
Phenology: Sharing and Comparing Your Schoolyards' Clocks!

Activity Overview

Students will learn about phenology and regional differences.

Objectives

Students will:

- Define and give examples of phenology
- Understand the relationship between phenology and climate
- Compare phenological trends across regions

Subjects Covered

Science, Language Arts, and Art

Grades

Targeted for grades 5 through 8

Modifiable for grades 3 through 12

Materials

Internet access, copy of Aldo Leopold's letter, tools to measure variables like temperature and precipitation or access to weather data (newspapers or online).

State Standards

Science:

Decide which questions to ask (A.4.1)

Decide which data should be collected (A.4.3)

Decide on changes that have occurred (A.4.5)

Develop themes for questions (A.8.1)

Use models to predict actions and events (A.8.6)

Apply themes to develop future visions (A.12.1)

Language Arts:

Create or produce writing (B.4.1, 8.1, 12.1)

Understand forms, structures, & punctuation marks (B.4.3, 8.3, 12.3)

Art:

Use sketching to develop ideas (C.4.6)

Use sketching to experiment & develop ideas (C.8.5)

Background

You may have learned about Aldo Leopold and how phenology is used to show climate change in the "Leopold Legacy" activity. Our goal in that activity was to show how phenology (the timing of life cycles) is changing from one year to the next. But phenology is also different from one place to the next! If you're from Wisconsin, you know that the timing of the seasons is very different even just within our state. Phenology is experiencing a "rebirth," since so many people are interested in using it to understand climate change. But people have been practicing it for thousands of years for many other reasons: predicting the onset of seasonal allergies, deciding when to plant crops and when to safely travel across waterways, etc. Can you think of other reasons for practicing phenology? (Students may think of planting gardens, going swimming, planning vacations...and other "clocks" in their lives include the school year, birthdays, etc). Why would you plan to plant your garden later in northern Wisconsin than in southern Wisconsin? You may wish to refer to "Ecosystem Comparisons" (Section 1-5) to remember ways to compare schoolyard sites.

Activity Description

We'll learn about how phenology varies throughout Wisconsin, by partnering with phenology "pen pals" and using internet resources. Aldo Leopold wrote lots of letters to his family when he was away at boarding school as a high school student. Many of them contain phenological observations! Here's part of a letter to his brother:

"More things to write about now than time to write in. After a long hard all-afternoon search I found the first phoebe, not a hundred yards from where they first were last year. They frequent boggy woods containing skunk cabbages now, as those flowers draw all the early insects, and have been blooming for several weeks. The first water spiders are out, and a single frog was piping down to the 'Big Woods.' Crows are building nests."

Discussion

If you look at the Leopold phenology data, you might be able to guess the date of this letter, based on looking at when the phoebe arrives and skunk cabbage blooms. Aldo usually saw the first skunk cabbage bloom in Baraboo on March 24, and the first phoebe arrive on March 25. But this letter was written at Aldo's New Jersey boarding school! How would spring phenology be different in New Jersey than in Wisconsin? Also, it sounds like his observations in the letter are looking at the peak of skunk cabbages, not just the first ones. (In case you're wondering, the letter is dated March 22, 1905).

Sharing and Comparing Your Schoolyards' Clocks! (cont.)

Experiment with sketching for complex solutions (C.12.6)

Know art communicates ideas (G.4.1)

Know artwork has meaning (G.4.2)

Create art that has meaning (G.4.4, G.8.4, G.12.4)

Know visual images are thinking & communication tools (G.8.1)

Use visual images as tools for thinking & communicating (G.12.1)

Create art that has complex meaning (G.12.4)

Use drawing to examine objects (H.4.2)

Draw, paint, sculpt from life (H.8.3)

