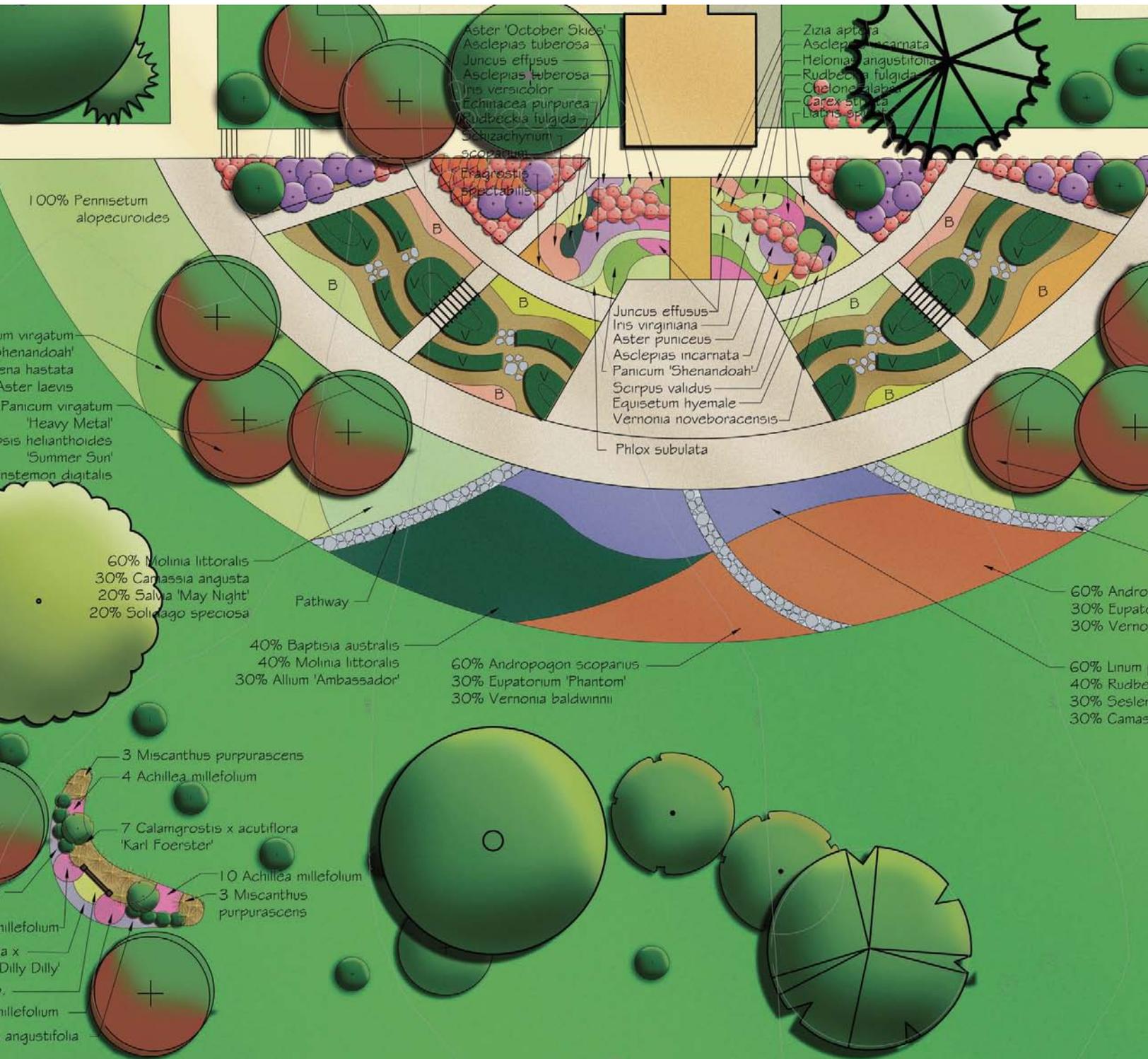


# CCHS

## Greenhouse and Outdoor Classroom Garden Guide



# The Garden Mission

***The mission of the Coolidge High School Greenhouse Garden is to create and sustain a schoolyard garden that accommodates both formal lessons and informal garden experiences; provides a venue for environmental education and community building; and enhance the grounds of the Coolidge High School campus.***

The garden incorporates 9 distinct garden landscapes, each with a unique ecological purpose and learning objective. Coolidge High School's intent is to link the Greenhouse Garden to a refurbished greenhouse that together holistically integrates environmental and wellness education into the school's curriculum and culture.

