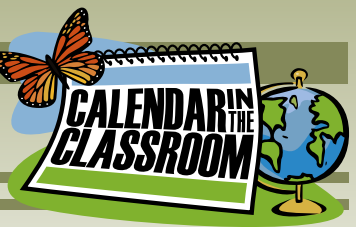




Changing Seasons



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.

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.
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.

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.)

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 students 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

online: <https://jeffersfoundation.org/programs/calendar-in-the-classroom/>

Minnesota Academic Standards

ELA Standards and Benchmarks

Grade	Benchmark with Anchor Standard/Code
3	<p>Write routinely for a range of tasks, purposes and audiences. (W2: 3.2.2.1)</p> <p>Write to inform or explain, selecting and organizing relevant details to show understanding of the topic, building on skills from previous years. (W5: 3.2.5.1)</p> <p>Ask and answer questions to check understanding of content and viewpoints, as well as for clarification, in a discussion. (LSVEI 1: 3.3.1.2)</p> <p>Create written, oral and digital content that communicates knowledge and ideas, including relevant facts and descriptive details, in a variety of presentation styles. (LSVEI 3: 3.3.3.1)</p>
4	<p>Write routinely for a range of tasks, purposes and audiences. (W2: 4.2.2.1)</p> <p>Use vocabulary, language, structure and features of spoken language to convey ideas precisely in communicating with others in social and academic situations. (LSVEI 2: 4.3.2.1)</p> <p>Create written, oral and digital content that communicates knowledge and ideas in an organized manner, including relevant and credible facts and descriptive details to support central ideas or themes, in a variety of presentation styles. (LSVEI 3: 4.3.3.1)</p>
5	<p>Write routinely for a range of tasks, purposes and audiences. (W2: 5.2.2.1)</p> <p>Write to inform or explain, using precise, domain-specific vocabulary, developing subtopics, and grouping related information logically in chosen text structure, including using formatting and visuals when useful to aid comprehension, building on skills from previous years. (W5: 5.2.5.1)</p> <p>Use vocabulary, language, structure and features of spoken language to communicate ideas precisely, recognizing situational differences. (LSVEI 2: 5.3.2.1)</p>

3-D Science Standards

Science Practices:

3. Planning and Carrying Out Investigations
4. Analyzing and Interpreting Data
8. Obtaining, Evaluating and Communicating Information

Crosscutting Concepts:

1. Patterns

2. Cause and Effect: mechanism and explanation

7. Stability and Change

Disciplinary Core Ideas:

LS1: From molecules to organisms: Structures and processes

3rd Grade: Plants and animals have internal and external structures that impact survival

5th Grade: Requirements for plant growth

LS2: Ecosystems: Interactions, energy, and dynamics

3rd Grade: Strategies animals use to survive

ESS1: Earth's place in the universe

3rd Grade: Native American Tribes and other cultures use patterns in stars to make predictions and plans

5th Grade: Describe patterns in the seasonal appearance of some stars in the night sky