WILDLIFE HABITAT DESCRIPTIONS

NOTE: “See list.” in the text refers to the “Wildlife Plant List” document that you received in Week One.

PRAIRIE/PRAIRIE GARDEN

Definition/Description
Prairie: A prairie is a vast treeless (less than one tree per acre) landscape dominated by native grasses and native forbs (showy, flowering plants).
Prairie Garden: A prairie garden, usually part of a home/school landscape, is of variable size and utilizes native forbs and grasses often organized according to height, color, bloom time, etc.

Requirements
Size: Prairie: The size is variable. A prairie of less than an acre will allow many different species to be grown, but to attract larger and more diverse wildlife by having a variety of plant communities, more acreage is needed.
Prairie Garden: A prairie garden can be any size. An existing perennial bed may be enhanced or a new one established.

Light: Six hours or more per day of full sun should be available.

Water: No water is needed after the plants are established (after one to two years).

Elevation/Topography: Level ground is best for a prairie, but a south-facing hillside is doable as is an east or west-facing hillside. North slopes should be avoided.

Soil: Native plants will grow in a variety of soils: dry and mesic (moderately moist) plants do well in loose soils with good drainage, while wetland plants will do well when drainage is poor (standing water three to four hours after rainfall). Soil may be amended using sand.

Plant Materials: Sun-loving native forbs and grasses are recommended. See list.

Planting and Maintenance: Follow the guidelines given in the handout, "How to Plant and Maintain Native Plants."

Special Considerations
Patience: Because native plants need to develop vast root systems, a prairie planting may take several years (five or more) to look mature, especially if started with seeds.

Further Information
Fermilab Science Education Office: http://ed.fnal.gov/home/educators.shtml *Fermilab Prairie Resources*
Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.
Illinois Department of Natural Resources: http://www.dnr.illinois.gov
Illinois Prairie Page: http://www.illinoishistory.gov/PrairiePages.htm

Illinois Natural History Survey: http://www.inhs.uiuc.edu
McClain, William E. 1997. *Prairie Establishment and Landscaping*. Illinois Department of Natural Resources, Springfield. http://dnr.state.il.us/Teachkids ("Books and Other Publications" tab)
Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.
University of Illinois Extension: http://www.thisland.uiuc.edu/57ways_7.html *57 Ways – 7. Plant 'Wild' in your Backyard.*
University of Wisconsin Herbarium: http://www.botany.wisc.edu/herbarium
U.S. Department of Agriculture: http://plants.usda.gov
vPlants: http://vplants.org

BUTTERFLY GARDEN

Definition/Description: A butterfly garden is a massed planting of butterfly-favorite plants in a sunny location that provides food and shelter for all stages of butterfly life. Prairies are the original butterfly gardens.

Requirements
Size: The size of this habitat is variable.

Light: Six or more hours per day of full sun should be provided, although some butterflies will visit certain shade or partial shade plants.

Water: Once established, no additional watering is needed, if native plants are used. Adult butterflies (especially young males) tend to seek low spots filled with mud ("puddling") where they obtain not only moisture, but also minerals. A container of wet sand may also be used. Add sticks or rocks for perching.

Elevation/Topography: A flat or slightly sloped location that is protected from wind and that is suitable for native plant growth is best.

Soil: Loose, well drained loam soil is preferred for this garden, but native butterfly plants will grow in almost any soil and moisture levels.

Plant Materials: Native plants are recommended and are available for many different types of butterfly habitats. Host plants (for eggs, larva) and nectar plants (for adults) should be considered when selecting plants. Adults tend to prefer flowers that are flattened, forming a landing platform. Orange, red or yellow flowers that are short-tubular in shape are best. You should plan for continuous blooming throughout the summer. Consult the Illinois Department of Natural Resources' *Butterfly Gardens* brochure for plant lists.

Planting and Maintenance: Follow the guidelines given in the handout "How to Plant and Maintain Native Plants." Nectar and host plants should be planted in masses (clumps) rather than rows or randomly, because butterflies are attracted by color as well as scent (prefer heavily perfumed flowers).

Special Considerations
Rocks: Include some large rocks, preferably dark in color (heat absorption) for basking. Butterflies need a body temperature of 85°-100°F for flying.