The garden fosters learning opportunities that extend well beyond environmental systems, seasonal cycles, and sustainability to wellness, social responsibility, community building and land stewardship. The garden is intended to provide an outdoor classroom that enhances the academic curriculum in math, science, and the humanities as well as provide the students with opportunities, to learn about nutrition, to connect with nature and simply observe and enjoy beauty. The garden also serves as a neighborhood amenity and is intended to bring together students and the community to provide opportunities for positive interactions between students, peers, adults, and role models. Participating in care for the garden will foster a sense of place and instill a sense of ownership, accomplishment, and pride along with teaching life skills, such as cooperative work and respect for self and others.

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***Community design day, April 2011***



***Build-it-day, November 2011***



***Meadow planting day, April 2011***

## **Designing and Building the Garden**

The Coolidge High School Greenhouse Garden is located along the south side of the school, along 5<sup>th</sup> Street NW and Sheridan Street NW. The garden grew out of the student's desire to refurbish the greenhouse that was constructed as part of the school in 1938. For almost 40 years the greenhouse provided a living lab for agricultural and horticultural science education; however, it fell into disrepair in the 1980's due to lack of maintenance and de-emphasis on agricultural sciences.

In 2009, the students in the Architectural, Construction, and Engineering (ACE) Mentoring program identified the need and had the desire to bring the greenhouse back to life just as the nation's interest was growing to improve access to nutritious foods and employ sustainable practices to protect and conserve our natural resources. The ACE Coolidge Team, along with the school's Alumni association and other key stakeholders, plan to restore this keepsake and create the first LEED certified school greenhouse in the city. Not only will this be a valuable educational project for the ACE students but also raises the profile of CCHS as being a leader in green and sustainable practices.

The Greenhouse Garden was a collaborative partnership between Potomac Chapter of the American Society of Landscape Architects (ASLA), the ACE Mentoring program at Calvin Coolidge High School, the Calvin Coolidge High School Alumni Association (CCAA), and local community members.

The multiple talents of its sponsors and participants, paired with the generous donations from vendors at the ASLA 2010 Annual Meeting & Expo in Washington, DC; design and construction support from DC Office of Public Education Facilities Modernization (OPEFM); and support from Casey Trees and the DC Department of the Environment made the School's dream to "plant a garden and build a community" a reality. The garden was designed by more than 50 students and community members during a design day facilitated by ASLA in the spring of 2010. A core volunteer team of landscape architects and community members turned the design into plans and OPEFM, along with volunteer crews, designed and planted the garden. More than \$250,000 was donated professional services and landscape materials, such as gravel, irrigation, lighting, paving, plants, and site furnishings. OPEFM provided the services to grade and install the infrastructure needed to construct the garden and more than 140 student and community volunteers helped to plant the garden.

# The Garden

The garden radiates out from the greenhouse into the community in layered concentric arcs with a central gathering space for activities and events. (See Fig. A). The central space is on axis with the greenhouse and flanked by ecologically themed and functional low maintenance sub-gardens intended to support a variety of learning – both in subject matter and learning style.



**Fig A: Plan Overview of the garden and its specialty garden areas**

The core of the garden consists of raised planting beds to be used seasonally to grow annuals and vegetables. These beds are flanked by shrub and butterfly gardens which host insects and pollinators that will benefit the entire garden. The rain and wetland gardens are designed to collect and clean stormwater to demonstrate the benefit of natural ecological systems. The memorial garden, east of the greenhouse, was refurbished as a more formal but relaxed contemplative garden from which the larger garden can be viewed. West of the greenhouse is a perennial shade garden which links to the shrub/pollinator garden areas. The perimeter of the overall garden arc is designed as a sweep of meadow that physically separates the structured garden areas from the park like areas which include new canopy and understory trees that provide habitat for birds, as well as enhanced planting that feature the Coolidge marquee.

The Garden Guide includes a section for each sub-garden with enlarged diagrams, a brief ecological value statement, a list of plants and simple maintenance guidelines. A section on infrastructure provides important information on the irrigation and lighting systems, furniture and paving.

## **“Friends of the Garden”: Growing the Garden and Building Community**



*Build-it-day, November 2011*

Gardens that are well designed and properly prepared and planted will provide years of enjoyment and learning opportunities and host a variety of functions for the school and the community. The success of the Coolidge High School Greenhouse Garden is dependent on a collaborative partnership of teachers, students, and community members to help manage its important activities.

