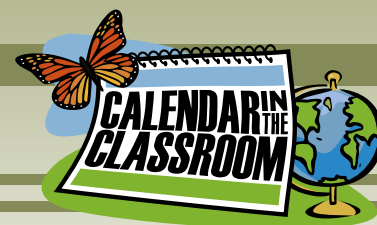




Changing Seasons



Overview

In these sessions, which are distributed throughout the school year, students will discover the phenological events that signal the changing of the seasons as they use information from the *Minnesota Weatherguide Environment™ Calendar* and collect original data as they make observations outdoors. In the process, students work in teams to create four pictures depicting the changing seasons and the phenological events for each season.

Standards/Benchmarks *

- Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information. ELA (5.2.3.3)
- Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. ELA (5.2.5.5)
- Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. ELA (5.8.2.2)
- Describe how plant and animal structures and their functions provide an advantage for survival in a given system. Science (5.4.1.1.1)
- Give examples of beneficial and harmful human interaction with natural systems. Science (5.4.4.1.1)

Background

Phenology is the branch of science dealing with the relationship between climate and periodic seasonal occurrences in nature, such as the migration of birds or the flowering of plants. Phenological events are those resulting from seasonal changes in nature.

Biology is the scientific study of life and living things, including their origin, diversity, structure, activities and distribution. Here we consider biological events that result from seasonal changes.

The Activity

Warm Up

1. Read *Reasons for the Seasons* by Gail Gibbons
2. Discuss each season as you read the book.

Day 1

1. Define Phenology with the class and record it in their journals.
2. Discuss the seasons and what months make up the different seasons in Minnesota.
3. In their journal have the students divide the page into four sections and label each section with a season. Divide the class into four groups and assign each group a season to research.

Time:

- Day 1 50 min.
- Day 2 50 min.
- Day 3-5 40-50 min.

Skills:

- Team building
- Critical thinking
- Observing
- Recording data
- Writing
- Drawing/Designing
- Interpreting
- Predicting
- Drawing conclusions

Vocabulary:

- phenology
- phenological events
- biological events
- physical events

Materials Needed:

- *Minnesota Weatherguide Environment™ Calendars*
- colored pencils
- science notebook
- straightedge
- MN field guides
- easel; easel paper; post-it notes
- *Reasons for the Seasons* by Gail Gibbons

Signs of Fall (Sept./Oct./Nov.) (Have students predict what will be different in a month or two.)	Signs of Winter (Dec./Jan./Feb.)
Signs of Spring (Mar./Apr./May)	Signs of Summer (Jun./Jul./Aug.)

4. They should think about and include phenological observations of animals, plants, weather, night skies, Minnesotans' recreational and work activities, etc.

Note: Human activity is not considered a phenological event, but is a response to phenological events.

5. Allow each group time to brainstorm phenological observations of the seasons. Use current and previous *Minnesota Weatherguide Environment™ Calendars* as a resource. Point out the Jim Gilbert Nature Notes in the calendar for each month. Walk around and assist as needed.

6. Take one student from each season group to become a new group of four. Have the students teach and share with each other what their groups came up with for the phenological observations for their seasons. Give them time to record information in their science notebook or journals. Walk around and assist.

7. Bring class together for class discussion and to check for understanding.

Day 2

1. Display a picture from the *Minnesota Weatherguide Environment™ Calendar*. Discuss the season in which the picture was taken. How do you know? What animals would you expect to see in this picture?

2. As a class, discuss what this picture would look like in the winter, summer, fall, spring. What would change? (Animals, plants, weather, climate, colors, recreational activities, etc.) Why? Draw an example together as a class. Review the components of a scientific drawing and how to label your drawing. Record phenological observations below each picture.

3. Show students a picture depicting a season.. Tell them they are to draw the exact same scene in each of the seasons in their journals. Label each drawing with the month they are depicting. They can add additional things to their picture, but they should fit the season. They can use their phenology notes, *Minnesota Weatherguide Environment™ Calendars*, and Minnesota field guides for reference. This is a scientific drawing so they are to label the drawings and record their phenological observations below each picture.

Day 3-4

1. Take students outdoors to record observations of a plant, they may also draw and/or photograph the plant to accompany their observation notes and questions. Because they will have to return throughout the year they should choose a plant that is likely to be permanent and easy to relocate even in snow. Drawing a map of its location might also help. Trees can be a good subject for this activity. Have students revisit this plant at least two more times—once in winter and once in spring.

2. Time to work in class.

Wrap Up & Assessment

Day 5

1. Have science notebooks or journals open on student's desks to start this assignment. Create a chart on the board with "Something I Observed," and "Something I Wondered." Give each student 2 post-it notes to record what they observed and what they are still curious about. Allow students to do a "museum walk" (view the notebooks) taking notes on their post-its. As they finish students will put post-its on the board.

2. Discuss students' observations.

Questions for Discussion

· How do animals adapt to the different seasons in order to survive? For example, snowshoe rabbits change color, many mammals grow a heavy winter coat of fur, and frogs and turtles may burrow in the mud at the bottom of a pond.

- How are migration and hibernation related to phenology? Due to the meteorological changes associated with winter, birds migrate and some animals go into hibernation.
- How do plants adapt to the different seasons in order to survive? For example, deciduous trees drop their leaves in the fall. Perennials die back, leaving only the roots (and stems in some plants) alive – waiting for the warmth of spring to start growing again.

Extensions

- Have them choose a location/scene around school or home to watch and record observations throughout the different seasons (they could take pictures or draw).
- Research more in depth on how humans impact an environment, both the benefits and drawbacks.
- Draw a picture in the season of their choosing predicting what they think that scene will look like in ten, twenty, or a hundred years.

Resources

Gibbons, Gail: *Reasons for the Seasons*
 Minnesota Weatherguide Environment™ Calendar

* Minnesota Academic Standards

Standards Met

Subject	Code	Standard	Benchmark
ELA	5.2.3.3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information.
	5.2.5.5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.	Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.
	5.8.2.2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	Summarize a written text read aloud or information presented in diverse media, formats, including visually, quantitatively, and orally.
Science	5.4.1.1.1	Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	Describe how plant and animal structures and their functions provide an advantage for survival in a given system.
	5.4.4.1.1	Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	Give examples of beneficial and harmful human interaction with natural systems.