

9TH-12TH GRADE UNIT

LESSON 3 Issues and Action

NUTSHELL

In this lesson, students discuss the meaning of stewardship. They investigate an urban forest issue through a WebQuest. Students then create an action plan for addressing that issue in their own community. Finally, students use a Venn diagram to illustrate the overlap that issues have between urban and rural forests and evaluate the relevance of these issues to their own lives.

BIG IDEAS

- Issues such as urban sprawl, tree neglect, and insect and disease infestation are changing the characteristics of urban forests. (Subconcept 21)
- Declining health and abundance of urban trees, especially in metropolitan regions of the country (and world), can result in increased stormwater runoff, reduced air quality, and overall climate change on a global scale. (Subconcept 22)
- Individuals, neighborhood groups, volunteer groups, and elected officials can have a positive influence on others by increasing recognition of the value and importance of an urban forest. (Subconcept 23)
- All citizens have a responsibility to be stewards of the environment. Decisions they make affect urban forests as well as other forests. (Subconcept 24)

** If classtime is used for web research, additional time is needed.*

OBJECTIVES

Upon completion of this lesson, students will be able to:

- Evaluate issues that could change the characteristics of urban forests.
- Describe the impact of declining health and abundance of urban trees on environmental quality.
- Compare the influence different people and groups have.
- Initiate environmental stewardship activities.
- Describe how personal decisions affect forests.

SUBJECT AREAS

Language Arts, Social Studies

LESSON/ACTIVITY TIME

- Total Lesson Time: 170 minutes
- Time Breakdown:
 - Introduction10 minutes
 - Activity140 minutes*
(additional homework time needed)
 - Conclusion20 minutes

TEACHING SITE

Classroom; Computer Lab


BACKGROUND

Wisconsin's forests face a number of issues. Urban forests have many of the same issues rural forests do and some specific concerns that are unique. Some of the issues that are shared in forests around Wisconsin are invasive species, insect and pest problems, and forest



fragmentation. Some urban forest issues that are not found elsewhere or are not as significant elsewhere are tree canopy loss, tree and utility conflict, soil compaction, heat island effect, stormwater runoff, and construction damage.

MATERIALS LIST

FOR EACH STUDENT

- Copy of Student Page  3, *Firewood Fears*

FOR EACH GROUP OF 3 OR 4 STUDENTS

- Copy of Student Page  1, *Task Outline (optional)*
- Copy of Student Page  2, *Grading Rubrics (optional)*
- USB Flash drive

VOCABULARY

Bias: An opinion or belief that strongly favors one side of an issue.

Canopy: The leaves and branches of a tree or group of trees.

Heat Island: The phenomenon that, because concrete and asphalt absorb and radiate heat, cities are five to nine degrees warmer than rural areas.

Invasive Species: A species that enters an area and causes harm by outcompeting species that are already there.

Renewable Resource: A resource that has the ability to regenerate, grow back, or produce more.

Soil Compaction: The elimination of air spaces in soil due to pressure being exerted on it.

Steward: A person who takes responsibility to make decisions and take actions today that will allow resources to be maintained in a healthy manner.

TEACHER PREPARATION

- Make arrangements for each group of students to have access to the internet.
- Go to the urban forestry page of the LEAF website at www.uwsp.edu/leaf/ and navigate to the WebQuest. Write down the direct address to the WebQuest to give to students.
- Check the WebQuest online to verify what issues are currently included.

INVASIVE SPECIES

An invasive species is one that outcompetes the native species in an area. Invasive species can be plants, animals, insects, or diseases; invasive species can be aquatic or terrestrial. There are many different invasive species impacting forests, including urban forests. Gypsy moth, Dutch elm disease, and emerald ash borer can have heavy impact on urban forests. Dutch elm disease hit hard in the 1960s and 1970s in Wisconsin and killed hundreds of thousands of trees.

The emerald ash borer is spreading rapidly through the Midwest and has the potential to have a similarly devastating impact on our urban forests. Emerald ash borer is an invasive insect species that feeds on all species of ash trees. Since ash trees are common in Wisconsin's urban forests, the potential impact of this invasive species is great.

