
Prairie (Garden) Species Selection

Activity Overview

Students create a list of species for their school restoration site as determined by environmental, ecological, aesthetic, and educational criteria.

Objectives

Students will:

- Identify criteria for selecting prairie species that will grow in their restoration site
- Choose species based on ecological and aesthetic considerations
- Work cooperatively as a team
- Outline reasons why their species selections are appropriate for their site
- Learn about native prairie plants

Subjects Covered

Science

Grades

3 through 12

Activity Time

2 hours total (15 minutes Introduction, 15 minutes to develop criteria, 45 minutes to select species, 30 minutes to compile species selections)

Season

Any

Materials

Wildflower and grass field guides, species selection criteria worksheet and species selection form, native plant nursery catalogs and regional Web-based plant lists.

State Standards

Science:

Decide which collected data is pertinent to new problems (A.4.2)

Decide which data should be collected (A.4.3)

Develop themes for questions (A.8.1)

Use scientific sources & resources (B.4.1)

Background

Your site is surveyed and the restoration site is located on the school grounds. Now you are ready to select species native to your region that are suited to the soil, moisture, and light conditions of your schoolyard. Selecting species appropriate for your school restoration site helps insure survival of prairie seed and transplants. Keep in mind natural communities are dynamic and complex. A community planted by human hands will not attain the same diversity and complexity as a natural ecosystem that has taken thousands of years to evolve. Through time and natural processes the restored community will flourish in its own direction.

To begin the process of species selection, identify your site and requirements, then determine what plant characteristics will fit your site and needs. Review the following criteria and identify the criteria that fit your site characteristics and goals for your project. Use nursery catalogs, native plant books, field guides, and regional Website plant lists to select appropriate species that fit your criteria. List those potential species on the species selection form. You may need to adjust the number of species for your mix depending upon your budget, availability, and size of your planting area. A minimum of 15 forbs and 3 grasses are required for a prairie restoration. The goal is to have a new flower come into bloom every week during the growing season — about 30 forbs plus grasses. A planting list can include many more species. Curtis Prairie, at UW-Madison Arboretum, has 300 species.

Criteria for Selecting Species

Necessary criteria for every restoration:

1. *Grass/forb ratio:* The proportion of species for a reasonable mix of grass and forb species that mimics the natural structure and character of a prairie can be anywhere between 30% to 80% grass. Aesthetically, grass species, including sedges and other grass-like species, define the visual character or essence of the prairie. Ecologically, grasses provide structural support for forbs, hold the soil with their fibrous root systems and provide food and cover for wildlife. Forbs provide visual interest, provide food for wildlife on a continual basis and enhances diversity. A low proportion of grasses (30%) increases the intensity of the floral display long with the cost. A seed mix heavy with grasses (80%) tends to create a prairie dominated by grasses over time. Restorationists tend to design mixes with 30% to 60% grasses. When determining a ratio of grasses to forbs consider cost, ecology and aesthetics of the site.
2. *Pioneer species:* A prairie mix should include some fast-maturing pioneer species such as beebalm, black-eyed Susan, yellow coneflower, and blue or hairy vervain. These forbs will hold the soil and provide early interest. Additionally, you may include Canada wild rye, a pioneer grass, as a cover crop to help reduce weeds.
3. *Phenology:* One of the best known and most dramatic sequences in the

Prairie (Garden) Species Selection (cont.)

Select multiple information sources (C.4.3)

Communicate results (C.4.6)

Support conclusions with logic (C.4.7)

Identify data and sources to answer questions (C.8.2)

State learning from investigations (C.8.6)

Present a scientific solution to a problem (H.8.2)

Use scientific knowledge & reasoning (H.12.7)

prairie involves the plants blooming from mid-April through October. During the growing season approximately one new prairie plant blooms each day. This sequential or phenological change is dramatic. When choosing species, select plants for continuous bloom.

4. *Height:* When selecting species be aware of each plant's ultimate height and spread at maturity. Plant height should be in proportion with the size of your planting. Typically small-sized prairie gardens are planted with short prairie species. Large plants in a small area tend to dwarf the site and compromise its open feeling.