Wind Protection: Due to their delicate anatomy, butterflies should be protected from wind in a sheltered spot.

Overwintering Spots: Log piles, tree crevices and under tree bark provide winter habit for non-migrating butterflies in all life stages.

Nearby Sheltering Trees and Shrubs: Butterflies will often hide in nearby foliage when not nectaring.

Pesticides: Avoid using insecticides and/or herbicides in or near your garden.

Further Information
Butterfly Basics. http://www.fieldmuseum.org
Butterfly Gardening: http://www.urbanext.uiuc.edu/hortihints/0002d.html
Fermilab Science Education Office: http://ed.fnal.gov/home/educators.shtml *Fermilab Prairie Resources*
Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.
Illinois Department of Natural Resources. 2012. *Butterfly Gardens*. Illinois Department of Natural Resources, Springfield. http://dnr.state.il.us/Teachkids ("Other Brochures" tab)
Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.
Tallamy, Douglas. 2007. *Bringing Nature Home*. Timber Press, Portland, Oregon. 358 pp.

WOODLAND/OPEN WOODLAND (SAVANNA)/EDGE

Definition/Description
Woodland: A woodland is a landscape dominated by trees, mainly oaks, maples and basswood, with smaller understory trees and shrubs and an abundance of spring and some fall wildflowers.
Open Woodland (Savanna): An open woodland is a treed area where the canopy allows some sunlight to reach the ground throughout the growing season, providing habitat for partial shade plants.
Edge: Edge is the transition area between woodland and grassland where more sunlight is available, thus providing habitat for plants that will do well in more than four hours of sunlight daily, but not full sun.

Requirements
Size: The size is variable. You may be fortunate to have woodlands on your school property. If not, trees can be planted in an arrangement to create shade for the school building away from the building as well as providing wildlife habitat.

Light: Young saplings should be grown in full sunlight to prevent bending. Shrubs, forbs (showy flowering plants) and grasses for shade or partial shade may be selected.

Water: Trees and shrubs should be watered thoroughly immediately after planting and throughout the first growing season to encourage deep rooting. Watering by slow drip action is preferred. Any time drought conditions exist (no matter what the age of the tree/shrub) supplemental water should be provided. Native forbs and grasses do not require additional watering once established.

Elevation/Topography: Level ground is best for this habitat.

Soil: Trees and shrubs grow best in moderately moist (mesic), loose soils with good drainage. Sand and clay soils are not recommended. Native forbs and grasses will grow in many different types of soil. Research the best soil conditions before purchase of forbs or grasses.

Plant Materials: Native trees and shrubs should be selected with full growth potential taken into consideration (utility wires, blocking views, safety issues, leaf/fruit drop). Spring and fall blooming native forbs will add color to the woodland. Near the edge of the woodland, plants requiring partial shade may be selected. Birds are especially attracted to trees and shrubs that produce berries. See list.

Planting and Maintenance: Dig the hole only as deep as the root ball or roots extend. The trunk flare or root collar (where the roots meet the stem/trunk) should be at soil level and not below. Dig the hole twice as wide as the root ball. Carefully remove burlap or wire basket. Gently spread the lateral roots and refill the hole. Do not use peat moss or other soil amendments. Allow a slow stream of water to drip onto the soil. As the soil sinks around the roots, add more, but do not bury the trunk flare. Water thoroughly after planting. Stake, if necessary. Follow the guidelines for shady forbs given in the handout "How to Plant and Maintain Native Plants." Woodlands may be burned to eliminate noxious weeds and undergrowth and to rejuvenate forbs.

Special Considerations
Future Site Usage: Be sure the site chosen will never be used for future structures, building additions, parking, etc.

Wind: Wind conditions should be considered when selecting young trees. Otherwise, a wind break or staking may be required. To avoid this issue, purchase only trees with a circumference (at breast height) that can withstand the force of the expected wind.

Tree Wrap: The bark on young trees is often tender and can be damaged by freezing and thawing (especially on the side of the tree facing south and southwest). To avoid splitting of the bark, tree wrap may be applied around the trunk in November and removed promptly in March.