***Friends of the Garden*** will provide the organizational structure and support that is needed to help organize the numerous resources available to help program and maintain the garden while the teachers fully integrate the garden into the school curriculum. Such a program can also greatly enrich the experiences which occur in the garden and enhance its content over time. As the garden matures, it has the opportunity to grow a community. “*Friends of the Garden*” is an opportunity to learn to be gardeners, get together with friends, and to meet new neighbors. A suggested organizational structure is provided in the “Supporting the Garden: Funding and Grant Opportunities” of the Garden Guide along with a list of organizations in the Washington DC region that may assist the *Friends of the Garden* with training and routine maintenance.

## Learning in the Garden

School gardens by their very nature, present a dynamic and fertile learning environment. They enable students to solve problems and create products in context-rich and naturalistic settings while using their linguistic, logical-mathematical, spatial, bodily-kinesthetic, and interpersonal intelligences. The garden also serves as a foundation to learn valuable lessons about the environment, fostering and strengthening a student's connection to the greater community and world around them.

Learning in a school garden is multi-faceted and is easily adaptable to a variety of learning styles. This guide includes suggested learning activities arranged by subject matter and provides links to additional educational resources.

Studies have shown a clear and unambiguous set of benefits for all ages from garden based learning. There are many web based resources available to help develop, plan, evaluate, and enhance garden based learning. Just type in *Garden Based Learning* in your browser. For example: (<http://blogs.cornell.edu/gblblog/> & <http://blogs.cornell.edu/gblblog/files/2011/01/Top-5-GBL-Web-Resources-for-Creating-and-Sustaining.pdf> )



*Build-it-day, November 2011*

## Maintaining the Garden

Gardens, when they are first installed, will require much more constant effort than they do when they are more established. Like the puppy which requires more effort in the early years to ensure a well trained dog, there are some key things to manage at the outset which will simplify long term maintenance.

Maintenance of the garden involves several routine tasks that are scheduled throughout the year to ensure that plants are healthy and growing well. The main garden tasks are watering, weeding, mulching and cutting back or removing dead foliage in late fall and early spring. The importance of each of the maintenance items and general instructions on how to apply these to each of the gardens is provided in greater detail in the Garden by Garden Section of the guide. The garden will need different levels of effort through the seasons. An overview of the types of maintenance activities and general schedule for a typical year is provided in Figure B, the General Maintenance Schedule.

General Maintenance Schedule											
Task	Months										
	January	February	March	April	May	June	July	August	September	November	December
Monitoring											
Pruning (if needed) <sup>i</sup>											
Fertilizing <sup>ii</sup>											
Cut back Perennials											
Watering <sup>iii</sup>											
Edging (if needed) <sup>iv</sup>											
Weeding (as needed)											
Mulching <sup>v</sup>											
Spring Clean Up <sup>vi</sup>											
Fall Clean Up <sup>vii</sup>											

**Fig B: General Maintenance Schedule**

<sup>i</sup> Prune broken branches of shrubs and trees only.

<sup>ii</sup> Use a general all-purpose fertilizer, follow directions for application on package.

<sup>iii</sup> Follow garden guide instructions, and set irrigation system controls in late spring.

<sup>iv</sup> Edge planting beds adjacent to grass areas only to keep grass from growing into beds.

<sup>v</sup> Schedule mulching with the Spring Clean Up day.

<sup>vi</sup> Spring Clean Up consists of removing dead leaves, old mulch and weeds. Can also schedule cutting back the perennials. Should be a one-day event in early spring.

<sup>vii</sup> Fall Clean Up consists of weeding, mulching and general clean up for winter. Should be a one-day event scheduled before the frost.

Activity	Year	2011	2012	2013	2014	2015	2016	2017	2018
Remove top 1" of Mulch and Replace									
Divide Perennials and Plant									
Mow Meadow (mid -June/ mid-July/mid- Aug)									

## Garden Guidelines

Use the monthly maintenance schedule to identify tasks needed for each garden area and assign specific maintenance tasks to responsible volunteers and use it to identify how to teach curricular skills within each task type. At a minimum, plan a Spring (between March and April) and Fall (between late August and late October) Clean Up day with volunteers/ Friends of the Garden to support the student-teacher efforts for each season.

The following maintenance activities are general guidelines that should be followed and applied on a regular basis to each garden.

### Watering:

- Most plants die because they get too much or too little water.
- New plantings: the soil should be moist but not soaking wet for the first two weeks.
- Established plantings: It is time to water if it hasn't rained in over 14-30 days (except for winter) and the perennial's leaves are drooping.
- When to Water: Water either first thing in the morning or after 2 in the afternoon.
- How to Water: A deep watering once a week is better than a light sprinkling every few days. Deep watering is defined as 1x/ week for 1 hour or 1x/3-4 weeks for 2-4 hours. Deep watering encourages deep root development that helps the plant survive over the winter.
- Automatic Watering. The automatic irrigation system covers the rain, wetland, shrub, perennial, and marquee gardens. Information regarding the irrigation system is contained in the Irrigation portion of the "Maintaining the Garden" section. The least effective method for watering is with a hand-held nozzle because gardeners seldom apply enough water and it is poorly distributed over the bed.

