TEACHERS GUIDE

Young naturalists

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, May-June 2025, mndnr.gov/mcvmagazine.

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 <u>student portion of the guide</u> includes vocabulary words, 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 <u>mndnr.gov/mcvmagazine</u> and click on *past issues*.

Thank you for bringing Young Naturalists into your classroom!



"Winging It"

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer*, May-June 2025, mndnr.gov/mcvmagazine.



SUMMARY. As summer nears, Minnesota welcomes the return of the monarch. "Winging It" helps Young Naturalists recognize what makes this familiar butterfly so special while providing a glimpse into their fragile future.

SUGGESTED READING LEVELS. Third through middle school grades

MATERIALS. Young Naturalist story and student study guide; Internet access, and other print and online resources your media specialist may provide; and additional optional resources for extension activities.

PREPARATION TIME. 10–15 minutes, not including time for extension activities.

Estimated instruction time. 30-60 minutes, not including extension activities.

MINNESOTA ACADEMIC STANDARDS APPLICATIONS. "Winging It" activities described below may be used to support the following Minnesota Department of Education standards for students in grades 3–8.

WRITING BENCHMARKS

Research to Build and Present Knowledge (Benchmarks 3.6.7.7, 4.6.7.7, 5.6.7.7, 6.7.7, 6.7.8.8, 7.7.7, 8.7.7.7) Text Types and Purposes (Benchmarks 3.6.1.1, 3.6.2.2, 4.6.2.2, 5.6.1.1, 5.6.2.2, 6.7.2.2, 7.7.2.2, 8.7.2.2)

Arts

Artistic Process: Create or Make (0.2.1.5.1, 4.2.1.5.1)

ENGLISH LANGUAGE ARTS

Reading Benchmarks: Informational Text Key Ideas and Details (Benchmarks 3.2.1.1, 3.2.2.2, 3.2.3.3, 4.2.1.1, 4.2.2.2, 4.2.3.3, 5.2.1.1, 5.2.2.2, 5.2.3.3, 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, 4.2.5.5, 5.2.4.4, 6.5.4.4, 6.5.6.6, 7.5.4.4, 8.5.4.4) Integration of Knowledge and Ideas (Benchmarks 3.2.7.7, 4.2.7.7, 4.2.8.8, 5.2.7.7, 5.2.8.8, 6.5.7.7)

LANGUAGE BENCHMARKS

Vocabulary Acquisition and Use (Benchmarks 3.10.4.4, 3.10.6.6, 4.10.4.4, 4.10.6.6, 5.10.4.4, 5.10.6.6, 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 Key Ideas and Details (Benchmarks 6.13.1.1, 6.13.2.2, 6.13.3.3) Craft and Structure (Benchmark 6.13.4.4, 6.13.6.6)

WRITING BENCHMARKS: LITERACY IN SCIENCE AND TECHNICAL SUBJECTS

Text Types and Purposes (Benchmark 6.14.1.1) Research to Build and Present Knowledge (Benchmark 6.14.7.7)

Speaking, Viewing, Listening and Media Literacy (Grades 3-8)

Comprehension and Collaboration (Benchmarks 3.8.1.1, 3.8.3.3, 4.8.1.1, 5.8.1.1, 6.9.1.1, 7.9.1.1, 8.9.1.1) Presentation of Knowledge and Ideas (Benchmarks 3.8.4.4, 3.8.5.5, 4.8.4.4, 5.8.4.4, 6.9.1.1, 6.9.2.2, 7.9.1.1, 8.9.1.1)

Матн

Data Analysis (Benchmarks 3.4.1.1, 4.4.1.1, 5.4.1.1, 5.4.1.2) Geometry & Measurement (Benchmarks 4.3.3.2, 5.3.2.1,) Algebra (Benchmarks 6.2.1.1, 6.2.3.17.2.4.2)

Science (*coding is based on the 2019 commissioner approved draft of MN Academic Standards in Science) Science and Engineering Practices

1. Developing and using models

- 3. Planning and carrying out investigations
- 4. Analyzing and interpreting data

- 5. Using mathematics and computational thinking
- 8. Obtaining, evaluating, and communicating information

CROSS CUTTING CONCEPTS

- 1. Patterns
- 2. Cause and effect
- 3. Scale, proportion, and quantity
- 4. System and system modles
- 6. Structure and function
- 7. Stability and change

DISCIPLINARY CORE IDEAS

Life Sciences 1: From molecules to organisms: Structures and processes Life Sciences 2: Eccosystems: Interactions, energy, and dynamics Earth and Space Sciences 3: Earth and Human Activity

SOCIAL STUDIES

Geography (Benchmarks 3.3.1.1.2, 4.3.2.3.1, 4.3.4.9.1, 6.3.1.1.1, 7.3.1.1.1, 8.3.1.1.2))

For current, complete Minnesota Academic Standards, see <u>www.education.state.mn.us</u>. Teachers who find other connections to standards are encouraged to contact *Minnesota Conservation Volunteer*.