Large areas can be planted with a mix of short and tall prairie species. Short grass species are less than four feet; tall species are greater than four feet.

Additional criteria:

1. *Color:* Flower color is an aesthetic consideration. Look for color combinations and contrasts within each blooming interval. Pairing complementary colors (yellow/purple, red/green, orange/blue) tend to intensify the colors.
2. *Major Plant Families:* Major plant families are in every prairie habitat. To create a realistic prairie restoration you may select species based on plant family composition. Members of daisy, bean, rose, mint, and grass families are the most prevalent. See the Additional Resources for "Vegetation of Wisconsin" by John T. Curtis for a list of the leading plant families for each prairie type.
3. *Species that attract specific insects, birds and other wildlife:* Planting a diversity of native prairie flowers and grasses, along with shrubs and trees nearby, provides maximum habitat and opportunity to attract a variety of butterflies and birds. Wildlife in the schoolyard adds life, beauty, discovery, and educational opportunities. Planning and proper plant selection will increase the number and variety of butterflies and birds attracted to your planting. Prairie flowers attract a diversity of pollinating insects. Grazing insects such as grasshoppers, leafhoppers, and butterfly larvae feed on prairie grasses and forbs. These insects form the base of the food web, especially for birds. Birds also feed on highly nutritious seeds produced by prairie plants. Tall and short grasses and nearby trees and shrubs provide cover and nesting. A few select woody plants provide wind protection for butterflies and hummingbirds that nectar on prairie flowers.
4. *Species desired for prairie lessons, activities and research:* Once your prairie is in the ground you will want to use your prairie to explore, to learn and conduct prairie research. You may select plants Native Americans used for food and medicinal uses or plants that illustrate plant adaptations. Also, consider species that have a variety of seed types to study seed dispersal mechanisms or to test seed germination methods.

Prairie (Garden) Species Selection (cont.)

5. *Species blooming during the school year:* Over half the prairie species bloom during the summer months when students are on vacation. To insure experiencing plants in bloom during the school year increase the number of species that bloom in the spring and fall months.
6. *Species that should be added later or planted as transplants:* Some species do not germinate and survive well in a new planting, e.g., prairie dropseed, shooting star, alum root, gentians and lilies. In most situations, plants that are difficult to germinate in the field can be added as seed after a burn a year or more after a seed mix is planted. An alternative would be to add them as transplants. Note these species on your plant list, and designate areas for them on your planting map.
7. *Species that are aggressive:* Some plants can be overly aggressive either through vegetative reproduction or seed. These species, such as sunflowers, switch grass, common goldenrod, and cupplant often form large masses. Species with this type of growth habit are appropriate for large sites but may become too overpowering in smaller-sized plantings.
8. *Plant sources and indigenous species:* A limiting factor to plant selection may be plant availability and a source of plants indigenous to your local area. Some restorationists strongly advocate using only local seed and plants. Reasons for using local seed include species that are most likely genetically adapted to the site's specific climate and soils, and protection of the gene pool of populations growing near the restoration site.

Activity Description

1. As a group, review the site characteristics and identify criteria that fit your site characteristics and goals for your project. Fill out the prairie species selection criteria worksheet
2. Divide into teams. Each team may be responsible for choosing species within a bloom period such as April/May, June, July, August, September/October and a team to select grasses and other grass-like species. You will find that some species will overlap.
3. Next select potential prairie species using books, nursery catalogs and the web lists.
4. Re-group; go in the round and share as teams the species you chose and why.
5. Compile all species selected on a master species selection form.
6. The next step is determining a budget for the species you selected. See Earth Partnership for Schools activity "Balancing a Budget."

Extensions

- Research plants selected using the Earth Partnership for Schools activity "Up Close and Personal."
- Make posters of plants selected.
- Create a version of Earth Partnership for Schools activity "A Prairie Year" using the species selected.

Additional Resources

- Brown, Lauren. (1979). *Grasses-An Identification Guide*. Houghton Mifflin Co., New York.
- Brown, Lauren. (1976). *Weeds in Winter*. W.W. Norton & Company, Inc., New York.

Prairie (Garden) Species Selection (cont.)