### Pest Control:

- Following organic pest management methods and standards are preferable in school and community gardens.
- Schedule seasonal consultations with a garden expert to assess garden health.
- For pest control assistance, take a sample of the soil, plant or pest to local gardening experts at a local garden center, a botanical garden, or Master Gardener's clinic. Some local resources can be found at the back of this guide.
- Control pests and diseases as soon as noticed to avoid spreading the problem to other plants. Cut out diseased foliage immediately to avoid it spreading.

## **Weeding:**

- Regular weeding in the growing season is important to avoid desirable plants from being choked out by weeds; weeding frequency varies by garden type.
- Tag plants or follow planting plans to avoid weeding desirable plants.
- Some of the primary winter weeds include: chickweed and, garlic mustard. The primary spring weeds include: lesser celandine, garlic mustard, stilt grass, blue grass, and mile a minute (devils tail). The primary summer weeds include: crab grass and knot weed. A good source for weed identification is found in a book by Peter Del Tredici called *Wild Urban Plants of the Northeast: A Field Guide*.
- Mile a minute or Devil's tail weed should be removed immediately. It is a very invasive plant. Also, promptly remove weeds such as crab grass, ground ivy and clover.
- Record the type and time that weeds appear for future reference and use.

## **Mulching:**

- Mulching twice a year protects the soil and plant roots from freezing in the winter and drying out in the summer, ensuring adequate moisture for the root systems during the growing season. It also helps to cut down on the pesky weeds!
- Mulch in the spring and late fall around all perennials, shrubs, and trees. Do not mulch in winter; it will warm the soil causing new growth which will be severely damaged when frozen.
- Mulch depth should not exceed 3". Recommended depths for individual gardens are provided in the guide below.
- Mulching plants and trees: create a donut hole around the plant base; do not pile up like a volcano smothering the plant. Create a basin around the base of tree trunks.

## **Fertilizing:**

- Soil health is important to sustain a healthy garden. Since soil nutrients are depleted over time, perennials and annuals may need to be fertilized. A soil test is often advised to determine soil health before fertilizing. Soil can be sent to a lab to do these tests; for examples go to: [www.soilfood.com](http://www.soilfood.com).
- Compost tea, applied during the growing season will improve soil health and promote healthy plant growth.
- Generally, fertilize perennials and annuals in early spring (late March to mid-April) to promote robust flowering. Annuals are most likely to benefit from fertilizers but soil health is more important to create sustainable gardens.
- It is best to perform soil test to determine if fertilizer is needed. The Soilfoodweb Lab is one option for obtaining a comprehensive soil profile. For most perennials, applying 1 to 2 pounds of an all-purpose fertilizer, such as a 10-10-10 (ratio of nitrogen, phosphorous and potassium) per 100 square feet is adequate. Follow directions on the product's label.
- After applying, water the plants to remove fertilizer from the foliage to prevent burn.
- Too much fertilizer will cause weak, leggy growth and inhibits flowering.

## **Plant Care:**

Plant care varies by the garden and plant type. For detailed plant care guidance, see individual gardens below.

- Perennials, including shrubs and trees, are plants that live longer than 2 years.
  - Once established perennials do not need a high level of maintenance.
  - Sufficient watering and mulching is most critical during the first year.
- Herbaceous perennials die back after the first hard frost in fall.
  - The dead plant debris should be cut off and removed in late fall or early spring of the following year. This will improve the appearance and reduce disease since plant pathogens thrive in the debris.
  - Annual plants usually germinate, flower and die in a year or season.

## **Infrastructure:**

The infrastructure provides the skeletal structure of the garden. It includes the grade of the land, the drainage, paving, irrigation, lighting, and some decorative elements. It is important to care for these items and include them in the annual maintenance plan.

## **Irrigation**

Irrigation system maintenance is necessary to ensure the most efficient use of the water that is being applied. Efficient irrigation is important because 40% of total water used in the area is applied to the landscape. To help conserve potable water, efficient water use is critical. These maintenance recommendations will help you evaluate your irrigation system before using it each spring and also throughout the growing season.

### **Irrigation Controller**

Irrigation controllers should be checked at the beginning of each growing season before running the sprinklers for the first time. First, find the manual for the controller. If the manual has been lost or misplaced, check the manufacturer's web site for downloadable versions or information on how to order one. Becoming familiar with the irrigation controller's manual will make spring start-up quick and easy. Check the wiring for any loose connections. Check all wire connections, including the rain sensor connection if one is attached. Make sure the rain sensor is connected and functioning.

