

Project BudBurst



Classroom Activity
www.budburst.org

Classroom Activity: Cold Consequences

Time: Two 30-minute class periods

Level: Grades 5-8

Overview: In this activity students will discover which parts of plants are most vulnerable to freezing weather.

Materials:

- Plant parts represented by:
 - Lettuce (leaf)
 - Broccoli (stem)
 - Blossoms (flowers)
 - Potato (tuber root)
 - Pepper (fruit)
- Access to a freezer
- Knife

Education Standards: Available in the *Teacher Implementation Guide (Grades 5-8)*

Activity

1. Ask the students what happens to plants in freezing weather.
2. Show them the different vegetables (and flower blossoms) and ask them to identify the parts of the plants they represent.
3. Have the students brainstorm and list different signs of frost damage.
4. Ask them to predict what would happen to each plant part after a night in the freezer.
5. Freeze the plant parts and bring them to class the next day for inspection. Cut the plant parts open to aid observations. Use an unfrozen specimen to make comparisons.
6. Ask the students to list the most and least vulnerable plant parts to freezing.
7. Discuss how what the students have learned about the vulnerability of different plant parts (represented by vegetables) can transfer to other types of plants, such as wildflowers, grasses, shrubs, and trees.

Discussion Questions

1. What strategies can plants use to avoid damage from freezing?
2. What have students witnessed in plants in nature, as the plants protect themselves from damage from freezing?

Suggested Extension Activities

- Make observations of different plants during the winter to see if you can observe adaptations the plants have made to survive freezing conditions.
- Look at the Project BudBurst Field Guides and discuss the adaptations some of those plants have to survive freezing conditions.

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Background Information

Winter is a difficult season for many plants, especially those in colder climates. The days are shorter so there are fewer hours of sunlight than during other times of the year. Without sunlight, green plants cannot photosynthesize and make their food. Winter's cold temperatures slow plant growth. Freezing temperatures stop water from circulating in the plants' sap.

Like some animals, some plants survive the winter in resting stages (dormancy). Plants that we call annuals live for only one year. They grow, reproduce, and die at the end of the summer. Their seeds survive the winter and will germinate and grow the following spring.

Some plants survive as underground storage organs, such as tubers (potatoes, dahlias), tap roots (carrots, dandelion), and bulbs (onions, tulips). These plants store food reserves in their underground storage organs during the summer and autumn. In the following spring, these food reserves are used to grow new leaves and shoots above the ground. Many of these plants are called perennials because they do this year after year. In addition, these plants will also produce large numbers of seeds each year.

Trees add new branches and roots to their bodies each year. Trees have to survive all winter with their trunks and branches above the ground, exposed to the cold air. When temperatures go below freezing and water freezes into ice, trees cannot absorb water and transpiration becomes impossible. Trees can be divided into two groups: deciduous trees, which lose all their leaves in autumn and evergreens, which maintain their leaves on their branches throughout the year.

Source: Adapted from *Exploring the Native Plant World*, developed by the Lady Bird Johnson Wildflower Center in Austin, Texas

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