Mulch: Bark chips are very useful to retain moisture and keep down weed growth. However, avoid the "volcano" look. Do not let the chips come in contact with the trunk of the tree.

Emerald Ash Borer: Do not plant ash trees.

Garlic Mustard: Keep a watchful eye out for this invasive weed. Get rid of it immediately.

Patience: Trees are very slow growing. Some native forbs are also slow to flower (trillium takes eight years from seed).

Further Information

Earth Partnership Program: http://uwarboretum.org/eps/woodland_rest_int_work.php
Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.
Illinois Department of Natural Resources. *Landscaping for Wildlife*. http://dnr.state.il.us/Teachkids ("Other Brochures" tab)
Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.
Tallamy, Douglas. 2007. *Bringing Nature Home*. Timber Press, Portland, Oregon. 358 pp.
U.S. Environmental Protection Agency: http://www.epa.gov/greenacres/nativeplants/factsht.html Greenacres: Landscaping with Native Plants

RAIN GARDEN

Definition/Description: A rain garden is a planted depression that is designed to take all, or as much as possible, of the excess rainwater run-off from a house/building and its associated landscape, where native plants soak up some of the water allowing the rest to percolate slowly (within one to five days) into the ground.

Benefits:

Keeps rainwater and melted snow on site, so as not to overload storm sewers and cause flooding.
Allows streams and creeks to be fed by cool groundwater at a constant rate.
Provides a way to use and optimize rainfall, reducing or avoiding the need for irrigation.
Because water is held for a short amount of time, mosquito breeding does not take place.
Filters some pollutants caused by runoff from paved areas, roads and roofs.
Encourages wildlife and biodiversity.
Recharges groundwater, reducing the need for costly stormwater treatment structures.

Requirements

Size: The size needed is determined by the area of the surface to be drained (watershed) and the type of soil present at the garden site (sand, loam, clay).

1. Measure the length and width of the roof, road, etc. Calculate the area in square feet.
2. Determine the type of soil present. Follow the instructions on the Soil Texture Worksheet.
3. Decide on the depth of your garden. A typical rain garden is between four and eight inches deep.
4. Using Chart I below, multiply the watershed area by the size multiplier given on the chart for the desired depth. Example: Your roof area is 50' by 15'=750 sq. ft. Your garden is 6-7 inches deep, and you have loam soil. Multiply 750 sq. ft. x 0.25 (the size multiplier for your soil type) to equal 187.5 sq. ft. of rain garden space required. Round up to 200 sq. ft.

Type of Soil	3-5 in. deep	6-7 in. deep	8 in. deep
Sandy	0.19	0.15	0.08
Silt Loam	0.34	0.25	0.16
Clayey	0.43	0.32	0.20

Application: Rain Gardens within 30' of the home or structure

5. Chart II shows the size of the rain garden required to absorb 90 percent of the water as a percentage of the roof area. This figure is determined by the type of soil and how fast the water is absorbed. Example: To absorb 90 percent of the runoff requires a garden 90 sq. ft. in area (or 1/5, 20 percent the size of the roof) at a rate of 0.4 inches/hour.

Type of Soil	Size of Rain Garden as % of Roof Area	Infiltration Rate, in/hr
Sandy	20% (5:1)	0.4
Silt Loam	30% (3:1)	0.20
Clayey	60% (2:1)	0.05

Application: Rule of thumb for controlling 90% of runoff
The infiltration rate (in/hr) = Size multiplier regardless of depth

Light: Six or more hours per day of full sun are preferred.

Water: Plants should be watered immediately after planting and twice weekly (totaling one inch) until plants are established.

Elevation/Topography: No matter what the depth of the rain garden, the goal is to keep the garden level. The garden should be no closer than 10 feet from the building/downspout and with a slope of 1-12 percent away from the building. To determine the slope:

1. Pound one stake at the uphill end of the proposed site and another stake at the downhill end of the site.
2. Tie a string to the bottom of the uphill stake and run the string to the downhill stake.
3. Using a string level or carpenter's level, make the string horizontal and tie the string to the downhill stake at the leveled height.
4. Measure the width between the two stakes (in inches) and the height (in inches) of the downhill stake between the ground and string.
5. Divide the height by the width and multiply the result by 100 to find the percent slope. If the slope is more than 12 percent, it is best to find another site or talk to a professional landscaper.

