions Answer Key

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

- *1. How many years ago did the Young Naturalists Society (YNS) begin? **Subtract 1874 from the current year to get the answer.**
- *2. Describe the room where YNS met. **Answers will vary. Encourage close observation of the illustrations on pages 46–53. Challenge students to note as many details as possible.**
3. How did their friends play tricks on YNS? **Their friends sent them bogus (fake) specimens to identify.**
4. On one of his birding outings Thomas Roberts discovered a large flock of **pine grosbeaks**.
5. Why did YNS members believe it was important to preserve plant and animal specimens? **They believed their specimens might be valuable for future scientists to study.**
- *6. What can you learn about the YNS from the illustration on page 49? **The illustration tells a lot about the boys’ activities. They discussed what they collected and/or observed. They made sketches and written accounts of their discoveries.**
7. Who originated the YNS? **Thomas Roberts and Clarence Herrick founded YNS.**
8. What was special about Minnehaha Falls? **Minnehaha Falls was a place Clarence often explored to find yellow lady’s slippers and maidenhair ferns.**
9. Lake Johanna was interesting because **there was a large colony of passenger pigeons living there, a species that became extinct during the boys’ lifetimes.**
10. What did the YNS study that is in the news today? **Rob Williams reported on copper mining in northeastern Minnesota.**
11. What did YNS members do that would be illegal today? **They killed many birds that are protected today, especially songbirds.**
12. If a friend had never seen an oak savanna, how would you describe it? **Oak savannas are places where oak trees grow in prairie grasses.**
13. Describe how YNS members collected and preserved plant specimens. **First, they made notes on where the plant was growing. Then they tried to collect as much of the plant as possible (roots, stems, leaves, and flowers). Finally, they pressed the specimen in a plant press, flattening it between papers to preserve it for future identification.**
14. What data did Thomas Roberts note when he observed birds? **In addition to recording the species’ common and scientific names, he noted the birds’ songs, what they ate, how they hunted for food, and where they rested and roosted.**
15. Why were YNS members interested in Charles Darwin? **They had read Charles Darwin’s work on evolution and wondered how bird lice had evolved.**
- *16. What did Emma and Thomas Roberts have in common? **Answers will vary. Emma and Thomas were siblings. They both had interests in nature and spent a lot of time observing plants.**
17. What year did the YNS disband? **1879**
- *18. How did Rob Williams become famous? **He became a world-renowned expert on mosses.**

Challenge: How much did it cost to belong to the YNS? What would it cost you in today’s currency for monthly YNS dues? **In order to answer the Challenge students will need the websites listed under “Inflation calculators” in Web Resources. Enter the year (1874) and \$1.00. Both sites will tell you that \$1.00 buys the same amount as \$0.05 in 1874. Multiply by two to get today’s equivalent for \$0.10. It would cost about \$2.00 per month to belong to the YNS today.**

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Minnesota Comprehensive Assessments Practice Items

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

Name _____ Period _____ Date _____

1. Which YNS member became well known for the book, *The Birds of Minnesota*?

- A. Clarence Herrick
- B. Thomas Roberts
- C. Emma Roberts
- D. Rob Williams

2. Frank Clough’s specialty was

- A. mammology
- B. botany
- C. geology
- D. pond water

3. How many boys attended the meeting depicted on page 49? _____ How do you know?

4. Why were white-tailed deer becoming less common near lakes Calhoun and Harriet?

- A. Hunters were killing them.
- B. A disease was decreasing their population.
- C. Wolves were preying on them.
- D. Their habitat was being taken over by farms and houses.

5. _____ liked to study and draw microorganisms

- A. Emma Roberts
- B. Clarence Herrick
- C. Rob Williams
- D. Frank Clough

“The Young Naturalists”—Teachers Guide

Minnesota Comprehensive Assessments Answer Key

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

1. Which YNS member became well known for the book *The Birds of Minnesota*? **B. Thomas Roberts**
2. Frank Clough’s specialty was **C. geology**.
3. How many boys attended the meeting depicted on page 49? **Seven** How do you know?
There are seven dimes on the table, monthly dues for each YNS member.
4. Why were white-tailed deer becoming less common near lakes Calhoun and Harriet?
D. Their habitat was being taken over by farms and houses.
5. **B. Clarence Herrick** liked to study and draw microorganisms.

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Vocabulary

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

aquatic	related to or living in water
botanist	scientist who studies plants
common name	a name for a plant or animal that is based on the language of everyday life
endangered	threatened with extinction
evolution	change in the inherited characteristics of biological populations over successive generations
extinct	no longer in existence
flora	plant life in a specific place and/or time
ornithologist	scientist who studies birds
scientific name	latinized, two-part name (the first part is the genus and the second part is the species)
species	group of organisms that resemble each other and may reproduce
threatened	vulnerable to endangerment

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Vocabulary Study Cards

Teachers guide for the Young Naturalists article “The Young Naturalists” by Sue Leaf. Published in the May–June 2014 *Minnesota Conservation Volunteer*.

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**
plant or animal is one

FOLD HERE

A plant or animal **that lives
in or near water** is

What is a
botanist?

FOLD HERE

A scientist who studies plants is a

A **common name**
for a plant or animal is

FOLD HERE

The name for a plant or animal
**that is based on the language of
everyday life** is its

If a animal or plant is
endangered it is

FOLD HERE

If an animal or plant is **threatened
with extinction** it is

What is
evolution?

FOLD HERE

The change in the inherited characteristics of biological populations over successive generations is called

If a plant or animal is
extinct it has

FOLD HERE

A plant or animal species that has **died out** (is no longer in existence) is

What is the **flora**?

FOLD HERE

The plant life in a specific place and/or time is called the

An **ornithologist** is

FOLD HERE

A scientist who studies birds is an

A plant or animal’s
scientific name is its

FOLD HERE

A plant or animal’s **latinized, two-part name** (the first part is the genus and the second part is the species) is its

What is a **species**?

FOLD HERE

A group of organisms that resemble each other and may reproduce is a

If an animal or plant is **threatened** it is

FOLD HERE

If an animal or plant is **vulnerable to endangerment (extinction)** it is

FOLD HERE

FOLD HERE

FOLD HERE