

# TEACHERS GUIDE

## TO “MINNESOTA'S MIGHTY OAKS”

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, January-February 2023, [mndnr.gov/mcvmagazine](http://mndnr.gov/mcvmagazine).

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*Minnesota Conservation Volunteer* magazine tells stories that connect readers to wild things and wild places. Subjects include earth science, wildlife biology, botany, forestry, ecology, natural and cultural history, state parks, and outdoor life.

**Education has been a priority** for this magazine since its beginning in 1940. “One word—Education—sums up our objective,” wrote the editors in the first issue. Thanks to the MCV Charbonneau Education Fund, every public library and school in Minnesota receives a subscription. Please tell other educators about this resource.

**Every issue now features** a Young Naturalists story and an online Teachers Guide. As an educator, you may download Young Naturalists stories and reproduce or modify the Teachers Guide. The [student portion of the guide](#) includes vocabulary cards, study questions, and other materials.

**Readers’ contributions** keep *Minnesota Conservation Volunteer* alive. The magazine is entirely financially supported by its readers.

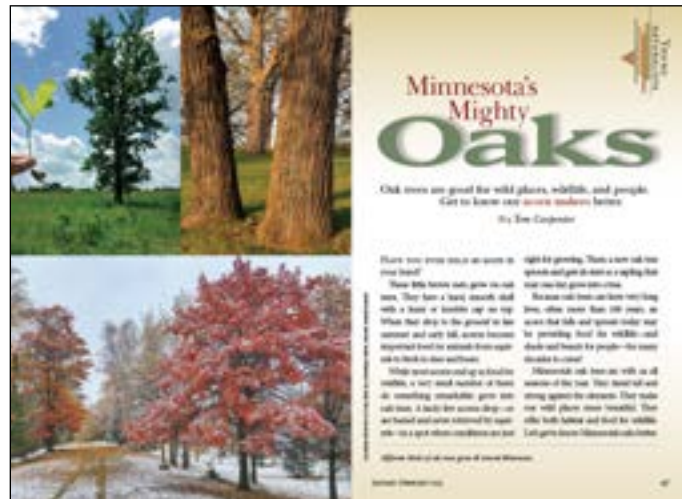
**Find every issue online.** Each story and issue is available in a searchable PDF format. Visit [mndnr.gov/mcvmagazine](http://mndnr.gov/mcvmagazine) and click on *past issues*.

**Thank you** for bringing Young Naturalists into your classroom!

# “MINNESOTA'S MIGHTY OAKS”

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**SUMMARY.** A nature journal is a wonderful tool for exploring the world around us. This Young Naturalists feature encourages students to enrich their explorations of nature by recording what they see, hear, feel, smell, and think as they encounter living and nonliving features of our environment..

**SUGGESTED READING LEVELS.** Third through middle school grades

**MATERIALS.** KWL organizer; optional resources include dictionaries, video viewing equipment, Internet access and other print and online resources your media specialist may provide.

**PREPARATION TIME.** 15–30 minutes, not including time for extension activities.

**ESTIMATED INSTRUCTION TIME.** 30–60 minutes, not including extension activities.

**MINNESOTA ACADEMIC STANDARDS APPLICATIONS.** “Minnesota's Mighty Oaks” activities described below may be used to support some or all of the following Minnesota Department of Education standards for students in grades 3–8:

## ARTS

**ARTISTIC PROCESS:** Create or Make (Benchmarks 0.2.1.5.1, 0.3.1.5.1, 4.2.1.5.1, 6.2.1.2.1)

## ENGLISH LANGUAGE ARTS (GRADES 3-8)

Reading Benchmarks: Informational Text

Key Ideas and Details (Benchmarks 3.2.1.1, 3.2.2.2, 4.2.1.1, 4.2.2.2, 5.2.1.1, 5.2.2.2, 6.5.1.1, 6.5.2.2, 7.5.1.1, 8.5.1.1)

Craft and Structure (Benchmarks 3.2.4.4, 4.2.4.4., 5.2.4.4, 6.5.4.4, 7.5.4.4, 8.5.4.4)

Integration of Knowledge and Ideas (Benchmarks 3.2.7.7, 3.2.8.8., 4.2.7.7, 4.2.8.8, 5.2.7.7, 6.5.1.1, 6.5.2.2, 7.5.1.1, 8.5.1.1)