Now that the slope is known, decide on the depth of the rain garden from the following options:

If the slope is less than four percent, it is easiest to build a three- to five-inch deep rain garden.

If the slope is between five and seven percent, build the garden six to seven inches deep.

If the slope is between eight and 12 percent, build a rain garden eight inches in depth.

If the rain garden is more than 30 feet from the downspout, the lawn area that will be draining into the rain garden must also be considered along with the roof area.

Soil: Rain gardens can be built in sandy, loam or clay soils as determined by the "Estimating Soil Texture" worksheet. To test simply for water infiltration: dig a hole about 6 inches deep where the proposed rain garden will go. Fill the hole with water. If the water takes more than 24 hours to soak in, the soil is not suitable for a rain garden.

Shape: A hose or string should be laid out on the grass in an attractive pattern, such as a crescent, kidney or teardrop shape, according to the calculated size. The garden should be dug with a flat bottom and sloping sides, resembling a pie tin.

Plant Materials: Select native wetland edge vegetation including forbs, sedges, rushes and grasses that have well established root systems, usually one- to two-year-old plants. Plant plugs are preferred over seeds due to flooding and wind that might make seeding difficult. See list.

Planting and Maintenance: Dig each plant hole twice as wide as the plant plug and deep enough to keep the crown of the young plant level with the existing grade. Put the plant in the hole, refill with soil and firmly tamp around the roots to eliminate air pockets. Label plants, if desired. Mulch may be used to keep in moisture and discourage weeds. Follow weed control guidelines in the handout "How to Plant and Maintain Native Plants."

Special Considerations

Wildlife: Selecting plants that are attractive to wildlife will make the rain garden more interesting. Butterflies, dragonflies, birds and toads are likely visitors.

Mosquitoes: Mosquitoes require one to two days to lay and hatch eggs in standing water. An additional seven to 12 days are required for the larvae to become adults in standing water (time may be shortened, depending on air temperature). Water in rain gardens seldom lasts more than four or five days, so mosquitoes are not a problem.

Further Information

Center for Neighborhood Technology: http://www.cnt.org/repository/Water_booklet_final.pdf

City of Chicago:
http://www.cityofchicago.org/city/en/depts/water/supp_info/conservation/green_design.html *Green Design*

Earth Partnership Program:
http://uwarboretum.org/eps/research_act_classroom/rain_garden_curriculum.php

Rain Garden Network: http://www.raingardennetwork.com

BIOSWALE

Definition/Description: Bioswales are similar to rain gardens, but while rain gardens are level, bioswales slope. They tend to resemble drainage ditches and are often constructed near large pavement areas or roadsides where greater volumes of water may flow after a rain. The roots of plants within bioswales help in erosion control and water absorption. Because of the slope, water is generally not held as long as in a rain garden. Often a rain garden may be constructed at the end of a bioswale. Bioswales may have steep sides, requiring additional commercial products to aid in soil retention. They may be dry for long periods of time, once rainfall or snow melt have dissipated.

Requirements

Size: Length and depth are variable. The bioswale's size is determined by the size of the surface to be drained.

Light: Full sun is best, but shade may be created by the presence of trees or surrounding buildings.

Water: No additional watering should be necessary, once plants are established.

Elevation/Topography: Generally, a gradual slope is best in order to prevent a minimum of erosion during heavier rain storms. Erosion mats are available to help hold the soil, if the slope is steep.

Soil: Do not plan a bioswale where the soil is sandy.

Plant Materials: Hardy native plants with an established root system are best. Carefully consider light and water requirements when selecting the plant species.

Planting and Maintenance: Because planting is occurring on a sloped area, plants with developed root systems should be put in place using the "How To Plant and Maintain Native Plants" guidelines. Staking or landscape netting may be necessary until roots take hold.

Special Considerations

Erosion: Erosion is probably the biggest problem to be faced with a bioswale.

Wildlife: This type of habitat is often a very attractive place for birds and other wildlife.

