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## Site Preparation Scenarios

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### Activity Overview

PART I: Students read, discuss, make judgements, and present the pros and cons to different scenarios related to site preparation for a restoration.

PART II: Students research, develop and present recommendations for site preparation of their school restoration site.

### Objectives

Students will:

- Examine and evaluate possible site preparation actions they might take that have an impact on the environment
- Gain an understanding of the pros and cons of various methods of site preparation
- Make decisions among various site preparation options under certain circumstances and present their decisions orally and/or in writing

### Subjects Covered

Science, Language Arts, and Social Studies

### Grades

9 through 12

### Activity Time

PART I: 1 hour introduction to site preparation, 45- 60 minutes for hypothetical scenario discussions

PART II: 1 hour to research school site; 1-2 hour discussion of options and determination of site preparation for school restoration

### Season

Any

### Materials

Scenario cards, background information on site preparation

## Background

Site preparation can affect the growth of both desirable species planted and preexisting weed species. Any restoration effort will have weeds in the first years. The weeds can be annuals, herbaceous perennials or woody perennials. There are a number of different possible methods for site preparation involving the use of tilling, mulching (plastic or organic), herbicide treatments, and cover cropping. The advantages and disadvantages of these methods vary widely. When deciding which of these options to use, one must consider other factors with respect to safety, price, effectiveness, convenience, opportunity for student involvement, length of treatment and possible environmental side effects. The significance of these factors depends on the specific details of the site. The existing vegetation, soil conditions, topography, time, and cost determine which method or combination of methods is appropriate for any given site.

Good site preparation is a critical factor for a successful planting. Removal of vegetation can be a first step. As previously mentioned, methods of removal include cultivating, smothering, herbiciding, burning, sod removal, and/or the use of a cover crop. For more specific information, refer to the Earth Partnership Handout, "Site Preparation." Review some of the advantages and disadvantages of removal techniques for non-native perennials and annuals and review the specific various options with students prior to completing the following activity.

## Activity Description

PART I:

*A note to teachers:* This activity is designed to give students the opportunity to examine their own values and beliefs as they relate to the environment and restoration process. It is not the intent of the activity to prescribe a "right" and "wrong" answer for the students, but rather provide a forum to discuss both the scientific and personal factors involved with choosing any particular site preparation technique. In some cases, students may perceive what would be the most ethical solution to a given problem while admitting that they realistically might not choose that option for scientific (or other) reasons. In this activity, four scenarios are presented, each of which has to do with issues of site preparation. For each scenario, the action choices are preceded by "would you" rather than "should you." This approach will encourage students to state what they would do in each given situation.

Step 1: Become familiar with the scenarios. In order to anticipate some of their likely reactions, you will need to be familiar with each of these scenarios ahead of time. Provide students with some basic information on site preparation as described in the Earth Partnership Hand-out, "Site Prepara-

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## Site Preparation Scenarios (cont.)

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### State Standards

#### English Language Arts:

Read & discuss texts to understand human experience (A.12.3)

Read to acquire information (A.12.4)

Create or produce writing (B.12.1)

Plan, revise, edit, & publish writing (B.12.2)

Orally communicate (C.12.1)

Listen & comprehend oral communications (C.12.2)

Participate in discussion (C.12.3)

#### Conduct then communicate research (E.12.1)

#### Science:

Show effects of different opinions and decisions about themes (A.12.2)

Give examples of models for solutions (A.12.3)

Construct arguments for conflicting models (A.12.4)

Identify and replace inaccurate models (A.12.6)

Reexamine evidence & reasoning (A.12.7)

Ask questions, build hypotheses, design investigations (C.12.1)

Identify issues, questions, research; design & conduct investigations (C.12.2)

Evaluate data (C.12.3)



Crab Grass (non-native species)

tion.”

**Step 2:** Divide the group into groups of four or five. This will provide more opportunities for everyone to be involved and interactive.