### **WRITING BENCHMARKS (GRADES 3-8)**

Research to Build and Present Knowledge (Benchmarks 3.6.7.7, 3.6.8.8, 4.6.7.7, 4.6.8.8, 5.6.7.7, 5.6.8.8, 6.7.7.7, 6.7.8.8, 7.7.7.7, 7.7.8.8, 8.7.7.7, 8.7.8.8)

### **SPEAKING, VIEWING, LISTENING AND MEDIA LITERACY (Grades 3-8)**

Presentation of Knowledge and Ideas (Benchmarks 3.8.4.4, 4.8.4.4., 5.8.4.4.)

### **LANGUAGE BENCHMARKS GRADES 3-8)**

Vocabulary Acquisition and Use (Benchmarks 3.10.4.4, 4.10.4.4, 5.10.4.4, 6.11.4.4, 6.11.6.6, 7.11.4.4, 7.11.6.6, 8.11.4.4, 8.11.6.6)

### **READING BENCHMARKS Literacy in Science and Technical Subjects (Grades 6-8)**

Key Ideas and Details (Benchmarks 6.13.1.1, 6.13.2.2)

Integration of Knowledge and Ideas (6.13.7.7, 6.13.8.8)

### **WRITING BENCHMARKS: LITERACY IN SCIENCE AND TECHNICAL SUBJECTS (GRADES 6-8)**

Research to Build and Present Knowledge (Benchmark 6.14.7.7)

### **SCIENCE (\*CODING IS BASED ON THE 2019 COMMISSIONER APPROVED DRAFT OF MN ACADEMIC STANDARDS IN SCIENCE)**

#### **SCIENCE AND ENGINEERING PRACTICES**

3. Planning and carrying out investigations
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

#### **CROSS CUTTING CONCEPTS**

2. Cause and effect
3. Systems and system models
7. Stability and change

#### **DISCIPLINARY CORE IDEAS**

Life Sciences 2: Ecosystems: Interactions, energy, and dynamics

Earth and Space Sciences 3: Earth and human activity

## SOCIAL STUDIES

Geography (Benchmarks 3.3.1.1.2, 4.3.1.1.1, 5.3.1.1.1)

For current, complete Minnesota Academic Standards, see [www.education.state.mn.us](http://www.education.state.mn.us). Teachers who find other connections to standards are encouraged to contact *Minnesota Conservation Volunteer*.

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**PREVIEW.** What do your students already know about oak trees? Give them a chance to share their thoughts and observations. Then divide them into small groups to do a KWL activity. Give each student a copy of the organizer (see [teach-nology.com/web\\_tools/graphic\\_org/kwl/](http://teach-nology.com/web_tools/graphic_org/kwl/)) and encourage each to make notes during the group discussion. Within the groups, have students describe what they already know about oak trees and what they wonder about them. and encourage each to write down their thoughts on the organizer. As you read and discuss the article and carry out extension activities, they can then record what they learn. If you'd like to try something different, you might wish to check out the [THC and KLEW](#) frameworks.

**VOCABULARY PREVIEW.** You can find a copy-ready vocabulary list at the end of this guide. Feel free to modify it to fit your needs. Share the words with you students and invite them to guess what they think they mean. Tell them you will be reading a story that will help them understand these words so they can use them in the future! As your students encounter these vocabulary words in the story, you may want to encourage them to infer meaning using context clues, such as other words in the sentence or the story's illustrations. Students also could be encouraged to compare their inferences as to what the words mean with their earlier guesses and with the definitions from the vocabulary list.

**STUDY QUESTIONS OVERVIEW.** Preview the study questions with your class before you read the article. Then read the story aloud. Complete the study questions in class, in small groups, or as an independent activity, or use them as a quiz.

**ASSESSMENT.** You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Have students write multiple-choice, true-false, or short-answer questions based on the article. Select the best items for a class quiz. (2) After reading the article, have each student draw a tree on a large piece of paper. After drawing the tree, have them write as many oak facts as they can in leaf-shaped outlines hanging from the branches. 3) Divide students into groups of three to four. Have each group put together a skit that includes at least four things they learned about oak trees from the article. After each skit, have students call out the new facts presented so you can list them on the board.