City Ordinances: Be sure to check on city regulations regarding any alterations of drainage ditches. Problems could arise if rainwater/snowmelt flow in a new direction, causing flooding or water retention.

Further Information

City of Chicago:
http://www.cityofchicago.org/city/en/depts/water/supp_info/conservation/green_design.html *Green Design.*

Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.

GREEN ROOF

Definition/Description: A green roof or rooftop garden is a popular trend among urban dwellers on the roofs of residential, commercial and school buildings where street-level green space is lacking. Plant material may be displayed in containers or in several inches of soil on top of a waterproof barrier. Flat roofs were the first to be "greened," but currently even sloping roofs have been mastered.

Benefits:

A green roof:
- lowers temperatures in the summer, saving on energy bills.
- reduces smog caused by pollution reacting with heat and sunlight as a result of increased demands made on power companies for more air conditioning.
- insulates in winter, reducing energy costs. It may provide up to 25 percent more insulation than a regular roof and can reduce heat loss due to wind by 50 percent.
- improves air quality by increasing oxygen and reducing carbon dioxide levels.
- improves water runoff by retaining 75 percent of rainwater that falls on it and traps sediments, leaves and particles.
- increases sound absorption.
- creates habitat for butterflies, birds and other wildlife.
- is aesthetically pleasing to surrounding buildings and creates a garden refuge in a sea of concrete.

Requirements

Size: The size is variable and is determined by the preexisting roof.

Light: Six hours or more of full sun per day are needed.

Water: Due to a green roof's elevation, the additional heat and wind present will result in supplemental watering being necessary.

Elevation/Topography: If the rooftop will be accessible to people and serve as an outdoor room, a flat roof is required. Inaccessible gardens, not used by people, could be constructed on a sloped roof.

Soil: Generally, the soil must be three to four inches thick and composed of a special, lightweight growth medium that is 30 percent organic soil, expanded clay pellets, wood chips and vermiculite.

Plant Materials: For an accessible rooftop, sun-loving native plants can be used. Annuals and plants adapted to containers may be selected. Sometimes small trees and shrubs are grown. Grasses, mosses and sedums are popular for inaccessible roofs.

Planting and Maintenance: Follow the directions from a landscape architect or horticulturist that are specific to the roof materials and plants used.

Special Considerations

Safety: Safety is a primary concern with a green roof. Every aspect of the project should be dealt with seriously, including easy and safe access, fencing or railings, number of occupants at any one time, etc.

Building Codes: Careful study of all regulations regarding construction and safety of the garden should be undertaken.

Professional Assistance: Due to the specialty of this type of garden, a structural engineer and a landscape architect familiar with this unique habitat should both be consulted.

Slope: The slope must be measured to determine if the garden will be accessible or inaccessible to people and if sloped, the degree of difficulty in establishing a rooftop garden.

Structural Load Capacity: How much weight can the roof hold, considering saturated soil (6.75 lbs./sq. ft. for every inch of soil depth) as well as up to three feet (20 lbs./sq. ft.) of snow, plant materials, garden equipment, people, etc.? A structural engineer must help you with these calculations.

Roofing: Existing roofing materials must be considered.

Drainage system, waterproofing, electrical and water supply: All of these factors must be considered. Consult with a structural engineer.

Further Information

City of Chicago:
http://www.cityofchicago.org/city/en/depts/water/supp_info/conservation/green_design.html *Green Design*.

Snodgrass, E. C. and L. L. 2006. *Green Roof Plants: A Resource and Planting Guide.* Timber Press, Portland, Oregon.
Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.

RAVINE

Definition/Description: A ravine is a V-shaped channel cut into a hill by rain and melting snow run-off. Over time the V-shape gradually turns to a U-shape. A ravine is an ecotone (transition between ecosystems) of land meeting water with dryer, shady upland and moist, sun-dappled lowland.

Requirements
Size: The size of a ravine is variable and is determined by the slope of the land.

Light: The light available ranges from total shade to partial shade to full sunlight.

Temperature: The temperature in a ravine is often several degrees cooler than that of the surrounding land, creating a microclimate.

Water: A ravine is generally dry at the top with gradually increasing moisture often ending in a stream (frequently seasonal) at the bottom.

