

Spruce Budworm Community Outreach Unit

Goal/Standard

HS-LS2-6. **Evaluate** the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. (Next Generation Science Standards HS-LS2-6)

Essential Questions

- How does the forest ecosystem respond to stress? (overarching)
- How does the forest ecosystem change and adapt from the impact of a pest such as the spruce budworm and the effects of human management of this pest? (topical)

Outcomes

At the end of this unit, students will be able to explain what spruce budworm is and how outbreaks of this pest have affected the forest ecosystem. They will also be able to evaluate how human management of the forest in response to this pest has changed the forest ecosystem and predict how future outbreaks may impact the forest ecosystem.

Performance Task

Students will demonstrate their understanding by organizing a public outreach event in which they work with foresters and community stakeholders to present and discuss:

- the impact of past spruce budworm outbreaks
- how past outbreaks were managed and the effects of this management
- the potential for another spruce budworm outbreak
- the potential ecological impacts of another outbreak

Following the outreach event, students will share their evaluation of how the spruce budworm has affected the forest ecosystem in the past and its potential to affect the forest ecosystem in the future.

Learning Plan

Hook: Students will be given pictures showing large areas of dead spruce and fir trees resulting from the last spruce budworm outbreak in Maine and asked to consider what could have caused the damage and to draw a diagram to show how the loss of such trees could affect the forest ecosystem as a whole.

Introduction: After students have completed the hook activity, the teacher will provide students with an overview of the expected outcome of this unit and a copy of the scoring rubric. Students will be asked to discuss and explain what the results of a productive community outreach event will look like and how they will demonstrate that they have been successful.

Event Planning/Organization:

1. Students will be given background resources (articles, web-sites, reports) in regards to the spruce budworm outbreak in Maine in the 1970's and 1980's and be asked to:
 - explain how the spruce budworm impacted the forest
 - explain how the spruce budworm outbreak was managed
 - explain how this management impacted the forest
 - explain unintended consequences of this management (i.e. increases in deer population resulting from greater feeding areas in clear cut forests and changes in forest composition)
 - explain why the public needs to be informed of a potential impending outbreak
2. Students will be asked to brainstorm and research a list of community stakeholders and local foresters and natural resource providers. After reviewing the stakeholder list with the class and teacher, students will:
 - determine who to invite as speakers and write and send invitation letters/emails
3. Students will brainstorm and outline the details of the community event and begin to establish details (date/time, location, refreshments, facility requirements, etc.).
4. The students and teacher will work together to determine if outside funding is needed and work on requesting donations from local businesses.
5. Once details are established, the students will work on advertising the event (fliers, local newspaper, social media).
6. Students will contact and/or meet with speakers to work out a plan for presentations. The students will be responsible for introducing speakers, explaining why they are hosting the event, and leading the discussion following presentations.
7. Students will prepare brief evaluation sheets for guests to fill out at the end of the event.

Evaluation/Assessment:

1. Students will complete an assessment in which they address the following questions:
 - A. How has spruce budworm affected the forest ecosystem of Maine in the past?
 - B. How could a potential outbreak in the near future affect the forest ecosystem of Maine?
 - C. How could a future outbreak be different from past outbreaks? Why?
 - D. How did the management of the last spruce budworm outbreak affect the Maine forest ecosystem?
 - E. Explain one un-intended result of previous management strategies and explain why this result occurred.
 - F. How would you recommend managing a potential outbreak in the near future? Why?
 - G. Do you think the public outreach event was successful? Why or why not? What would you do differently if you were to host another event?
2. Students will send a feedback survey to the presenters from the outreach event.
3. Students and the teacher will review and discuss the feedback from presenters and the evaluations from the event.

Accommodations: The teacher will adapt the lesson to account for the needs of individual learners as needed.