

Phenology: Spring Leaf Index

A Carolina Essentials™ Activity

Student Worksheet



Overview

How do you know when spring begins? The calendar says March 20 or sometimes March 21. Astronomers refer to this as astronomical spring or the vernal equinox because there is an equal amount of sunlight and darkness. Plants and animals in the Northern Hemisphere react to the increasing amount of sunlight as spring approaches by budding, coming out of dormancy, beginning migrations, or breeding.

Spring is also green. Scientists use [first-leaf and first-bloom indexes](#) (a nationwide database) as a biological and visual definition of spring. The first-leaf Index is based on the leaf-out of lilacs and honeysuckles, which are among the first plants to show their leaves in the spring and are found across the nation. Satellites gather data on leaf-out remotely as the amount of green land cover increases. [Citizen scientists](#) also submit data by reporting the first signs of leaves in their own yards.

As plants leaf out and provide a food source, animals that eat those plants also emerge. The study of related events, particularly between plants and animals that occur on a predictable or periodic cycle, is called **phenology**. Phenology studies are crucial to determining disruptions in environmental relationships as climate patterns shift, and phenology studies provide evidence of environmental changes.

Phenomenon

Watch the short video and think about this question: What would happen if a late spring freeze killed the flowers? Jot down your thoughts.



[Hummingbird feeding on Salvia](#)

Essential Question

How can nationwide data be used to support claims of environmental changes?

Activity Objectives

1. Interpret a Spring Leaf Index Anomaly map.
2. Interpret activity curves for the blue jay and northern red oak.

Safety

No PPE is required for the activity.

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SAFETY REQUIREMENTS

No PPE is required for the activity.

MATERIALS

Spring Leaf Index Anomaly Map (June 2018)

Activity curves for blue jays and fruiting northern red oaks (2017)

Activity Procedures

A. Map—Spring Leaf Index Anomaly

1. Examine the map for patterns and relationships between the onset of spring and geography, biomes, regional weather, ground cover, water availability, and anything else you can think of that may affect the onset of spring.
2. Make a list of your patterns and relationships and the evidence for each. Share your findings with the class.

B. Graph—Activity Curve for Blue Jays and Fruiting Red Oaks

1. Using the activity curves for the northern red oak and blue jay, describe the annual cycle of acorn production (ripe fruit) for the northern red oak. What evidence supports your claim.
2. Describe the annual feeding pattern (nut gathering) for the blue jay. What evidence supports your claim?
3. Make a list of your descriptions and share them with the class.

Analysis and Discussion

1. Summarize the onset of spring for the contiguous United States. Address the regions of the country, whether spring was early, late, or on time, and the evidence that supports your claim.

2. Using the activity curves, describe the blue jay's annual feeding relationship with the northern red oak. What evidence supports your claim?

3. How might the blue jay have to adapt its feeding habits if there is an unusually early spring? What impacts might this have on the food web?

4. How might the blue jay have to adapt its feeding habits if there is an unusually late spring? What impacts might this have on the food web?

5. If spring were to come 3 weeks early to the southern and mid-Atlantic states for the next 20 years, how might it affect the hummingbird? What far-reaching effects could it have on the ecosystem? Use evidence to support your claims.

Analysis and Discussion continued

