



Signs of the Seasons: A Maine Phenology Project

<http://umaine.edu/signs-of-the-seasons/>

Phenology Calendar Activity

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Grade level: K-adult

Themes: Phenology, climate change

Activity type: Hands-on, group or class discussion

Setting: Classroom, conference room, meeting space

QUESTIONS

What is phenology?

When do natural and human events happen in your community?

Is the timing of some events changing? If so, how?

What might be the consequences of these changes?

OVERVIEW

Participants create a month-by-month calendar of phenological events (i.e., seasonal biological events such as flowering, migrations, and fall foliage) on a chalkboard, whiteboard, or large sheets of paper hung up around the room. They then discuss the calendar of events, learn a formal definition of phenology, and discuss possible consequences of changes in phenology timing where they live (see attached handout with examples of phenology-related climate change effects). The activity can be particularly effective if you incorporate discussion of climate change (which is causing changes in the timing of many phenological events), although it is not necessary.

This activity reinforces the idea that phenology is all around us all the time—we already see it and understand it. Participation in Signs of the Seasons (or other phenology citizen science projects) is simply a way to capture important information about local variations in the timing of phenology. Scientists and resource managers use this information to understand how

climate change is affecting plants, animals, and humans, and how to best manage these changes.

EDUCATION STANDARDS

Maine Learning Results (*Science and Technology*)

A1 Unifying Themes – Systems

3-5. Students explain interactions between parts that make up whole man-made and natural things.

6-8. Students describe and apply principles of systems in man-made things, natural things, and processes.

9-Diploma. Students apply an understanding of systems to explain and analyze man-made and natural phenomena.

A3 Unifying Themes – Constancy and Change

3-5 a. Recognize patterns of change including steady, repetitive, irregular, or apparently unpredictable change.

6-8. Students describe how patterns of change vary in physical, biological, and technological systems.

E1 The Living Environment – Biodiversity

3-5. Students compare living things based on their behaviors, external features, and environmental needs.

6-8. Students differentiate among organisms based on biological characteristics and identify patterns of similarity.

E2 The Living Environment – Ecosystems

3-5. Students describe ways organisms depend upon, interact within, and change the living and non-living environment as well as ways the environment affects organisms.

6-8. Students examine how the characteristics of the physical, non-living (abiotic) environment, the types and behaviors of living (biotic) organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are part.

LEARNING OBJECTIVES

- Participants develop a working definition of phenology
- Participants understand that the timing of phenological events can change, particularly as a result of changes in climate
- Participants identify some of the actual or potential local impacts of changes in phenology

MATERIALS

- Large chalkboard or whiteboard, or 12 sheets of flip chart paper with markers

TIME NEEDED

15-20 minutes for participants to create calendar

20 minutes for discussion and reflection

ACTIVITY PROCEDURE

1. Before the activity, create 12 large boxes on your chalkboard or whiteboard, or hang 12 sheets of paper around the room and label each box/sheet with a month of the year.

2. Ask the students to get up and take chalk/markers and fill in the calendar with events (plant, animal, and human) that they look forward to (or would prefer to avoid) each year, such as the timing of spring flowering and songbird arrivals, berry seasons, fall foliage, annual festivals, such as maple or apple festivals, holidays, sports seasons, hunting or fishing seasons...etc. Do not use the word phenology for this portion. *Note: when working with very young students, participants may draw instead of write, or an adult can capture their ideas in writing.*
3. Introduce the concept of phenology, and explain that it is represented by the events that the participants have put into the calendar. Provide a formal definition of the word phenology, and explain that the study of phenology includes the influence of local climate:

“Phenology is the study of periodic plant and animal life cycle events and how these are influenced by seasonal and interannual variations in climate.”

(<http://en.wikipedia.org/wiki/Phenology>)

Phenology is ubiquitous in the world around us, yet, until recently, the word has been relatively obscure. Reinforce the idea that this activity shows the depth and variety of participants’ personal knowledge of and connections with phenological events in their own backyards and communities.

REFLECTION/FORMATIVE ASSESMENT IDEAS

Reflection: Ask participants to share any observations they might have made about the differences in timing among different species. Have they noticed that the timing of some events is changing, while that of others is not? How might we document these changes? Are there records that we could use to find out? What might cause changes in phenology? Are the changes likely to be uniform? What are some consequences (actual or potential) of changes in phenology for people, plants, and animals? Follow up this line of questions with an example or two of ways that different species are indeed changing in different ways, examples of how scientists (or others) have documented these changes, and the consequences seen in these areas.

Formative assessment: Ask students to create their own personal phenology calendar on a piece of large paper or in their science journal. It can either be written or illustrated. Ask them to fill in events for each month (human, plant, or animal) that they feel represent the phenology of their lives and the seasonal changes they look forward to each year.

EXTENSION IDEAS

This activity can be used to identify phenological events that the community is particularly interested in investigating, or sources of historical data that may be particularly valuable. For instance, a coastal community might be very interested in understanding how the timing of fish migrations is changing. Some participants in the group may know of records of past fish runs—e.g., town records, newspapers, journals of family members, etc.—that could be used to investigate the changes.

RESOURCES

Signs of the Seasons (<http://umaine.edu/signs-of-the-seasons>)
USA National Phenology Network (<http://www.usanpn.org>)

For assistance contact:

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