Next, check the time and day showing on the controller and correct them if necessary. This is also the time to set up an irrigation schedule. Each of the gardens has a separate zone and was designed so that each garden could receive the exact amount of water to create a successful garden. For example, the meadow garden may only be watered one time per month in the middle of the summer where the veggie gardens may be watered a couple of times per week in the middle of the summer.

- Controller manual: Find the manual for your irrigation controller and make sure you are familiar with its operation.
- Controller cabinet: Open the cabinet for the irrigation controller and make sure it is free of debris such as cobwebs or dirt. This is also a good time to replace the battery.
- Wiring: Check all wiring connections for wear and breakage. Repair if necessary.
- Time/day settings: Check the time/day settings on your controller to make sure they are correct. This is also a good time to set up an irrigation schedule.
- Irrigation schedule: Set up your irrigation schedule. Ask your local county Extension office for a schedule tailored to your area.

## **Sprinkler System**

Once the irrigation schedule is programmed, inspect the sprinkler system by checking the valves, sprinkler heads, and emitters.

- Observe the spray patterns and position of the sprinklers for obvious problems such as clogged or misaligned heads.
- Some sprinkler heads may be tilted, surrounded by grass, or even buried. If not positioned properly, these sprinkler heads will be unable to apply water efficiently.
- Some sprinklers also have built-in filter screens that should be cleaned and replaced if necessary.
- Watch for leaks and misting from sprinkler heads that may indicate high water pressure problems. High pressure can be corrected by adjusting the flow control on the valves. When this is done, turn the irrigation system on manually to make sure it is operating as programmed.

- Flush system: Before running the system, remove the last sprinkler head in each line and let the water run for a few minutes to flush out any dirt and debris. Replace the sprinkler heads and turn the system on, running one valve at a time.
- Broken or clogged heads: Look for obviously broken or clogged heads and make the necessary repairs or replace. Consider installing irrigation heads that have screens to prevent debris (grass, soil, or bugs) from clogging the sprinkler heads. Clean out screens that may be clogged.
- Broken/leaking valve or pipe: Observe the lowest head in each station for leaks. Algae or moss may be growing in the area and may indicate the problem.
- High pressure : Look for a very fine mist from spray heads caused by excessive pressure in the system. Correct the problem with a pressure regulator after the water meter, pressure regulating sprinkler heads, or added devices on individual sprinkler heads have been checked. *Visit your local irrigation supply store for needed materials.*
- Low pressure: Check to see if the sprinklers are covering the desired area uniformly. If your pressure is too low, try watering at a different time or modifying your system so there are fewer sprinklers on each valve.
- Incorrect spray arc: Check to see that irrigated areas are being covered completely. Consider adjusting the spray pattern if possible, or replace the spray nozzle(s) with another that has the correct spray pattern. *Visit your local irrigation supply store for needed materials.*
- Low head drainage: Check to see if water is draining through the lower heads. Install check valves where appropriate, or replace existing heads with heads that contain built-in check valves. *Visit your local irrigation supply store for needed materials.*
- Mismatched heads: Check to see that different types of heads are not used in the same irrigation zone. Nozzles should also be correlated for matched precipitation rates. *Visit your local irrigation supply store for needed materials.*
- Over-spray : Look for over-spray of sprinklers onto sidewalks, driveways, and streets. The sprinklers' spray patterns should either be adjusted or changed to a pattern that will stay within the planting area.
- Spray pattern blocked or misdirected: Look for blocked spray patterns. Remove vegetation and other obstructions that may be blocking the spray, or consider raising the heads.
- Sunken heads/short pop-ups : Check each head to see that it is at ground level. Raise sunken heads to grade or replace existing short pop-up heads in the lawn with taller pop-ups, as necessary. You can also trim around existing heads to avoid blocking the spray but you will have to do this on a continual basis. *Visit your local irrigation supply store for needed materials.*
- Tilted heads: Heads should be aligned vertically, except in sloped areas. In a sloped area, heads should be aligned perpendicular to the slope to achieve proper coverage. Tilted heads can cause ponding and uneven coverage.
- Uneven or extended head spacing: Check to see if you have head to head coverage between sprinklers. If necessary, consult a qualified professional to design a system with head-to-head spacing.

## **Drip System**

As with sprinkler systems, run the system, one valve at a time, to check for problems.

- Clogged dripline should be replaced.
- Check to see that all of the dripline is in place. Missing and broken dripline needs to be replaced to keep your system running efficiently.
- Look for pinched or broken tubing and straighten or replace it. Also make sure that all tubing is attached and that connections are secure.