TREE CANOPY LOSS

The tree canopy is the area covered by the leaves and branches of trees. The word “canopy” can be used in terms of an individual tree or to describe the collective branches and leaves in an entire forest. The tree canopy has many benefits, so the loss of the canopy has many drawbacks. Drawbacks include increased building cooling costs, loss of animal habitat, increased stormwater treatment costs, and increased air pollution. The loss of tree canopy can be caused by many different factors. Loss of trees due to construction, insect and disease attacks, along with death of trees due to general tree age and poor health can reduce the total tree canopy. The tree canopy can be maintained if trees are replaced.

HEAT ISLAND

Concrete, asphalt, and other surfaces in urban areas absorb heat from the sun and radiate it. This creates what is known as a “heat island.” Urban areas tend to be five to nine degrees warmer than surrounding rural areas because of this phenomenon. Trees can be a great benefit in combating the effect of the heat island. Trees can shade surfaces that absorb heat, keeping them cooler.

Many of the issues urban forests face are interrelated. For instance, the death of trees may be caused by invasive species or soil compaction. Both contribute to tree canopy loss. In turn, tree canopy loss will likely increase the problems caused by heat islands.

TREES AND UTILITIES

The companies that supply electricity to homes and businesses must maintain overhead power lines. Trees can grow into these lines and cause conflict. Trees growing into power lines and other utilities must have their branches or roots safely pruned away. This can cost the companies significant amounts of money; that cost is passed to the customer through utility bills. Trees that lose branches or tip over entirely during severe weather can be the cause of power outages for tens of thousands of people.

SOIL COMPACTION

Trees and other plants need soil to grow. Soil must have air spaces in it to let water percolate through and must allow air to get to roots in order for the plant to survive. Soil that has been compacted has lost those air spaces. Compaction can occur because of heavy equipment used during construction of buildings and roads. It can also be caused by human foot traffic repeatedly using the same unpaved path. Soil compaction limits the ability for a newly planted tree to survive. Compaction of soil around an existing tree’s roots can kill an otherwise healthy tree.

THE GOOD NEWS

The good news is that many of these problems can be addressed. We know the positive impacts trees can have in a community. With community support, appropriate laws to support trees and tree care, technological expertise, and citizens willing to take action, urban forests can work harder for us.



PROCEDURE INTRODUCTION

1. Discuss the meaning of “renewable resource.” *(A resource that has the ability to regenerate, grow back, or produce more.)* Ask students if forests should be considered a renewable resource. *(Yes.)* Ask students why this might be important to them. *(We use forests for different things. Trees don’t live forever, so it is important that forests can be regenerated to continue providing benefits.)*
2. Discuss with the class what a steward is. *(A person who takes responsibility to make decisions and take actions today that will allow resources to be maintained in a healthy manner.)* Focus the students’ attention on the idea that responsibility and action are the key parts of stewardship. Ask students if they think they are stewards of anything. Ask students to discuss how they might become stewards of their urban forest.
3. Explain that the first step in becoming a good steward for their urban forest is to learn about some of the issues facing it. The next activity will allow them to learn about an issue and formulate ways they can take action on that issue.

ACTIVITY - WEBQUEST

1. Divide the class into groups of three or four. Assign each group a different urban forest issue to investigate. Issues include tree canopy loss, emerald ash borer, invasive species, trees and utilities, soil compaction, and heat island. Depending on class size, you may need to increase the number of students per group or have some issues investigated by more than one group. It may be helpful to note that some issues are looked at from the perspective of how they impact urban forests; others are looked at from how urban forests impact the issue.

NOTE: The issues listed here are included online as of the date of publication of this document. As their prominence changes, issues may be added or removed. Please check the website regularly.

