

Lesson Plan: Teaching Phenology in Plants (Flowering) through Climate-related Examples

As a **high school** or **undergraduate Biological Sciences** teacher, you can use this set of computer-based tools to help you in teaching the **phenology of plants**, and **phenological events in plants** such as **flowering**.

This lesson plan allows students to understand phenology and phenological events in plants and animals. Further, the activities help students to determine the possible relationship between climate and phenological events such as flowering in plants. The exercises stimulate thinking about the possible impact of climate change on these periodic life-cycle events.

Thus, the use of this lesson plan allows you to integrate the teaching of a climate science topic with a core topic in the Biological Sciences.

Use this lesson plan to help your students find answers to:

- *What is phenology?*
- *Name some phenological events in plants and animals.*
- *What are the climate-related factors that may affect the flowering of plants?*
- *Which phenological events in plants could be affected by an increase in the average global temperature?*

About the Lesson Plan

Grade Level	High school, Undergraduate
Discipline	Biological Sciences

Topic(s) in Discipline	Phenology in Plants, Phenological Events in Plants, Life-cycle Events in Plants, Flowering of Plants
Climate Topic	Climate and the Biosphere
Location	Global, USA
Access	Online, Offline
Language(s)	English
Approximate Time Required	90 – 130 min

1 Contents

- 1. Reading (20 – 30 min)** A presentation (reading, discussion) that introduces the topic of phenology and its significance.
<https://extension.umaine.edu/signs-of-the-seasons/wp-content/uploads/sites/6/2014/08/What-is-Phenology.pptx>
from the Supplemental Resources Section at <https://extension.umaine.edu/signs-of-the-seasons/resources-for-educators/>
- 2. Classroom/Laboratory Activity (60 – 90 min)** A classroom/laboratory activity to discuss and understand the potential impacts of climate change on the phenology of plants (specifically, the bloom date of North American lilac shrubs).
<http://kbsgk12project.kbs.msu.edu/blog/2012/11/06/why-fly-south-how-climate-change-alters-the-phenology-of-plants-and-animals/>

3. Suggested questions/assignments for learning evaluation

- What is phenology?
- Name some phenological events in plants and animals.
- What are the climate-related factors that may affect the flowering of plants?
- Which phenological events in plants could be affected by an increase in the average global temperature?

2 Step-by-step User Guide



Here is a step-by-step guide to using this lesson plan in the classroom/laboratory. We have suggested these steps as a possible plan of action. You may customize the lesson plan according to your preferences and requirements.

1. Introduce the topic by using a presentation/reading

- Introduce the topic of phenology and its significance by using the presentation, “[What is Phenology?](#)” from the University of Maine Cooperative Extension.

The presentation can be accessed at <https://extension.umaine.edu/signs-of-the-seasons/wp-content/uploads/sites/6/2014/08/What-is-Phenology.pptx>.

- Discuss a few phenological events (periodic life-cycle events) in plants and animals.

2. Conduct a classroom/laboratory activity

Explore the possible impact of climate change on phenological events in plants through a hands-on classroom/laboratory activity, “[Why fly south? How climate change alters the phenology of plants and animals](#)”, from W.K. Kellogg Biological Station, Michigan State University.

This activity includes reading, data analysis, and data interpretation exercises to understand phenology and the possible impact of climate change on periodic life-cycle events in plants. The yearly first bloom date of North American lilac shrubs is examined as a case study.

The classroom/laboratory activity can be accessed at

<http://kbsgk12project.kbs.msu.edu/blog/2012/11/06/why-fly-south-how-climate-change-alters-the-phenology-of-plants-and-animals/>.

- Download the Resources from <http://kbsgk12project.kbs.msu.edu/blog/2012/11/06/why-fly-south-how-climate-change-alters-the-phenology-of-plants-and-animals/>.
- Read and discuss the article “Climate Basics”.
- Use the downloaded Lesson Plan to conduct the classroom/laboratory activity. Students will use the provided data to plot and analyze graphs, and to interpret the results.

3. Questions/Assignments

Use the tools and the concepts learned so far to discuss and determine answers to the following questions:

- *What is phenology?*
- *Name some phenological events in plants and animals.*
- *What are the climate-related factors that may affect the flowering of plants?*
- *Which phenological events in plants could be affected by an increase in the average global temperature?*

3 Learning Outcomes

The tools in this lesson plan will enable students to:

- define phenology
- enumerate various phenological events in plants and animals
- analyze data on life-cycle events in plants to determine trends
- interpret data on life-cycle events in plants
- discuss the possible link between climate and phenological events in plants
- discuss the potential impact of climate change on periodic life-cycle events in plants

4 Additional Resources



If you or your students would like to explore the topic further, these additional resources will be useful.

1. Classroom/Laboratory Activity

Several resources for classroom/laboratory activities “Signs of the Seasons: A New England Phenology Program”, from the University of Maine Cooperative Extension:

<https://extension.umaine.edu/signs-of-the-seasons/resources-for-educators/>

5 Credits/Copyrights

All the teaching tools in our collated list are owned by the corresponding creators/authors/organizations as listed on their websites. Please view the individual copyright and ownership details for each tool by following the individual links provided.

We have selected and analyzed the tools that align with the overall objective of our project and have provided the corresponding links. We do not claim ownership of or responsibility/liability for any of the listed tools.

1. **Reading, “What is Phenology?”** [Signs of the Seasons: A New England Phenology Program, University of Maine Cooperative Extension](#)
2. **Classroom/Laboratory Activity, “Why fly south? How climate change alters the phenology of plants and animals”** Created by GK-12 Fellows Liz Schultheis and Dustin Kincaid; hosted at [W.K. Kellogg Biological Station, Michigan State University](#)
3. **Additional Resources** [Signs of the Seasons: A New England Phenology Program, University of Maine Cooperative Extension](#)