- Make the necessary adjustments and repairs to the system. When this is done, turn the irrigation system on manually to make sure it is operating as programmed.
- Clean filter /clogged dripline: Clean the filter and replace any clogged lengths of dripline. *Visit your local irrigation supply store for needed materials.*
- Dripline too close/far from plant: Check the placement of dripline after planting. The dripline should be located at the edge of the new seedlings or edge of the root-ball on new plantings and moved to the dripline (edge of foliage) of established plants.

## Winterization

Basic winterization of a sprinkler system is quite simple. The water supply should be turned off at the main valve and the irrigation controller should be set to the “rain” or “off” setting. Each valve should be turned on to release pressure in the pipes and water should be drained from the system to protect any components that could freeze. The system may have drain valves that can be opened for drainage, or the system may have to be blown out using air.

## Paving

The ECO COBBLE™ Pavers are located in the arched pathway and outdoor classroom area.

- Manufacturer: EP Henry
- Product: ECO COBBLE™ Paving is an environmental alternative to conventional paving systems. It is an interlocking concrete permeable paving system integrated with an underlying stone reservoir designed to temporarily store surface runoff and allow for direct infiltration to the subsoil. This product and its application is meant to provide a comfortable and structural walking surface while addressing stormwater management needs.
- Care and Maintenance: ECO COBBLE™ Paver is designed to allow for water to flow in between the gaps and into the stone base and eventually into the soil. The paver gaps have been filled with stone dust and the stone reservoir consists of No. 57 stone. The following steps should be performed every 6 months:
  - Clear any silt deposits accumulated in the paver gaps, as required.
  - Sweep stone dust into the paver gaps, as required.
  - If settling has occurred, lift pavers, retamp stone reservoir layer and add additional stone to level.
  - Check walkway edging and secure with spikes, as required.

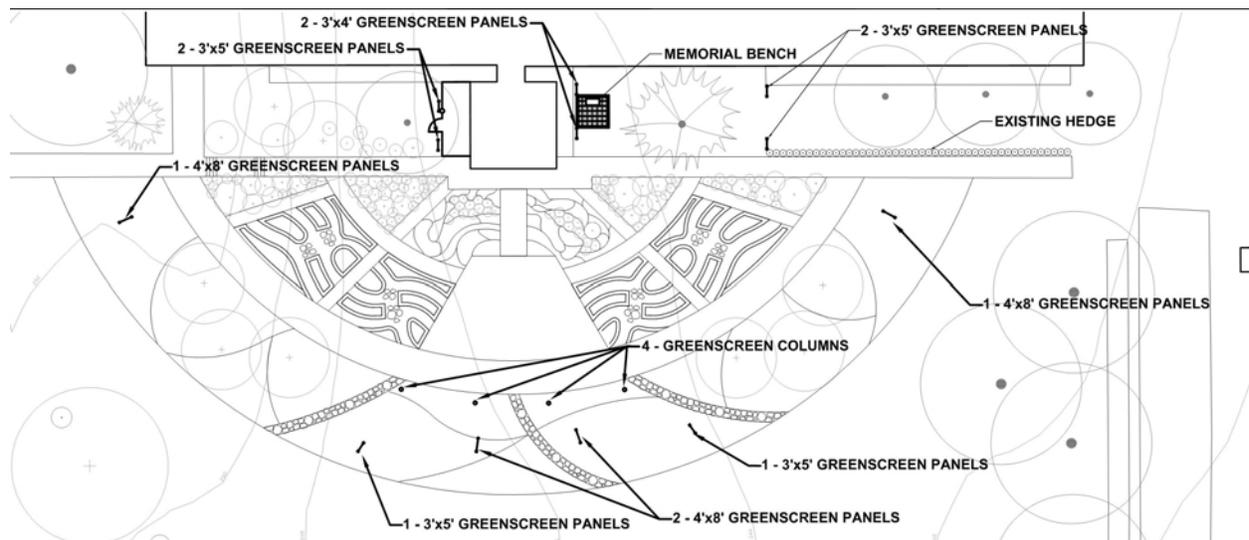
## Raised Planters

English Gardenwall™ is a conventional freestanding landscape wall system with a basic gravel base footer.