**Step 3:** Explain that you are going to present a series of scenarios, which will raise some problems associated with site preparation. Every scenario calls for personal decision making. The participants’ job is to think about how they would react if these things were really happening to them. You will need to allow enough time for the participants to think about and discuss their ideas. Depending on the time you have available, you can use these scenarios in different ways:

- **Short time available:** give each group a different scenario to work with, and toward the end, have each group share its reactions to its own scenario with other groups. This way you can cover a number of the scenarios in one activity, requiring less total time.
- **Longer time available:** give each group the same scenario to work with, and later, have the groups compare their reactions. This way you will have everyone involved with the same scenario allowing for wider comparisons. You can then go on to try the remaining scenarios in turn, but you will need much more time.

**Step 4:** Decide whether you are going to hand out the scenarios or whether you are going to read them aloud.

**Step 5:** When everyone is familiar with their scenario, ask: “*How would you deal with this situation?*”

Allow about 10 minutes for each individual to first consider how they think they would handle the situation and have them take notes on their choices.

**Step 6:** Allow about 5 minutes to share individual ideas with other group members. Their job is to listen to the ideas, not to discuss them at this stage.

**Step 7:** When everyone had offered ideas on their possible reactions, have groups discuss them, and then try to come up with a consensus view. Give students enough time to do this in some depth (about 10 minutes, minimum).

**Step 8:** Ask each group, in turn, to present their ideas. Allow other group members to ask questions. Debate is not necessarily needed. This can be done later. It is important to capture all the consensus views that have been agreed upon. It may be helpful to list these views on a wall board or flip chart for all to see.

**Step 9:** Complete this part of the activity by holding an open discussion about the issues and the problems that have surfaced. It is important to allow time for everyone to reflect on what they learned from the activity.

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## Site Preparation Scenarios (cont.)

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Choose & evaluate data collection methods (C.12.4)

Use explanations & models to describe results (C.12.5)

Present results (C.12.6)

Evaluate articles & reports using scientific criteria (C.12.7)

Investigate cooperation & competition (F.12.7)

Infer changes in ecosystems (F.12.8)

Analyze scientific or technological innovation (G.12.3)

Choose a problem & identify scientific or technological solution (G.12.5)

Analyze resource management (H.12.1)

Evaluate policy recommendations (H.12.2)

Show how policy decisions depend on culture & science (H.12.3)

Advocate a solution to a scientific problem (H.12.4)

Investigate a resource management plan or proposal (H.12.5)

Evaluate data and information sources (H.12.6)

Use scientific knowledge & reasoning (H.12.7)

### Social Studies:

Analyze cultural factors that influence design of places (A.12.9)

Analyze effects of ethics & values on science (A.12.10)

Describe affects of science & technology on culture (A.12.11)

Assess land use policies (A.12.12)

Analyze rights & responsibilities of citizens (C.12.1)

Use information to understand & communicate about an issue (C.12.8)

Identify public participation processes (C.12.10)

Evaluate how public opinion influences policy (C.12.11)

Use research to develop an informed position (E.12.14)

### PART II:

Visit the proposed restoration site on your school grounds and have students determine which site preparation option(s) is best suited for their restoration and explain why. The plan should include recommendations for removal of aggressive species on the site, if any, as well as a discussion of the advantages of their plan, justification for their choices, and a timeline. Consider factors such as safety, price, effectiveness, convenience, opportunity for student involvement, length of treatment, and possible environmental effects.

Each group presents their recommendations. As an entire class, decide how best to prepare your site.

### Extensions

- Have each student choose a scenario and write a short paragraph on the positive and negative effects of all the possible site preparation options. They should indicate what, if any, additional information is needed in order to make a responsible and informed decision. Students should identify what seems, in their judgement, to be the most responsible decision, and explain their reasoning.
- Invite guest speakers from the Department of Natural Resources, local parks, etc. to discuss how they address issues of site preparation and exotic species.
- Have students come up with their own site preparation scenarios and discuss them with the class.
- Students can design and implement research projects related to site preparation issues. Students can collect data, present their investigative results, and explain the implications of the results as they relate to site preparation.

### Additional Resources

- Packard, Stephen & Cornelia F. Mutel (Eds.). (1997). *The tallgrass restoration handbook: For prairies, savannas, and woodlands*. Washington, D.C.: Island Press.
- William R. Jordan et al. (Eds.) (1987). *Restoration ecology: A synthetic approach to ecological research*. Cambridge: University Press.
- Thompson, Janette R. (1992). *Prairies, forests, and wetlands: The restoration of natural landscape communities in Iowa*. Iowa City: University of Iowa Press.
- Shirley, Shirley. (1994). *Restoring the tallgrass prairie: An illustrated manual for Iowa and the upper Midwest*. Iowa City: University of Iowa Press.

