YOUNG NATURALISTS

TEACHERS GUIDE

to "10 Signs of Spring"

Multidisciplinary classroom activities based on the Young Naturalists nonfiction story in *Minnesota Conservation Volunteer,* March-April 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 student portion of the guide 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 mndnr.gov/mcvmagazine and click on *past issues.*

Thank you for bringing Young Naturalists into your classroom!

"10 Signs of Spring"

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

Summary. As springtime shifts in temperature and light affect plants and animals around us, nature has many exciting sights in store for us! "10 Signs of Spring" provides Young Naturalists with information on various sights and sounds that signal springtime's arrival and encourages them to record their own springtime observations.

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. ""10 Signs of Spring" 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, 6.7.7.7, 6.7.8.8, 7.7.7.7, 7.7.8.8, 8.7.7.7, 8.7.8)
Literacy in Science and Technical Subjects (Benchmarks 6.14.1.1, 6.14.7.7)

Arts

Artistic Process: Create or Make (0.2.1.5.1, 4.2.1.5.1)

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)

Writing benchmarks:

Text Types and Purposes (Benchmarks 3.6.2.2, 4.6.2.2, 5.6.2.2, 6.7.1.1, 6.7.2.2, 7.7.1.1, 7.7.2.2, 8.7.1.1, 8.7.2.2
Research to Build and Present Knowledge (Benchmarks 3.6.7.7, 4.6.7.7, 5.6.7.7, 6.7.7.7, 6.7.8.8, 7.7.7.7, 7.7.8.8, 8.7.7.7, 8.7.8)

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, 6.9.4.4, 7.9.4.4, 8.9.4.4)

Math

Data Analysis (Benchmarks 3.4.1.1, 4.4.1.1, 5.4.1.1, 5.4.1.2)

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

6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
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
Life Sciences 4: Biological Evolution: Unity and diversity
Earth and Space Sciences 3: Earth and Human Activity

Social Studies

Geography (Benchmarks 4.3.4.9.1)

For current, complete Minnesota Academic Standards, see www.education.state.mn.us. 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 out loud the story's title, "10 Signs of Spring." Invite students to share their favorite sights, sounds, and smells of spring. Then ask students to think about their favorite spring activities and how they relate to seasonal changes in daylight and temperature.

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) Use a "Round Robin Retell" format to assess what students learned through the story. Students sit in a circle, and each student paraphrases a key idea from the story. (3) Provide students with a list of the ten signs of spring from the story, asking them to recall one detail from the story about five or more of the signs of spring.

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. Bring students into the schoolyard to make their own observations of signs of spring. Their observations could be used to write and illustrate their own "10 Signs of Spring" story. Or students could create phenology journals, patterning after the beautifully illustrated entries in Edith Holden's journals, or the more simple yet descriptive example at the end of this phenology story. .

2. Springtime has been a source of inspiration for poets throughout the ages. Invite students to select and read examples of spring poems. Using the inspiration of students' favorite signs of spring, a springtime walk outside, or quiet time in a "sit spot," ask students to write their own spring poems or to illustrate one of the poems they read earlier. Additionally, students could create engaging audio recordings of a poem (one of the examples, or one of their own) accompanied by relevant visual displays.

3. Phenology is not new. Humans have been observing and tracking natural events for as long as anyone can remember. The first written phenology records date back over 2000 years ago, with Chinese farms keeping track of insect life cycles to help them know when to plant their fields. Invite students to think about ways in which seasonal observations have aided in human survival throughout history. Today, data from seasonal observations guides decision-making for a wide range of natural resource management and human health concerns. Invite students to skim the examples on this information sheet and select one to learn more about it. Students can summarize what they learned and report back to their peers. Using what they have learned, ask students to construct an argument with evidence to support the claim that phenology is a critical indicator of ecosystem responses to environmental changes.

4. Snow fleas, also known as springtails, are one of the featured signs of spring in the story. Unlike their cousins who stay dormant over winter, snow fleas produce an anti-freeze-like protein that helps them keep eating organic material even in sub-zero temperatures. On warm spring days, snow fleas rise to the surface of the snow to find new food sources. Venture out with your students in search of snow fleas on a warm March day.

5. While many of us are used to thinking about our year as having four seasons, the Anishinaabeg have five seasons! Rather than spring, there is early spring, Ziigwan, and late spring, Minookimi. Invite students to learn more about these two seasons of spring through this short article and language lesson by World Wildlife Fund Canada. Then invite students to research Indigenous names of the months or moon cycles to see how these names reflect phenological events.

6. Have students create their own rain gauge (example instructions). Students can collect rainfall data at home during a month in the spring, recording their data on a graph or spreadsheet. Variations in recorded data across students provide opportunities for thinking about measurement accuracy and reasons for local variations in rainfall amounts. Using the classroom average of total rainfall, compare students' data with rainfall amounts from prior years for that same month using data from the Minnesota State Climatology Office.