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Preview. Introduce students to the Young Naturalists' story by reading aloud the story's title and subtitle. Invite students to share their experiences with butterflies, whether that be sightings or opportunities to watch them change life stages. Then ask students to think about the article's subtitle, "The phenomenal life and fragile future of the monarch butterfly." Have students share ideas about what this subtitle means and/or reasons why the monarch would be described as phenomenal and having a fragile future.

VOCABULARY PREVIEW. You can find a copy-ready vocabulary list at the end of this guide. Share the words with your 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.

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 story. Select the best items for a class quiz. (2) Have students create a concept map or web that graphically organizes the main ideas and details. (3) Have students write a summary of the main ideas from the story. Then have students "share and compare" their work with a partner to self-assess their learning. As they share, students can think about or respond to questions such as: How were the summaries alike and different? What ideas did you include that were different from your partner's? (4) Have students develop a model (diagram, drawing, physical model, etc) that represents the life stages of the butterfly.

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, allow students to follow particular interests, or support academic benchmarks.

1. This story concludes with the author encouraging all of us to help monarchs by planting milkweed and native wildflowers in our yards or school grounds. Bring students into the schoolyard to make observations regarding how butterfly-friendly it is. If possible, work with students to add milkweed and wildflowers to school grounds (<u>this site</u> has more information about creating monarch waystations). Alternatively, students could create posters that raise awareness of the fragile future of the monarch and things that others can do to support monarch conservation.

2.Introduce students to the concept of citizen science and the role they can play in helping scientists gather data that can help them study and track species such as monarchs (this <u>slide show</u> provides a brief introduction to citizen science and <u>Journey North</u>). Invite students to explore the citizen science monarch data through Journey North. For example, students can watch the northward migration of the adult monarchs and compare sightings and migration movements across previous years through <u>data visualizations</u>. Or they can compare different ways observation data is displayed (as data points on a map, as data in a table).

3. Invite students to look at photographs in the story. How do you think the monarch got its name? Some suggest it got its name from the black-and-gold line at the top of the chrysalis. This line reminded them of the crowns worn by human kings and queens (monarchs). Other sources suggest its name was given in honor of King William III of England, Prince of Orange. Ask students to think about what they would have named it if they had been the first to see this butterfly. Then ask students to share what they know about common names v. scientific names. Introduce the monarch's scientific name, *Da*-

naus plexippus, which in Greek means "sleepy transformation." Invite students' ideas as to what "sleep transformation" might be in reference to.

4. The author describes the monarch as familiar, but also as unforgettable and mysterious. Ask students to think of a plant or animal they would describe as familiar, yet unforgettable and mysterious. Using the animal or plant that came to mind, ask students to conduct research and write a nonfiction piece similar to "Winging It" that conveys their firsthand experience with or connection to that species, as well as what makes their chosen species both special and mysterious. Alternatively, students could write a shorter nonfiction piece about a species of their choosing, having the words form the shape of the species (similar to page 25 of the <u>Watchers of Butterflies</u> article).

5. The monarch is the only butterfly known to make a two-way migration like birds do. Provide students with a blank map of North America. Using details from the story supplemented by online research, ask students to map the migration route of the eastern population of monarchs, including the areas they travel between and the stops along the way. Students can add physical characteristics of places in the U.S. and Mexico that are important in the context of the monarch's migration. Maps should incorporate the TODALS map basics (title, orientation, date, author legend, and scale). Older students can be encouraged to research the migration route of the western population of monarchs and include that route on their map.

6. Introduce students to different types of symmetry (bilateral, rotational, asymmetrical, etc.). Ask students what type of symmetry the monarch has. Then invite students to think about other examples of species that have bilateral symmetry and generate possible ideas as to what those species with bilateral symmetry have in common. Then show students this <u>short video</u> on the science of symmetry. Using the video as a springboard, discuss with students the advantages of symmetry in species and why biologists (and mathematicians!) are interested in symmetry. Then invite students to create their own symmetrical butterflies by painting one wing of the butterfly, folding the paper together so that the paint from one side presses onto the other side, and opening it again to reveal a symmetrical butterfly.

