

# TEACHERS GUIDE

## TO “WEIRD AND WONDERFUL PLANTS”

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, September–October 2017, [www.mndnr.gov/mcvmagazine](http://www.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 Naturalist 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. It is the only state conservation magazine to claim the distinction of being financially supported by contributions from its readers.

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

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

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**SUMMARY.** Living things have a variety of adaptations that help them thrive and reproduce under the conditions in which they are found. “Weird and Wonderful Plants” introduces Young Naturalists to five native Minnesota plants with unusual adaptations and explores how their unique traits help them obtain the food they need and create future generations.

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

**MATERIALS.** KWL organizer, index cards, paper, poster board, colored pencils, crayons, pens, markers, YouTube videos (See Web Resources), dried beans, craft/building supplies (rubber bands, string, paper cups, clothespins, paper clips, plastic spoons, etc.), shoe boxes, other print and online resources your media specialist may provide

**PREPARATION TIME.** One to two hours, not including time for extension activities

**ESTIMATED INSTRUCTION TIME.** One or two 50-minute class periods (not including extensions)

**MINNESOTA ACADEMIC STANDARDS APPLICATIONS.** “Weird and Wonderful Plants” 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 3

Structure and Function in Living Systems

3.4.1.1.1; 3.4.1.1.2

## GRADES 3 AND 7

Evolution in Living Systems

3.4.3.2.2; 7.4.3.1.3; 7.4.3.2.3

## ARTS K–12

1. Artistic Foundations: Visual Arts
2. Artistic Process: Create or Make: Visual Arts
3. Artistic Process: Perform or Present: Visual Arts; Music
4. Artistic Process: Respond or Critique: Visual Arts; Music

Current, complete Minnesota Academic Standards are at [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*.

**PREVIEW.** (1) To prepare for exploring this Young Naturalists feature, review the basic biology of plants at the level appropriate for your students. What parts comprise a typical plant? How do plants obtain food? How do they reproduce? Thinking about the assumptions we make about what plants are like provides a good foundation for exploring the five unusual plants presented here. Discuss how each plant has its own unique traits, and how these traits help them survive in the world. Hint at the content of this Young Naturalists piece: that some plants have traits that take them beyond our usual expectations for what plants are like. (2) You might follow with a KWL activity. To find out what your students already know (K) about unusual plants, divide the class into small groups to brainstorm their ideas. Give each student a copy of the organizer (see [www.teach-nology.com/web\\_tools/graphic\\_org/kwl/](http://www.teach-nology.com/web_tools/graphic_org/kwl/).) and encourage each to make notes during the group discussion. Ask what students would like to learn, or what questions they have, about the topic (W). 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 or art class, you may wish to focus your prereading activity on academic standards that apply for that class.

**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.

You might wish to use the study cards (adapted from [Strategic Tutoring](#)) found at the end of the [Study Questions](#) for this Young Naturalists feature. On one half of the card, in large letters, is a key vocabulary word or phrase with smaller letters framing the word or phrase in a question or statement. On the other half is the answer to the question or the rest of the statement. Cut along the horizontal line, fold in the middle, and tape or staple, then use like flash cards. We've included a few blanks so you or your students can add new words or phrases if you'd like.

**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.

**ADAPTATIONS.** Read aloud to special needs students. Abbreviate the study questions or focus on items appropriate for the students. Adapt or provide assistance with extension activities as circumstances allow.

**ASSESSMENT.** You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas include: (1) Ask students to describe what they learned about unusual strategies some plants use to obtain food and reproduce. See the “learned” list from your KWL activity. (2) Have students write multiple-choice, true-false, or short-answer questions based on the article. Select the best items for a class quiz. (3) Posters and presentations are an excellent strategy for allowing students to demonstrate what they have learned. (4) Have students make a chart that allows them to compare and contrast the five plants features in the story.

**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. This story touches on three aspects of plant life that vary from species to species: pollination, seed dispersal, and strategies for obtaining energy and nutrients. Invite students to learn more about one of these topics, then present their findings to the class in the form of a video, poster or play.
2. What allows some insects to thrive inside a pitcher plant, while others die? Finding the answer will give more advanced students an opportunity to learn to search the scientific literature for answers.
3. Have students design and build their own seed launchers. Provide dried beans and a variety of craft/building supplies (rubber bands, string, paper cups, clothespins, paper clips, plastic spoons, etc.). Set limits on where and how devices can be tested to avoid injury from flying beans.

4. The plants described in this article are identified with two names (common and scientific). Where do plants get their scientific names? What clues might their scientific names give us as to what they're like? Put genus or species names into search box at [Dave's Garden Botany](#) to find out! Discuss why scientific names are used.
5. Obtain a carnivorous plant such as a Venus flytrap from a supplier (educational sources can readily be found online). Grow it in the classroom, observe its special structures adapted to carnivory, and feed it to watch the structures in action.
6. Indian pipe and pitcher plant are both known for some medicinal benefits. Explore the historical use of native Minnesota plants for curing ailments.
7. Each plant described in this story lives in a different type of habitat. Have students choose one plant, then learn about and share adaptations that help it thrive in its unique setting. If time and circumstances allows, have them make shoebox dioramas using found objects (leaves, pebbles, branches, etc.) from nature and background drawings (stream, forest, etc.) that depict the habitat in which their chosen plant might live.