7. A recent discovery by Jena Shields, a biophysicist at Cornell University, provides a reason why dandelions are so successful at spreading. Based on where seeds are on the seed head, they are susceptible to different wind directions. Seeds on the side facing a breeze let go, and the seeds on the other side hold on until the wind shifts. This makes sure that the seeds get dispersed in all different directions, thus helping dandelions spread in many different directions. Ask students to design and conduct an experiment to test her research finding (the detachment of dandelion seeds is sensitive to the wind direction). Alternatively, students could design and conduct an experiment to determine if wind speed is a factor in the directional detachment of dandelion seeds.

8. Humans also shape the landscape! As a class, generate a list of ways humans modify the physical environment and how they are, in turn, affected by these modifications. Then, look at the list and think about and discuss how this list of human influences differs from the forces described in the article (wind, ice, water, etc.). Encourage students to look for signs of human activity and consider the impacts of this activity on nature the next time they visit a "natural" outdoor space.

Web Resources

Young Naturalist stories

Nature's Calendar
Nature on the Move

General Teacher and Student Resources

Minnesota DNR Teachers' Resources

Minnesota Conservation Volunteer stori

12 Months of Minnesota
Phenomenal Phenologist

Phenology Citizen Science Resources

Minnesota Phenology Network
USA National Phenology Network

Curricula Resources

Nature's Notebook Classroom Activities
Penology Wheels

Study questions answer key

Which species in the story is migratory?
a) **Monarch**
b) Morel
c) Chickadee
d) Snow flea

2. What are two details from the story that support the author's description of dandelions as being "here to stay."
Dandelions thrive in all kinds of conditions, from soggy summers to dry droughts. A single flower can contain up to 20,000 seeds.

3. True or false: If you see reddish bulges on the tips of silver maple branches, the ground is probably still frozen.
False. As the ground thaws, sugary sap rises from the roots of the tree through tubes in the trunk to the tallest branches. The energy the sap provides allows the tree to produce the flowers that blossom out of the reddish bulges.

4. Which sign of spring does the author describe as being helpful to nature?
Snow fleas! They help by decomposing dead leaves and other organic material, making nutrients available for new plant growth in spring.

5. Which two signs of spring are very important to Minnesota's bees?
a.The call of the chorus frog and the movement of snow fleas
b. The blooming of dandelions and silver maple blossoms
c.The blossoming of pussy willow and the emergence of the morels
d.**The blooming of dandelions and blossoming of pussy willows**

6. A hundred years ago it would have been unlikely to hear or see the return of sandhill cranes in the springtime. According to the story, what are the two reasons for being able to see and hear them again?
A law protecting migratory birds and an increase in open spaces helped bring them back.

7. What species in the story has a name that means "lion's tooth?"
a. Dandelion
b. Morel
c. Pussy willow
d. None of the above

8. True or false: On warm days in March, snow fleas emerge from the snowpack, using tiny wings to propel themselves through the air.
False. Snow fleas do not have wings. They propel themselves by snapping a forked tail-like structure called a furcula. This is why they are sometimes called spring-tails, due to their ability to catapult through the air.

9. List three signs of spring from the story that are wetland species.
Pussy willows, red-winged blackbirds, and boreal chorus frogs

10. Which of the following is a tool that a phenologist might likely use?
a) Scissors
b) Calendar
c) Microscope
d) Microphone

Challenge question: What do the black-capped chickadee, red-winged blackbird, and boreal chorus frog have in common, besides being one of the 10 signs of spring highlighted in the story? **Suggested answer: The males are the noisier species in the spring; the males make the calls of the springtime breeding season.**

Minnesota comprehensive assessments answer key.

1. What genre is "10 Signs of Spring?"
a. Fiction
b. Historical Fiction
c. Nonfiction
d. Realistic Fiction

2. What can we infer from the author's statement, "Love them or hate them, dandelions are here to stay."
a. Climate change will not affect dandelions.
b. Even though they are not native to Minnesota, dandelions are good for people and bees.
c. People help spread seeds of dandelions when they pick and blow dandelions, making them likely to stay in Minnesota for a very long time.
d. **Not all people feel the same way about dandelions.**

3. What detail in the story supports the author's description of spring as a gradual process ("When nature awakens from a long winter's nap, it's a gradual process.")? **"Because the axis on which the Earth spins each day is tilted relative to its yearly path around the sun, the northern hemisphere gets gradually more darkness than daylight from September to April, and gradually more daylight than darkness from April until September."**

Vocabulary

Phenology – the study of seasonal changes
Boisterous – noisy, energetic, cheerful and rowdy
Dormant – temporarily slowed down or inactive
Furcula – the forked tail-like structure that helps a snow flea propel itself through the air
Amplify – to enlarge or expand; to make a sound louder
Mycelium – a root-like structure of fungus consisting of a tangled network of vegetative threads
Emerge – to appear or become known
Elongated – stretched out; something that is longer or thinner than usual
Metamorphose – to change or transform

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