WEB RESOURCES

Young NATURALIST STORIES Nature on the Move Special Delivery Mirrors of Minnesota Pollinator Partners MINNESOTA CONSERVATION VOLUNTEER STORIES Watchers of Butterflies Majestic Migrant

PHENOLOGY CITIZEN SCIENCE RESOURCES Journey North Correo Real Monarch Watch Tagging

CURRICULA RESOURCES Monarchs and More Teaching Tools about Monarch Butterflies The Monarch Butterfly Royal Mail: A Manual for the Environmental Educator Monarch Mission Teaching about the Magnificent Monarch

VIDEO RESOURCES <u>Watch a Breathtaking Monarch Butterfly Swarm (PBS Nature)</u> <u>Monarch Migration and Metamorphosis (National Geographic)</u>

STUDY QUESTIONS ANSWER KEY

1. The female monarch can recognize milkweed by "taste buds" at the end of her:a) feetb) proboscisc) antennae

d) tongue

2. Wildflowers are one food source for the adult butterfly. How do butterflies help wildflowers in return?

When the butterfly feeds on the flower, pollen from the flower brushes onto its head, body, wings, and legs. Later, if it visits another flower of the same kind, pollen may fall onto that blossom, pollinating the plant to help it make seeds that will be the monarch's food next year.

3. True or false: Monarchs are protected in the U.S. as an endangered species.

False. In 2024, the United States government agreed to consider protecting monarchs as a threatened species under the Endangered Species Act.

4. When the monarch butterfly first emerges from its chrysalis, what causes the wings to change from moist and crumpled to sturdy and wing-shaped?a) The exoskeleton is shed one last time.

b) Fluid from the butterfly's abdomen flows into the thin, hollow tubes that give the wings their shape.

c) The butterfly's head, which was at the bottom of the chrysalis, breaks free and helps push the crumpled wings into their sturdy shape.

d) The butterfly uses its six legs to kick the wings into shape.

5. The monarch larva molts several times during the caterpillar stage. During the final molt, what color is the exoskeleton?

- a) Pale and almost invisible
- b) Bright orange and black
- c) Yellow, green, and black stripes
- d) Lime green with a scattering of gold spots.

6. What three reasons does the story give for the decline of monarch populations? Loss of habitat from development, use of chemicals to control unwanted insects and plants that have harmed monarch and their food sources, and logging of the mountain forests where monarchs winter.

Challenge question: If the Monarch butterfly isn't a picky eater and will feed on many kinds of wildflowers, garden flowers, and flowering trees and shrubs, why does the author invite readers to plant milkweed in their yard or garden? **Suggested answer:** While the adult monarch isn't a picky eater, its young are picky eaters! Milkweed is the only thing the young will eat after hatching from their eggs.

MINNESOTA COMPREHENSIVE ASSESSMENTS ANSWER KEY.

1. Using clues from the story, which of the following statements best describes the author's main purpose for writing "Winging It?"

a. To help readers learn the four stages of the Monarch's life cycle

b. To encourage readers to recognize what makes Monarchs special and do things to help them.

c. To help readers realize what an amazing migration journey the Monarchs go through.

d. To make readers aware of reasons for the Monarch's decline in population.

2. What does the author use to help readers learn about the fragile future of the butter-fly?

- a. Photographs
- b. Vocabulary words
- c. Supporting details
- d. Population graphs

3. Compare and contrast the four generations of monarchs mentioned in the story. The first three generations all migrate northward and lay eggs before dying. The first generation mates in early spring and migrates northward from Mexico into Texas, lays eggs, and dies. The second generation hatches from those eggs, grow up, and migrates farther north, laying eggs and then dying. The third generation is born from the eggs of the second generation. These are the monarchs that return to Minnesota and arrive in the spring and early summer; they also die after laying eggs. The fourth generation emerges from these eggs in late summer or early fall and migrates south to winter in central Mexico. This fourth generation lives longer than the other three generations.

VOCABULARY

Metamorphose – to change or transform Proboscis – a long, flexible, tube-shaped sucking mouthpart Pollinate - to take pollen from one plant or part of a plant to another so that new plant seeds can be produced Larva – an immature form of an insect that differs from the adult; the stage between egg and pupa Pupa – developmental stage between the larva and adult in insects undergoing complete metamorphosis Chrysalis – another name for the pupa of a butterfly

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