**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. Nearly 100 species of oak are found in the United States. Have each student choose one. Give them time to research their species to learn where it is found and what special traits it has. Have them color in the regions on a North American map where their species is found. Discuss why different oaks might be found in different places. Based on what they learn through this research and sharing information with each other, have students predict what species of oak are likely to be found on or near their school grounds. Explore the school grounds to see if their predictions were correct, and if not, discuss why they may not have seen the species they anticipated.

2. The story describes two insect-related challenges for oaks: the beetles that carry the fungus that causes oak wilt and the two-lined chestnut borer, which attacks oak trees that are stressed and weakened by drought. In addition, forest experts in Minnesota are concerned about oak tree die off over the next few years due to recent droughts. Encourage students to research what homeowners can do to reduce stress on oak trees and devise a way to communicate what they have learned. This is a good opportunity to introduce students to a possible career connecting the results of research with people who can use it.

3. With the help of an adult volunteer, make “[tree cookies](#)” out of an oak branch. Teach students how to use gradually finer grades of sandpaper to smooth the cut sides. As you do, talk about the various parts of a tree cross-section—xylem, phloem, cambium, heartwood—and how each helps the tree thrive. When everyone’s cookie is well polished, varnish them and (when dry) let them take them home to give as a gift, or use as a holiday tree ornament, beverage coaster, or paperweight.

4. Acorns are rich in texture and natural beauty. Have students collect acorns from your school grounds, a nearby park, or other public area in the fall and use them for an art or craft project. Numerous ideas can be found on the Internet, or invite students to come up with ideas of their own.

5. Long before European descendants arrived in this area, Indigenous people used oak tree products for food, medicine, utensils, and more. Invite students to learn about traditional uses and share what they learn through a poster presentation.

6. Visit a park, nature center or other outdoor space with several oak trees. Divide stu-

dents into teams of three to four and have each team choose an oak tree. Have them identify what kind of oak it is using the clues in the article. Have each team write down a detailed description of “their” tree. You might want to use the Young Naturalists feature stories “Write, Sketch, Explore” and “How Big Is That Tree?” as guides. After they have finished objectively describing their trees, invite students to individually write a poem inspired by their tree. Use the objective description and the various poems associated with each to explore and discuss the difference between the two types of writing.

7. Oak savannas used to cover 10 percent of Minnesota, but today less than 1 percent remains. Lack of fire is one of the reasons for this decline, as without fire, pin oaks take over the area. Pin oaks are fast growing and shade out the slow-growing bur oak seedlings. The Minnesota Valley National Wildlife Refuge is working to restore their oak savanna by girdling pin oaks—cutting or removing bark around the trees to kill them without cutting them down, making way for bur oak seedlings to grow. Have students research this restoration project, learn why the pin oaks are girdled rather than cut down, and then evaluate the merits of the practice.

8. When oaks produce a “bumper crop” of acorns in a particular year, it is called a mast year. Guide students in learning about how mast years affect populations of acorn-eating wildlife, as well as how these mast years affect survival of future generations of oaks. Younger students could be asked to design an investigation or experiment to test the weather folklore that an abundance of acorns in the fall predict a harsh winter. Older students can be asked to use the mast year concept to construct an argument supported by evidence that changes in components of an ecosystem affect populations.

## WEB RESOURCES

### MINNESOTA DNR WEB PAGES

#### GENERAL TEACHER AND STUDENT RESOURCES

[Minnesota DNR Teachers’ Resources](#)

[Oak Wilt](#)

[Black Oak](#)

[Bur Oak](#)

[Chinkapin Oak](#)

[Northern Pin Oak](#)

[Northern Red Oak](#)

[Swamp White Oak](#)

[White Oak](#)

### RELATED MCV ARTICLES

[How Big Is That Tree?](#)

[Ready, Set, Grow](#)

[Tremendously Marvelous Trees](#)

[Minnesota Profile: Bur Oak](#)

## VIDEOS

[All About Oak Trees](#)

[Oak Tree From Acorn \(50 Days Time-Lapse\)](#)