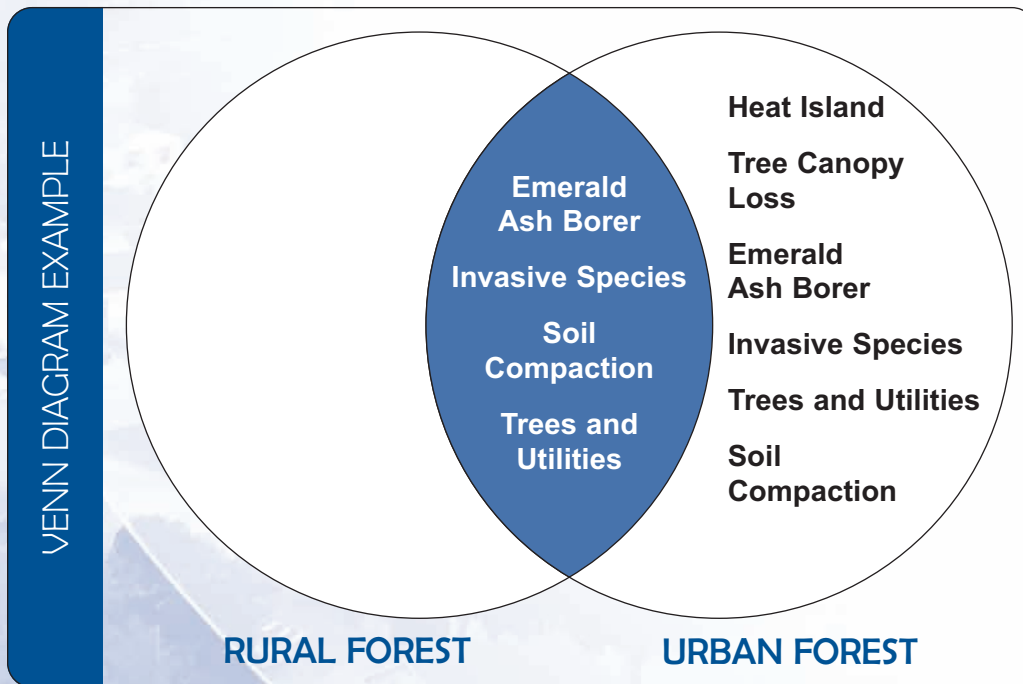
2. Tell the groups they will use a WebQuest to investigate the issue they have been assigned. Each group will write an action plan based on their research. The plan will summarize how the class/school can take action to help the community address the issue. Groups will present their plans to the class using a brochure, PowerPoint presentation, or poster. *(Other options are possible at your discretion.)* These presentations should “sell” their plan to the class. Presentations should focus on the reasons their issue should become the project the class chooses to work on.
3. Direct students to the WebQuest located on the LEAF website. *(Please locate the direct link to the WebQuest prior to beginning this lesson and give students that link. Navigate to the WebQuest using the student section of www.uwsp.edu/leaf/.)* If desired, give each group Student Page  1, *Task Outline*. The information on the student page is also included in the WebQuest. You may also wish to give each group a copy of Student Page  2, *Grading Rubrics*. These example rubrics are included in the WebQuest, but you may wish to create your own to describe your own expectations and grading criteria. Time and resources permitting, you may assign groups to do some research on their issue using library resources as well. Students may research their issues as a group, or as individuals who combine the information to write the plan. Assign research as homework if classroom time is limited.

- Have each group present their poster, PowerPoint, or brochure about the benefits of their plan. After the presentations are done, discuss as a class which one they think should be addressed. Discussion could focus on how easy it would be to implement, how many people it would impact, how much impact it would have, etc.

EXTENSION: Allow students to proceed with the action plan they chose. Have them work with local groups and community leaders to take action on an urban forest issue.

CONCLUSION – BEYOND THE URBAN FOREST

- Begin with a group discussion. Ask students to think about which of the issues they learned about would be found in rural forests as well as urban forests. Draw a Venn diagram with two overlapping circles on the board. In one circle, write the issues that students believe would only affect urban forests. In the overlapping area, write issues students believe would affect both urban and rural forests (see example below).
- Hand out Student Page **3**, *Firewood Fears* to each student. Ask students to read the statement and write a one-page paper about whether or not this issue is important to them. Have them consider and comment on whether the issue impacts them, whether they impact the issue, or both.



TASK OUTLINE

● TASK 1 ●

Your group has been assigned to research an issue and create a written action plan to address the issue. The intent of this task is for you to gain a general understanding of the issue. The following headings should be included in your written action plan with appropriate information under them. Include pictures and other graphics as appropriate.