- Courtenay, Booth & Zimmerman, James H. (1992.) *Wildflowers and Weeds- A Field Guide in Full Color*. Simon & Schuster, New York. (*Out of print, but worth a search*)
- Currah, R. & Van Dyk, M. (1983.) *Prairie Wildflowers- An illustrated manual of species suitable for cultivation and grassland restoration*. Friends of the Devonian Botanic Gardens-University of Alberta, Edmonton.
- Curtis, John T. (1959.) *The Vegetation of Wisconsin*. The University of Wisconsin Press. Madison, WI.
- Fassett, Norman C. (1951.) *Grasses of Wisconsin*. Regents of the University of Wisconsin, Madison, WI. (*Recommended for high school level*)
- Kindscher, Kelly. (1987.) *Edible Wild Plants of the Prairie*. University Press of Kansas, Lawrence, KS.
- Kindscher, Kelly. (1992.) *Medicinal Wild Plants of the Prairie*. University Press of Kansas, Lawrence, KS.
- Kirt, Russell R. (1989.) *Prairie Plants of Northern Illinois: Identification and Ecology*. Stipes Publishing Company, Champaign, IL.
- Kirt, Russell R. (1995.) *Prairie Plants of the Midwest: Identification and Ecology*. Stipes Publishing Company, Champaign, IL.
- Mirk, Walter. (1997.) *An Introduction to the Tall Grass Prairie of the Upper Midwest*. The Prairie Enthusiasts, c/o Gary Eldred, 4192 Sleepy Hollow Trail, Boscobel, WI 53805.
- Newcomb, Lawrence. (1977.) *Newcomb's Wildflower Guide*. Little, Brown & Co., Boston.
- Prairie Enthusiasts' Website: <http://www.prairie.pressenter.com/>
- Runkel, Sylvan T. and Roosa, Dean M. (1989.) *Wildflowers of the Tallgrass Prairie- The Upper Midwest*. Iowa State University Press, Ames, Iowa.
- Smith, J. Robert with Beatrice S. Smith. (1980.) *The Prairie Garden- 70 Native Plants You Can Grow in Town or Country*. The University of Wisconsin Press, Madison, WI.
- Stokes, Donald & Lillian. (1985.) *A Guide to Enjoying Wildflowers*. Little, Brown & Co., Boston.
- University of Wisconsin-Extension. (1998.) *Prairie Primer*. Cooperative Extension Pubs, Madison, WI

Assessments

- Review the species selected to see how well each plant meets the criteria.
- Choose three criteria and explain why you think its important to use for selecting plant species for your site.
- List 10 plants in phenological order and three grasses appropriate for your site.

Prairie (Garden) Species Selection Criteria Worksheet

School: _____

Location: _____

Planting Area : _____ (sq. ft)

Environmental Conditions:

Circle the site characteristics that describe your site.

Soil Type: Sandy Loam Clay

Soil Moisture: Dry Medium Wet

Light: Full sun Partial shade Shade

Topography: Steep Gently Rolling Level Low areas High areas

Species Characteristics:

1. Type of Prairie: Dry Dry Mesic Mesic (medium) Wet Mesic Wet

2. Grass Forb Ratio: _____ % Grasses _____ % Forbs

3. Height: Less than 4' (shortgrass prairie) Greater than 4' (tallgrass prairie)

4. Pioneer species: _____ (check off as a reminder)

5. Phenology (time of bloom):

_____ Spring (April – May)

_____ Early Summer (June)

_____ Summer (July)

_____ Late Summer (August)

_____ Fall (Sept. – Oct.)

Additional Criteria: Identify the criteria that fit your project goals.

6. _____

7. _____

8. _____

9. _____

10. _____

PRAIRIE (GARDEN) SPECIES SELECTION WORKSHEET

Common name										AP	MY	JU	JUL	AUG	SE	OC	Comments
Grasses and Sedges																	
Forbs																	

School _____ Name(s): _____ Date: _____

PRAIRIE (GARDEN) SPECIES SELECTION WORKSHEET

Common name									AP	MY	JU	JUL	AUG	SE	OCT	Comments
<u>Grasses and Sedges</u>																
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School _____

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School: _____ Name(s): _____ Date: _____