## WEB RESOURCES

### GENERAL TEACHER AND STUDENT RESOURCES

[Minnesota DNR Teachers' Resources](#)

[DNR Kids Page](#)

### RELATED YOUNG NATURALISTS STORIES

[Young Naturalists: Ready, Set, Grow \(the science of seeds\)](#)

[Young Naturalists: Look Down in the Woods \(common plants of the forest floor\)](#)

[Young Naturalists: Niches for Everyone \(how living things live together\)](#)

[Young Naturalists: Little Habitats on the Prairies](#)

### OTHER ONLINE RESOURCES

[Dwarf Mistletoe \(Minnesota Conservation Volunteer\)](#)

[Plants That Eat Animals \(Minnesota Conservation Volunteer\)](#)

[Nature Notes: Minnesota Has Three Native Cactus Species](#)

[Botanical Society of America: Parasitic Plants](#)

[Botanical Society of America: Carnivorous Plants / Insectivorous Plants](#)

### MINNESOTA WILDFLOWERS

[Indian pipe](#)

[Jewelweed](#)

[Brittle prickly pear](#)

[Mistletoe](#)

[Pitcher plant](#)

### VIDEOS

[Orange jewelweed/Spotted touch-me-not seed capsules exploding](#)

[Seed dispersal—The great escape](#)

## STUDY QUESTIONS ANSWER KEY

1. Chlorophyll helps plants make food from what three ingredients? **sunlight, carbon dioxide, and water**

2. How many centimeters tall is a typical Indian pipe plant? (Hint: there are 2.54 centimeters in an inch.) **about 15 centimeters**

3. Match the plant to the habitat in which it most commonly grows:

**Indian pipe = forests**

**Jewelweed = dampy, shady spots**

**Brittle prickly pear = sandy, gravelly, rocky locations**

**Mistletoe = branches of a coniferous tree**

**Pitcher plant = soggy wetlands**

4. Explain the meaning of the two common names of *Impatiens capensis*.

**The plant is called jewelweed because when its flowers have dew on them they sparkle like jewels. It is called touch-me-not because when the seeds are ripe, the seedpod explodes when you touch it.**

5. How does closing its stomata during the day benefit a prickly pear cactus? **It helps it keep water inside it from evaporating in the hot sun.**

6. Compare and contrast the way jewelweed and mistletoe spread their seeds. **Ripe jewelweed seed cases shoot their seeds into the air when something brushes against them. Mistletoe also shoots its seeds long distances through the air, but pressure from liquid inside the seedpod rather than the motion of something brushing up against it is what triggers it to do so.**

7. Name three kinds of animals that eat mistletoe. **Porcupines, birds, squirrels**

8. How far can a mistletoe shoot its seeds?

A. 20 inches

**B. 20 feet**

C. 20 yards

D. 20 miles

9. What benefit do pitcher plants get from the insects they trap?

A. the insects keep mosquitoes and midges away

**B. the insects provide nutrients**

C. the insects produce a liquid the pitcher plants need

D. it keeps the insects from bothering them.

10. **Downward-pointing hairs** and a **waxy substance** make it hard for insects to escape once they have fallen into a pitcher plant's pitcher.

11. How does a pitcher plant attract insects to its trap? **It produces a sweet nectar that insects like.**

*Challenge:* Both touch-me-not and mistletoe shoot their seeds from their seedpods. What is the advantage of moving seeds away from the parent plant when they are ripe? **Answers may vary; be open to ideas not presented here. Seed dispersal reduces the likelihood the new plants that germinate will compete with their parent plant for food, water, and nutrients. It also gives the species an opportunity to expand into new habitats.**

## MINNESOTA COMPREHENSIVE ASSESSMENTS ANSWER KEY.

1. How do Indian pipe plants get their food? **Indian pipes take food from other plants through threads of fungi that connect their roots.**
2. Describe a place you have been where you might find jewelweed. Why do you think jewelweed might grow there? **Answers will vary, but the place should be damp, shady, and near a stream or wetland.**
3. What do prickly pear leaves look like?
  - A. flat, thick, green
  - B. spines**
  - C. grass
  - D. rocks
4. Name two things a mistletoe fruit contains. **Liquid and seeds**
5. How do hairs help pitcher plants trap insects? **The hairs point down into the pitcher, making it hard for insects to crawl out.**

## VOCABULARY LIST

**chlorophyll** a green molecule that uses energy from the sun to turn water and carbon dioxide into sugar and oxygen

**coniferous** bearing seeds in cones or similar structures

**favorable** helpful

**freeloading** gaining benefits from something without giving in return

**fungi** plantlike living things that get their energy from other living or dead things

germinate sprout

**midge** a tiny fly

**nectar** a sweet substance that attracts insects

**nettles** plants whose leaves create a burning feeling when you touch them

**nutrients** substances needed to live and grow

**parasite** a living thing that lives with, and gets its food from, another living thing

**pollen** the male contribution to a seed

**tension** tightness