- Title/Issue name
 - Justification
 - What is the issue?
 - Why is the issue important?
 - What's being done
 - Find examples of things being done to address your issue (national, state, or local).
 - Identify the organizations, government agencies, or individuals involved.
 - Proposal to address the issue
 - What your class (school, etc.) can do to address the issue. (The actions must be realistic in terms of financial and human resources available.)
 - Why it is important that you take action and why it may be more important to take action on this issue than other issues. (It impacts your community directly, it can be solved with few financial resources, etc.)
 - References cited
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● TASK 2 ●

When the written plan is complete, your group will present information about the issue and your action plan to the class. For the presentation, be prepared to:

- Summarize the issue
- Summarize your plan
- “Sell” your plan to the class
- Answer questions about what you learned and defend your plan

GRADING RUBRICS

EXAMPLE ACTION PLAN GRADING RUBRIC				
	BEGINNING	DEVELOPING	ACCOMPLISHED	EXEMPLARY
ISSUE DESCRIPTION AND IMPORTANCE	Does not describe the issue. Does not explain the importance of the issue.	Briefly describes the issue and its importance.	Describes the issue and explains the importance of the issue.	Thoroughly describes the issue. Thoroughly describes the importance of the issue.
CURRENT ACTION AND ORGANIZATIONS	Does not list current actions being taken or organizations taking action.	Lists current actions being taken and organizations, but does not elaborate.	Lists and describes current actions being taken and organizations taking action.	Thoroughly describes current actions and organizations taking action at a variety of levels.
ACTION PROPOSAL	Does not list action.	Lists action but does not explain it or its importance.	Explains action proposal and outlines steps to achieve it. Explains the importance of the action.	Clearly explains action proposal and details steps to achieve it. Thoroughly explains importance of the action.

EXAMPLE PRESENTATION GRADING RUBRIC				
	BEGINNING	DEVELOPING	ACCOMPLISHED	EXEMPLARY
SUMMARIZES ISSUE	Does not summarize the issue.	Briefly summarizes the issue.	Thoroughly summarizes the issue.	Thoroughly summarizes the issue and describes the importance of the issue.
SUMMARIZES ACTION PLAN	Does not summarize their action plan.	Briefly summarizes their action plan.	Thoroughly summarizes their action plan and outlines steps to achieve it.	Thoroughly summarizes their action plan and includes specific details about steps to achieve it.
“SELLS” PLAN	Does not sell their plan.	Promotes their plan, but does not motivate others to want to support it.	Sells their plan and creates interest in others to support it.	Sells their plan and motivates others to take action.
ANSWERS QUESTIONS AND DEFENDS PLAN	Does not respond to questions asked and cannot defend their plan.	Answers questions briefly and minimally defends their plan.	Answers questions completely and defends their plan.	Answers questions thoroughly, offering additional related information and successfully defends their plan.

FIREWOOD FEARS

A campfire is an important part of the camping experience for many people. A camping trip wouldn't be complete without sitting around a campfire with friends and family talking, cooking meals, or toasting marshmallows. But did you know that the firewood that fuels your campfire could also be transporting harmful insects and diseases to the forested areas in Wisconsin, including your favorite park, campground, and even your own backyard or neighborhood?

Pests and diseases such as the gypsy moth, emerald ash borer, and oak wilt can be easily spread through infested firewood. Larvae and eggs can be hidden under the bark of infested wood. When the wood is moved, the insect or disease goes along with it.

In Wisconsin, the gypsy moth has become firmly established in the eastern half of the state, and quarantines prohibit the movement of wood products out of counties where the moth is a problem.

Oak wilt has spread throughout the southern two-thirds of the state – except for the Door County peninsula.

The emerald ash borer is a problem in Michigan, Indiana, and Illinois and is spreading. This beetle, which commonly moves around on firewood, has already killed nearly 15 million trees in southeast Michigan, Ohio, Indiana, and Ontario, Canada (as of 2006).

Across Wisconsin, campers are encouraged to take some simple steps to help ensure the healthy future of the state's parks and forests:

1. Leave firewood at home and purchase aged firewood near your campsite location.
2. Firewood purchased at or near your destination should be used during your camping vacation. Don't leave any unused wood behind and don't take it with you to another destination.
3. When buying firewood, make sure you receive pieces that are dry and have either no bark or bark that is loose (a sign that the wood is very dry).
4. Reduce your need for open fire by cooking over gas or charcoal.