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# Sharing and Comparing Your Schoolyard Clocks

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## Activity Overview

Students will learn about phenology and explore 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, Art

## Grades

Targeted for grades 5 through 8

Modifiable for grades 3 through 12

## Activity Time

50 minutes

## Season

Any

## 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)

**Technology options:** Measure onsite weather data with digital temperature probes, soil moisture probes, and digital humidity and rain gauges.

## Source

Sarah Wright from Center for Biology Education

Modified from Earth Partnership for Schools K-12 Curriculum Guide, University of Wisconsin Board of Regents.

## Background

Phenology (the timing of life cycles) changes from year to year and place to place. If you are from Indiana, 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 including: predicting the onset of seasonal allergies, deciding when to plant crops and when to safely travel across waterways. You can begin this activity by asking the students if they can think of other reasons for practicing phenology? (Students might mention planting gardens, going swimming, planning vacations and/or other "clocks" in their lives like the school year or birthdays). Or perhaps you might ask the students why you would plan to plant your garden later in northern Indiana than in southern Indiana?

## Activity Description

We will learn how phenology varies throughout Indiana, 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 is 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 not his home in Wisconsin! 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 are wondering, the letter is dated March 22, 1905).

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 Indiana schoolyards compared with those in southern

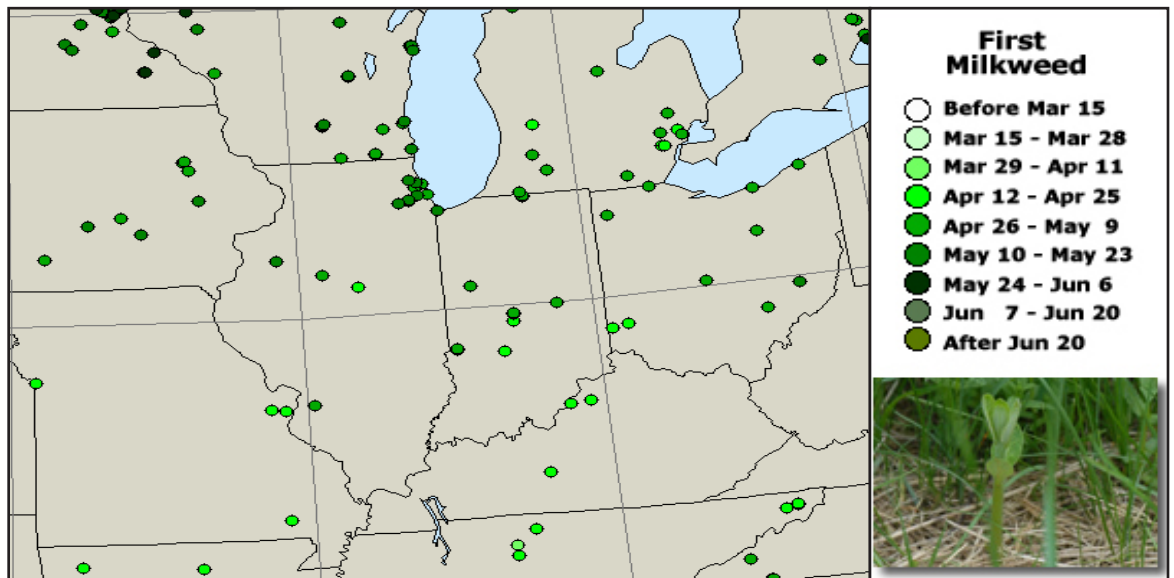
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Indiana? Is there a difference in phenology going from east to west, along a gradient of declining precipitation? You may wish to connect with a classroom or two in the EPS network to exchange letters, emails, and photos of phenological events in your 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, rainfall, soil moisture, and/or humidity levels.




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 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](http://www.journeynorth.org)

You can find maps like these by going to the Journey North ([www.journeynorth.org](http://www.journeynorth.org)) and clicking on “Phenology”. You can even find contact information for schools on the map by clicking on the “information” tool on the map.

### Extensions

-  Contribute your own data to a network like Journey North.
-  Create a photographic phenology journal of your schoolyard throughout the year. Share this digital presentation with another school, classroom, or students’ families.
- Create illustrations to show the phenological changes of a particular plant or animal species.
-  Use email to begin a phenology pen pal relationship with a classroom that has never studied phenology.
- Put your writings together to make A Schoolyard Almanac.

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## Additional Resources

### Books

- Bauer, C. and M. Smith Fry. 2000. *My nature journal: Explorations of the natural world using phenology*. Printed by the Arboretum Bookstore: Madison, Wisconsin. <http://uwarboretum.org/bookstore/>
- Leopold, A. 1949. *A Sand County almanac*. New York: Oxford University Press.
- Walther, Gian-Reto. 2002. *Ecological responses to recent climate change*. Nature, Volume 416.
- Weber, Larry. 1996. *Backyard almanac*. Duluth: Pfeifer-Hamilton Publishers.
- Weber, Larry. 1998. *Teaching with the seasons*. Green Teacher, No. 54.

### Websites

- Letter Writing Resources: [http://www.education-world.com/a\\_lesson/lesson281.shtml](http://www.education-world.com/a_lesson/lesson281.shtml)
- National Sustainable Agriculture Information Service: <http://attra.ncat.org/attra-pub/phenology.html>
- The National Phenology Network: <http://www.usanpn.org/>
- Project BudBurst, National Phenology Network: [www.budburst.org](http://www.budburst.org)
- Journey North: [www.journeynorth.org](http://www.journeynorth.org)
- Phenology and Climate Change: [www.windows.ucar.edu/tour/link=/life/phenology\\_climate\\_change.html](http://www.windows.ucar.edu/tour/link=/life/phenology_climate_change.html)
- Encyclopedia of Earth: <http://www.eoearth.org/by/topic>

## 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 and pictures how phenology is different in two or more locations.