Soil: The soil may be degraded, as topsoil has been removed leaving humus-deficient, less stable and possibly highly erodible layers exposed beneath. If the subsoil is clay, absorbing water slowly, heavy rains may produce highly abrasive and rapid run-off.

Plant Material: Native plants that grow quickly, allowing their long roots to stabilize the sides of the ravine, are desirable. Annual nurse crops (e.g., annual rye, *Lolium multiflorum)* or purchased erosion mats may help stability until native plants can be established. See lists for bioswales and detention basins.

Further Information
Chicago Wilderness. "Shedding Light on the North Shore Ravines." Fall 2008. pp.26-29.

HUMMINGBIRD GARDEN

Definition/Description: A hummingbird garden is a massed planting of hummingbird-favorite plants in a sunny location that provides nectar throughout the growing season, as well as plants that attract insects necessary for protein in the hummingbird's diet.

Requirements
Size: The size of a hummingbird garden is variable.

Light: Full sun should be available for six or more hours each day during the growing season.

Water: Once established, native plants require no additional watering.

Elevation/Topography: The ground should be flat or slightly sloped. Protection from the wind should be provided, although hummingbirds are strong fliers capable of moving forward, backward, up, down and hovering.

Soil: Loose, well drained loam soil is preferred, although native plants can be selected for most soils and moisture levels.

Plant Materials: Native plants are recommended. Hummingbirds are especially attracted to tubular shaped flowers in red and orange hues. Plan for continuous blooming throughout the summer to keep the birds coming to your garden. They are fearless and will happily feed close to the school, so you may want to locate your garden so it can be easily seen from your classroom. Hummingbirds also need insects in their diet, so providing plants that attract insects is also a thoughtful addition to the hummingbird garden. See plant list. Also check the butterfly plant list, as hummingbirds often will visit the same plants that are grown in a butterfly garden.

Planting and Maintenance: Follow the guidelines given in the handout "How to Plant and Maintain Native Plants." Nectar plants should be planted in masses (clumps) as opposed to rows or randomly, as hummingbirds are attracted by color.

Special Considerations

Feeders: Hummingbirds readily visit feeders filled with a solution of white sugar and water (one cup sugar to four cups water). Do not use brown sugar or red food coloring.

Diet: Besides nectar, hummingbirds also need protein to build body mass, especially in preparation for their long migration to Mexico and Central America. Insects are the main source.

Sound: Hummingbirds do not sing, but will “chatter” and buzz to communicate. Their wings flap 50-60 times per second, creating a “humming” noise.

Spider Webs: Believe it or not, spider webs can be harmful to hummingbirds, causing injury or even death. Hummingbirds weigh two to three grams (equivalent to the weight of three paperclips) and when caught in a web, may expend much energy trying to escape. Watch for webs in or near your hummingbird garden.

Further Information

Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.

Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.

DETENTION BASIN

Definition/Description: Detention basins are low-lying areas designed to hold run-off from rainfall or snowmelt for generally 24-48 hours. They are not the same as the retention ponds that typically surround parking lots or can be found in suburban subdivisions, where runoff is held for much longer periods of time, sometimes indefinitely.

Requirements

Size: The size varies according to the area to be drained.

Light: Full sun of six or more hours per day in the growing season is best.

Water: No additional watering is necessary once plants are established.

Elevation/Topography: A flat basin with gently sloping sides, lower than the area to be drained, is preferred.

Soil: Loose, well drained loam soil is best. Placing in a detention basin in clay soil is not recommended. Soil moisture conditions will vary from completely saturated to dry.

Planting Materials: A variety of native plants that are adaptable to a wide range of growing conditions is preferred. Most of these plants should grow well in damp soil but can also tolerate dry periods. If the sides are steep, consider using an erosion mat, a nurse crop to stabilize sides and plants that set down roots quickly for erosion control. Consult the plant list and also those for bioswales and rain gardens.

Planting and Maintenance: Follow the guidelines given in the handout "How to Plant and Maintain Native Plants." If prescribed burns are allowed, they would be best to insure the health of the basin. Otherwise, mowing and raking off would be the alternative process.

Special Considerations

Wildlife: This area may be especially attractive to wildlife, so take that into consideration when selecting plants for food (seeds, nectar, leaves, flowers), nest building and perches.