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## Site Preparation Scenarios (cont.)

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- Smith, J. Robert with Beatrice S. Smith. (1980). *The prairie garden: 70 native plants you can grow in town or country*. Madison: University of Wisconsin Press.
- Murray, Molly F. (1993). *Prairie restoration for Wisconsin schools: A guide to restoration from site analysis to management*. Madison: University of Wisconsin Arboretum.
- Local nursery catalogs are also a good resource!

### Assessments

- Upon completion, each student should:
  - Be able to describe why site preparation is important in the restoration process.
  - Be able to provide at least one pro and one con to each site preparation option.
  - Feel more comfortable presenting and discussing issues with their peers
  - Recognize at least 3 to 5 considerations when preparing a restoration site

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## The Scenarios

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### Scenario #1:

You and your friends have raised a lot of money to support the native planting on your school grounds and you want begin the first planting this spring. The site you have chosen is fairly large (5,000 square feet) and has been maintained as a lawn for the past five years. You have been told that your options are to plant a cover crop or mulch the site, which means that you would not be able to actually plant for another year. What are the advantages to these approaches? What are the disadvantages? What other option(s) would allow you to plant this spring? How would you convince your friends (and school) to go ahead and plant in the spring?

### Scenario #2:

We want to restore a prairie on our school site in an area with a very steep slope that is prone to erosion. There are a few native plants growing on the slope such as bee balm and black eyed susan. A local community member has volunteered to till the site. Is this the best option for this situation? Why or why not? What approach would you suggest? If any, are there other options and/or information you need to formulate another proposal?

### Scenario #3:

Last year, you chose to use a glyphosphate herbicide on a 1,000 square foot restoration site that has been established in an old abandoned field in the local park. You are concerned that persistent weeds and other undesirables will invade your prairie restoration. While you were able to plant the first restoration site rather quickly, there was a backlash among some community members who did not like the use of herbicides in the park. Your group wants to plant another 1,000 square feet this spring, but you are concerned about using herbicides again. What are your options and what would you do to address further community concerns? If any, are there other options and/or information you need to formulate another proposal?

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## The Scenarios (cont.)

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### Scenario #4:

The site for your prairie restoration is on a steep slope and sandy soils. The community and the administration want the site planted quickly. They suggest hiring a landscape contractor to do the site preparation and plant the prairie seed and cover crop with a tractor. While this may lead to the quicker growth of the prairie, you are concerned that if you and the rest of the students don't get to help in the planting that students won't care about the restoration and may not treat it well. What discussion points would you make to get the community and administration to consider alternatives to hiring a contractor? Are there compromises to make to accommodate different views? What are the limitations of each?

### Scenario #5:

Your woodland site is being threatened by garlic mustard, which can smother out the groundlayer where you want to plant additional wildflowers. Garlic mustard (*Alliaria petiolata*) is a biennial exotic which has in the last few years become a major threat to Wisconsin woodlands. It invades along edges of woodlands and spreads along trails and streams, growing in dense stands that choke out all other plants. Water flow, animals, and human activities further disperse garlic mustard. In a matter of several years, this plant can choke out all other ground layer species. You could choose to use herbicide treatments, but are concerned about health hazards, cost, the need to employ a licensed applicator, and community concerns that might be raised. You could also hand-weed, particularly in areas where the infestation is only scattered and desirable woodland plants can be saved, but you are concerned these efforts will not be enough to stop the invasion. What would you do?

Non-native perennials or annuals ("weeds") are generally removed by mulching, tilling, applying herbicides, sod removal or burning. Unwanted woody species are generally pulled out, girdled or cut and treated with herbicide.

### Scenario #6:

A special place was selected at a local park for students to restore an ecological restoration for at least four years of summer classes. Each year 2000 square feet of area will be prepared for planting the following year. The space is at the main entrance of the park and for that reason the restoration site must look well designed and presentable at all times of the year. Given that students will be involved in the site preparation and that the area must be aesthetically pleasing, what method(s) of site preparation would you suggest for the participants to implement.