## STUDY QUESTIONS ANSWER KEY

1 Name four kinds of animals that eat acorns. **Answers may vary but should include at least some of these: squirrels, turkeys, deer, bears, wood ducks, mallards, rabbits, chipmunks, mice, voles, woodchucks, raccoons, opossums, foxes, grouse, blue jays, woodpeckers, songbirds, insects**

2. Match each oak species with one or more traits presented in the story:

White Oak            Inside of acorn cap is hairy  
                              Rounded cap covers about 1/4 of the nut

Bur Oak                Bark is almost black

                              Acorn cap has a hairy fringe

                              Leaf lobes are pointed

                              Leaves look a little bit like a hand

                              Acorn cap is flat and only covers the top

                              Acorns mature in two years

                              Acorns fall and sprout in the spring

                              Grows in every county in Minnesota

                              Acorns often grow in pairs

Swamp White Oak    Acorns fall and sprout in the fall

                              Leaves are sharp like pins

Black Oak                      Widest part of leaf is in the middle

Acorn cap covers almost half of the nut

Northern Pin Oak    Leaves have fat lobes

[KEY]

White

Widest part of leaf is in the middle

Leaves look a little bit like a hand

Rounded cap covers about 1/4 of the nut

Acorns fall and sprout in the fall

Bur

Leaves have fat lobes

Acorn cap has a hairy fringe

Grows in every county in Minnesota

Northern Red

Leaf lobes are pointed

Acorn cap is flat and only covers the top

Acorns mature in two years

Acorns fall and sprout in the spring

Swamp White

Acorns often grow in pairs

Black

Inside of acorn cap is hairy

Bark is almost black

Northern Pin

Leaves are sharp like pins

Acorn cap covers almost half of the nut

3. Acorns form from:

**a. female flowers**

b. male flowers

c. both

d. neither



4. Acorns are rich in what kind of nutrient? **Protein**
5. How do turkeys break acorns up into small bits so they can digest them? **They grind them with their gizzards.**
6. How do squirrels help oak trees reproduce? **They carry the acorns away from the tree and bury them. The ones they don't come back to eat can grow into new oak trees.**
7. Describe three ways climate change affects oak trees. **Answers may vary. Those suggested by the story include: It can reduce the amount of water available in the spring. If climate change makes drought worse, it can make it harder for oaks to withstand pests. If it extends the growing season, it could give oaks a better start in life and may open the door to more oak species formerly found south of Minnesota.**
8. How do oaks benefit birds?
- They provide food in the form of acorns.
  - They provide food in the form of insects.
  - They provide places to nest.
  - a and c
  - All of the above**
9. Name four ways oaks help people. **Answers may vary but might include: They provide food for wildlife we like to watch and/or eat; they provide shade; they provide a quiet spot to sit and think; they add beauty to the world; they make wood we can use for home goods or fuel.**
10. What kinds of oaks are most likely to be found in a Minnesota savanna? **Bur oaks**
11. True or false: Oak wilt only hurts white oaks. **False. It can kill any kind of oak.**
12. Oak wilt is caused by:
- climate change
  - a fungus**
  - DNR foresters
  - the two-lined chestnut borer

**Challenge question:** What percent of Minnesota does savanna cover today? **0.10 x less than 0.01 = less than 0.001 = less than 0.1 percent**

- c. one million
- d. one billion

3. Name three traits that are useful for identifying oak trees. **Leaf shape, acorn shape, bark traits (other answers may be acceptable)**

4. Male oak flowers produce \_\_\_\_\_, while female oak flowers produce \_\_\_\_\_. **pollen, acorns**

5. Why is beneath an oak a great place for a spring-blooming flower? **Oaks leaf out late in the spring, so the flowers can get lots of sun.**

6. Why is oak wood good for making things? **It is strong and beautiful.**

7. Why do you think fires help prevent a savanna from becoming a forest? **Any reasonable response is acceptable; the article doesn't explicitly answer this, so the question is intended to spark thinking rather than elicit a correct answer.**

### **VOCABULARY LIST**

decade – 10 years

elements – weather

fungus – an organism that is neither plant nor animal and relies on other living things for food

gizzard – a part of a bird's digestive tract that grinds food into tiny bits

lobe – a curved portion that sticks out from an object

mature – grow up

sapling – a tree less than 4 inches in diameter 4½ feet above the ground