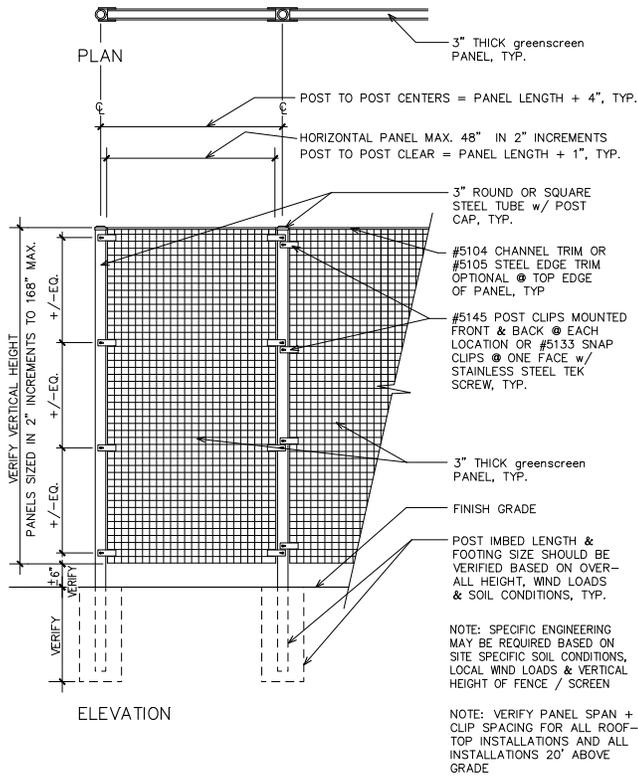
- Manufacturer: EP Henry
- Care and Maintenance: The walls themselves require little maintenance. If the walls start to lean or slump then a landscape professional should be consulted. Consult the *Raised Bed Seasonal Edible Garden* section in this guideline for soil and vegetative maintenance regime.
- The raised planters are located in the plaza/outdoor classroom area.

## Green Screen Columns and Panels

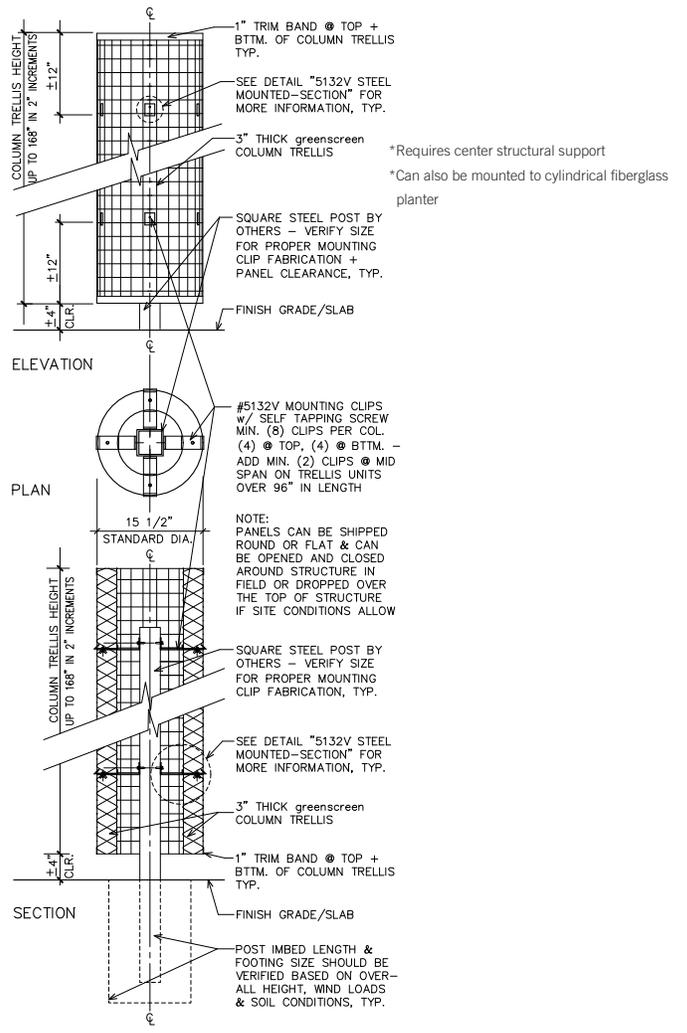
Greenscreen® Freestanding Trellis Fence & Greenscreen® Column Trellis are supported by galvanized fence posts and concrete footers which allow for climbing vegetation to grow vertically upon the columns and panels from the ground upwards.