Winter Interest: Leave dried plants for aesthetics, animal shelters and food for winter creatures.

Further Information

City of Chicago:
http://www.cityofchicago.org/city/en/depts/water/supp_info/conservation/green_design.html
University of Illinois Extension. *Green Design*.
Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.

CONTAINER AND PLANTER GARDEN

Definition/Description: A container or planter garden is composed of a pot or similar holder of plant material that is often decorative and the focal point of a garden or other location, adding interest, color and variety.

Requirements

Size: The size can vary, however, consideration must be given to whether or not the container needs to be moved to a protected winter location (freezing soil and the water it contains may damage containers by misshaping or cracking).

Light: Containers may be placed in full sun, partial shade or full shade with the appropriate plant materials.

Water: Native plants in a container will be exposed to much harsher conditions than in a garden bed, so extra watering may be required. Morning watering is preferred.

Fertilizer: Native plants normally do not require fertilizer, but if they are to remain in the container throughout the growing season with annuals, then fertilizer may be applied either every two weeks with a fast-acting fertilizer or every six to eight weeks with a slow release fertilizer. Fertilizer with three equal numbers is recommended, such as 10-10-10.

Exposure: Keep in mind that containers are often exposed to the elements on all sides, and plant materials are subject to much higher or lower temperatures than they would encounter in a garden bed. Extreme temperatures can damage roots, eventually weakening the plants and possibly causing death. Be vigilant and remove the plant(s) to a garden bed at the first signs of stress.

Soil: Although native plants grow in a variety of soil types, it is advisable to use commercial container mix (soilless), especially if combining native plants with annuals or nonnative perennials.

Planting Materials: Research your native plant choices before purchase. Consider light and water requirements, height, color, length of bloom time, etc. Plan to move your native plants to a garden bed when blooming fades or plants becomes uninteresting. This method is a good way to introduce and intermingle native plants in your perennial garden. Many native plants are interesting throughout the growing season with persistent seed heads, unusual scents and intriguing growth habits, not to mention their attractiveness to wildlife. See list.

Design: A 10-12 inch container will hold three medium plants (from four- to six-inch pots at purchase). The rule of thumb is to select one tall (upright) plant as the focal point (“the thriller”); one medium height plant with a mounding growth habit (“the filler”); and one trailing plant (“the spiller”) to flow over the side of the container.

Planting and Maintenance: Fill the container to within one to two inches from the top with soilless container mix. Add fertilizer according to directions on the package and mix with the soil. Position potted plants until you are satisfied with the “look.” Dig the holes deep enough so that the bud/crown (where stem meets root) is about one inch below the soil

line. Gently compress the soil around the plant. Water thoroughly and continue watering when necessary. Most native plants should not be deadheaded, because of interesting seed heads. However, use your own discretion. If a native plant becomes faded or uninteresting, transplant it into your perennial bed where it will provide you with years of beauty as its roots lengthen. At the end of the growing season, all remaining potted native plants should be transplanted to the garden bed. Do not try to overwinter the native plants in the pot or indoors. Their root systems need plenty of room to thrive and probably will not survive the cramped quarters of a pot for another year.

Special Considerations

Summer Duty: Containers/planters will have to be monitored over the summer months for watering, deadheading and possibly replanting as plants fade. Maybe maintenance personnel or other school staff can help, if students are unavailable.

Money: Money spent on annuals is often wasted, so why not invest in native plants that will provide beauty and attract wildlife for years to come to your school entrance and/or courtyard?

Mosquitoes: Do not allow excess water (including rainwater) to accumulate in the saucer under your container. Mosquito eggs require one to two days to hatch and seven to 12 days to become adults.

Experiment: Since this may be a relatively new endeavor for you, give it a try. You'll have nothing to lose! Your students will have great fun researching interesting native plants to grow in such a small space!

Further Information

University of Illinois Extension: http://urbanext.illinois.edu/containergardening/
Successful Container Gardens.

University of Illinois Extension: http://urbanext.illinois.edu/container/
Tips for Great Looking Container Gardens.

