

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)

CCSS.ELA-Literacy.SL.11-12.1.b

Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. (Common Core Standards)

Essential Questions

- How does an ecosystem respond to stress and adapt as a result of this stress? (overarching)
- How can the class work together to develop a program to inform the public of an event with environmental, community, and economic impacts? (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)
- 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 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 and they should also be able to apply their understandings of this scenario to evaluate how ecosystems may react to different scenarios. Students will be able to work cooperatively to organize and host a public outreach event to inform the public of the potential impact of this forest pest.

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 evaluate the impact of spruce budworm on 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 this damage and to draw a diagram or concept map 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:

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)
- assess the current status of the spruce budworm
- 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 this 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. Following the outreach event, 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 unintended result of previous management strategies and explain why this result occurred.
- F. What is the current status of the spruce budworm in Maine and nearby Canadian provinces?
- G. How would you recommend managing a potential outbreak in the near future? Why?
- H. 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 and outline a plan to improve future outreach events.

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

Habits of Mind: Students will use the following "Habits of Mind" throughout this unit: *Persisting, Listening with Understanding and Empathy, Thinking Flexibly, Questioning and Problem Posing, Applying Past Knowledge to New Situations, Thinking and Communicating with Clarity and Precision, Remaining Open to Continuous Learning* (<http://habitsofmind.org/wp-content/uploads/2014/09/HoM-Summary-Outline.pdf>)

Resources

Maine Spruce Budworm Task Force Report: <http://www.sprucebudwormmaine.org/>
Spruce Budworm Maine Facebook: <https://www.facebook.com/SpruceBudwormMaine16/>
Maine Forest Service Spruce Budworm Page:
http://www.maine.gov/dacf/mfs/forest_health/insects/spruce_budworm_2014.htm
University of Maine Center of Sustainable Forest Research/Spruce Budworm Task Force:
<http://crsf.umaine.edu/maine-spruce-budworm-outbreak/spruce-budworm-outbreak/>
Forests for Maine's Future: <http://www.forestsformainesfuture.org/>
Maine Forest Products Council: <http://maineforest.org/>
Spruce Budworm Tracher: <http://budwormtracker.ca/#/>

Spruce Budworm Outreach Unit

Goals/Standards:

As you complete this unit, you will demonstrate your understanding of the following standards:

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)

CCSS.ELA-Literacy.SL.11-12.1.b

Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. (Common Core Standards)

Essential Questions:

Throughout this unit, you should be considering the following essential questions:

- How does the forest ecosystem respond to stress? (overarching)
- How can the class work together to develop a program to inform the public? (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)

Performance Task:

In order to demonstrate your understanding of the standards and essential questions you will be organizing a public outreach event in which you 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

Project Overview:

In order to complete the performance task, you will complete the following steps:

A. Background Research:

Using online and print resources, you will put together a three to five minute presentation for the class in which you explain the following:

- how the spruce budworm has impacted the forest in the past
- how the last spruce budworm outbreak was managed
- how this management impacted the forest, including unintended consequences of this management
- why the public needs to be informed of a potential impending outbreak

The purpose of this presentation is to allow you to develop an understanding of why this outreach event is important and the information that we need to share with the public.

The following resources will be helpful:

- Maine Spruce Budworm Task Force Report: <http://www.sprucebudwormmaine.org/>
- Spruce Budworm Maine Facebook: <https://www.facebook.com/SpruceBudwormMaine16/>
- Maine Forest Service Spruce Budworm Page: http://www.maine.gov/dacf/mfs/forest_health/insects/spruce_budworm_2014.htm
- University of Maine Center of Sustainable Forest Research/Spruce Budworm Task Force: <http://crsf.umaine.edu/maine-spruce-budworm-outbreak/spruce-budworm-outbreak/>
- Forests for Maine's Future: <http://www.forestsformainesfuture.org/>
- Maine Forest Products Council: <http://maineforest.org/>
- Spruce Budworm Tracher: <http://budwormtracker.ca/#/>

B. Event Organization:

Keeping in mind our goal of informing the public of the potential impact of a spruce budworm outbreak, we will work together as a class to complete the following steps to prepare for our outreach event:

- brainstorm and research a list of community stakeholders and local foresters and natural resource providers
- determine who to invite as speakers and write and send invitation letters/emails
- brainstorm and outline the details of the community event and begin to establish details (date/time, location, refreshments, facility requirements, etc.)
- determine if outside funding is needed and work on requesting donations from local businesses
- advertise event (fliers, local newspaper, social media).
- contact and/or meet with speakers to work out a plan for presentations
- prepare brief evaluation sheets for guests to fill out at the end of the event
- set-up event venue

C. Event Follow-up:

In order to assess the success of the event and your understanding of the ecological impact of the event, you will complete the following:

- send a feedback survey to the presenters from the outreach event.
- review and discuss feedback from presenters and event evaluations
- complete an assessment

Name: _____

Date: _____

Spruce Budworm
Student Follow Up Evaluation

Directions:

Answer each of the following questions in complete sentences. Provide detailed explanations with supporting evidence where necessary.

1. Summarize the impact of past spruce budworm outbreaks on the forest ecosystem of Maine. Why did the pest have this impact?