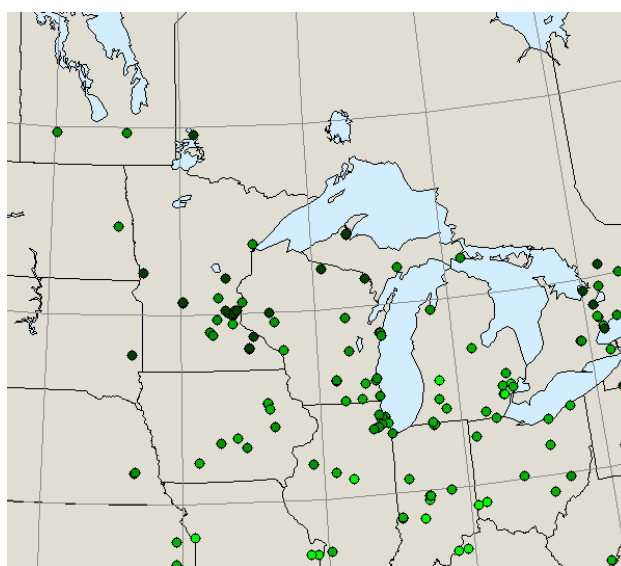
Use observation to draw, paint, sculpt from life (H.12.3)

Source

Sarah Wright from Center for Biology Education, University of Wisconsin-Madison

Aldo's letter gives us a great idea for learning about how phenology varies with geography. What might students see in the spring in northern Wisconsin schoolyards compared with those in southern Wisconsin? Is there a difference in phenology going from east to west, along a gradient of declining precipitation? You may wish to connect with a classroom or two in the EPS network to exchange letters, emails, and photos of phenological events in your schoolyard. It will be a great way to get to know each other and learn about phenology! Important observations to note and compare may include how your schoolyards differ in things like average temperature and rainfall (how might these affect phenology? Generally, warmer and/or drier weather causes plants to do things earlier).

Some networks of schools already track certain phenological events. For example, Journey North connects classrooms across North America to track events like monarch migration and lilacs blooming. One event that they track which could be useful to prairie people like us is milkweed phenology. The map below shows how the greening up of the first milkweed varies across the Midwest:



Images from Journey North, www.journeynorth.org

You can find maps like these by going to the Journey North website and clicking on "This Season's Projects" and then on "Maps." You can even find contact information for schools on the map by clicking on the "information" tool on the map.

Sharing and Comparing Your Schoolyards' Clocks! (cont.)

Extensions

- Contribute your own data to a network like Journey North.
- Create a photographic phenology journal of your schoolyard throughout the year, and share it with another school, another classroom, or students' families.
- Create illustrations to show the phenological changes of a particular plant or animal species, and share them.
- Begin a phenology pen pal relationship with a classroom that has never heard of phenology before.
- Put your writings together to make A Schoolyard Almanac.

Additional Resources

Books

- Bates, J. (1997). *A northwoods companion: Spring and summer*. Mercer, WI: Manitowish River Press.
- Bauer, C. & M. Smith Fry. (2000). *My nature journal: Explorations of the natural world using phenology*.
- Cochrane, T.S., K. Elliot, & C.S. Lipke. (2006). *Prairie Plants of the University of Wisconsin-Madison Arboretum*. Madison, WI: University of Wisconsin Press.
- Leopold, A. (1949). *A Sand County Almanac*. New York: Oxford University Press.
- Weber, L. (1996). *Backyard Almanac*. Duluth, MN: Pfeifer-Hamilton Publishers.
- Wright, S.D. & N.L. Bradley. (2008). *Thinking like a flower: phenology and climate change at the Leopold Shack*. In *The Vanishing Present: Wisconsin's Changing Lands, Waters, and Wildlife*. Chicago: University of Chicago Press.

Websites

- Project BudBurst, National Phenology Network citizen science campaign to track the seasons: www.budburst.org
- Journey North, educational site on phenology for schools: www.journeynorth.org
- Earth Alive!, Madison Metropolitan School District & Aldo Leopold Nature Center site on phenology: www.naturenet.com/EarthAlive

Assessments

- Students present their phenological works to peers or adults
- Students create a "phenology gallery" or interactive exhibit to demonstrate phenology to other students
- Students write a phenological story
- Students create a "calendar wheel" (like the round Mayan calendars) which places phenological events within their proper season/month for their local climate
- Students create maps or charts which convey in words & pictures how phenology is different in two or more locations