POND/WETLAND

Definition/Description

Pond: A small (generally less than 20 acres or smaller) permanent body of water where light penetrates to the silty or muddy bottom and is shallow enough for rooted water plants. The water temperature is typically uniform throughout and the water usually lacks wave action on the shoreline.

Wetland: A wetland is a low-lying land area whose soil is saturated with moisture either permanently or seasonally. Wetlands include swamps, marshes, bogs and fens.

Requirements

Size: The size of a pond or wetland is variable. Ponds are generally less than 20 acres in size and can be as small as eight feet across and one to two feet deep. Wetlands tend to be on a larger scale, because of their topography and purpose for water retention and filtration.

Light: Full sun (six hours minimum) is recommended. However, very shallow ponds may heat up, if in full sun, causing stress to plants and animals. This factor is especially true in small, manmade or pond "kits." Additional floating plants can help to keep the pond cool.

Water: Water levels in artificial ponds may need to be monitored, especially during times of drought. Additional water may need to be added to maintain plant and animal life. In naturally occurring ponds and wetlands, rainfall and snowmelt is usually sufficient. Often these bodies of water are also spring-fed.

Elevation/Topography: Natural ponds and wetlands most often occur as lowlands or depressions. Manmade or artificial ponds may be placed in any somewhat level area. A slight incline might be added or used to make the pump's circulation of water more interesting.

Soil: Ponds are characterized by silty loam and clay soils, while wetlands often have a combination of silt, clay, loam or Houghton muck.

Plant Materials: The plants characteristic of ponds and wetlands include moisture-loving plants, some of which are totally submerged, partially submerged, float on the surface or favor the shoreline and commonly include algae, grasses, sedges, rushes, water lilies and forbs. All plants should be carefully selected and evaluated for wildlife attractiveness. Plants that are adapted for erosion control may be of benefit for shoreline plantings. Plant plugs are preferred over seeds for ease of establishment and better results. As plants mature and seed fall occurs, the pond/wetland landscape will fill in. See plant list.

Planting and Maintenance: In ponds, submerged and emergent plants are often contained in pots filled with clay soil and topped with several inches of pea gravel to hold in the soil. Marginal plants can be tucked in among the surrounding rocks at the edge and even do well in a few inches of water. Floating plants are merely scattered on the top of the water. Wetland plants are planted in moist soil to a depth that is about one inch below the crown and tamped in. Excess growth of floating plants may occur. Periodically skim off excess plant material. Also, monthly, prune dying plant material. In the spring, remove decaying plant debris that may have accumulated in the bottom of the pond.

Special Considerations

Wildlife: Select plant materials that are especially attractive to a variety of wildlife species. Also, adding a water feature (fountain, spray, drip) to your pond is very inviting to wildlife.

Safety: Check local safety and building ordinances for restrictions and permits. A fence may be required for the specific depth and size of your proposed pond. Also, determine if unattended children may have easy access to your pond or wetland.

Pesticides and Other Chemicals: Avoid use of pesticides or chlorinated chemicals around your water habitats. Also, be alert to possible drift from nearby spraying as this can be fatal to aquatic animals and plants. Do not fertilize native plants.

Algal Blooms: Algal blooms can often be a problem when ponds are first established until a balance between the amount of plants and animals occurs. Additional plants (especially

submerged plants, which are oxygen generators) and snails or fishes may be added to help with algae control.

Winter Care: Your manmade pond may not be deep enough to allow for overwintering of animals or plants. If so, animals should be moved to a deeper pond, if possible, and plants can be brought indoors, allowed to dieback and overwinter in a cool, dry place.

Further Information

Ponds

Green Teacher. 2010. *Greening School Grounds.* New Society Publishers, Gabriola Island, Canada. 136 pp.

Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.

Natural Resources Conservation Service: http://www.ma.nrcs.usda.gov/news/publications/pond.pdf *Backyard Pond Tip Sheet*.

Wetlands

Newman, D. S., Warner, R. E. and P. C. Mankin. 2003. *Creating Habitats and Homes for Illinois Wildlife.* Illinois Department of Natural Resources and University of Illinois, Champaign. 212 pp.

Natural Resources Conservation Service: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_023212.pdf *Backyard Wetland Tip Sheet*.