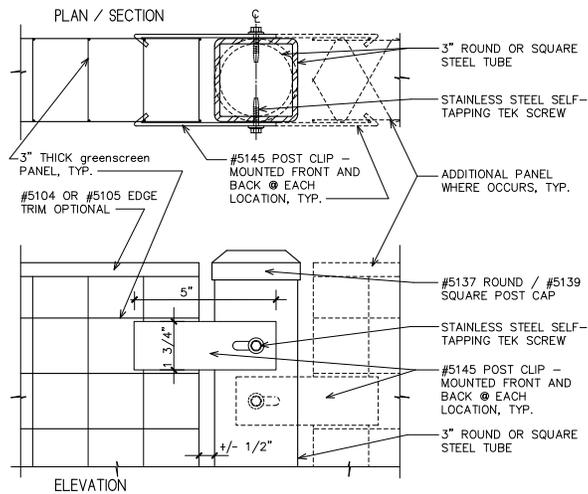
- Manufacturer: Greenscreen, Inc.
- Product: Greenscreen® Freestanding Trellis Fence & Greenscreen® Column Trellis
  - (2) 3'x4' Trellis Fence Panels
  - (6) 3'x5' Trellis Fence Panels
  - (4) 4'x8' Trellis Fence Panels
  - (4) 15.5" Dia. x 8' Column Trellis
- The field panels and columns are supported by galvanized fence posts and set in 12" dia x 2'/3' (taller panels require 3' depth) deep concrete footer. Two wall mounted panels are located on the Greenhouse wall in the Memorial Garden.
- Care and Maintenance: No vertical loads shall be placed on the structures. In the event that vertical loads are placed on the structures and leaning or toppling occurs, then the trellis wrap must be removed so that the posts get reset into the ground. Soil around the post footers must be compacted to secure footer in place.
- Skill development and learning ideas:
  - Planting vines
  - Living Walls (green walls)
  - Temporary Art projects



○ FREESTANDING FENCE / SCREEN - VERTICAL

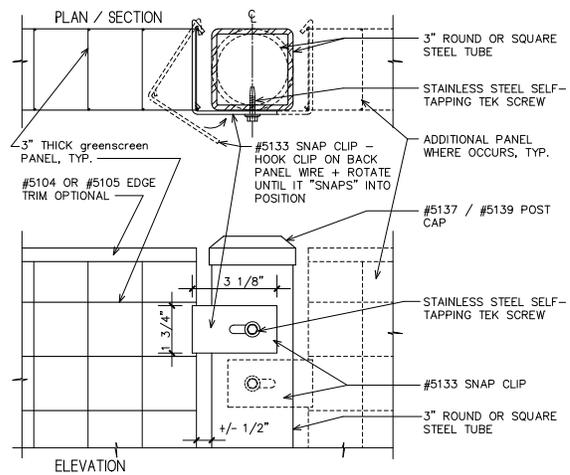


○ STANDARD COLUMN TRELLIS



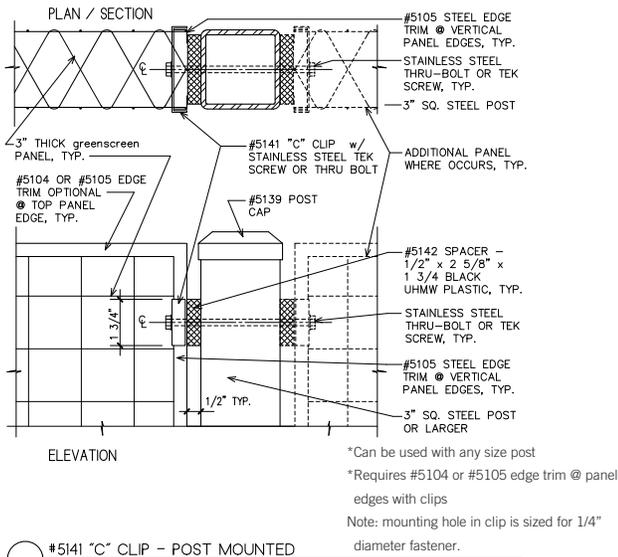
○ #5145 POST CLIP

\*Requires access to both sides of panels for installation  
 \*Requires 3" round or square posts to match panel thickness.  
 Note: Mounting hole in clip is sized for 1/4" diameter fastener.

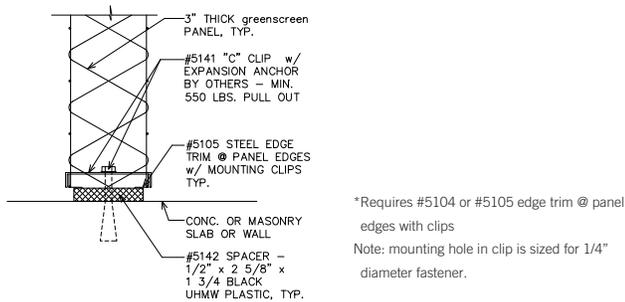


○ #5133 SNAP CLIP / POST MOUNTED

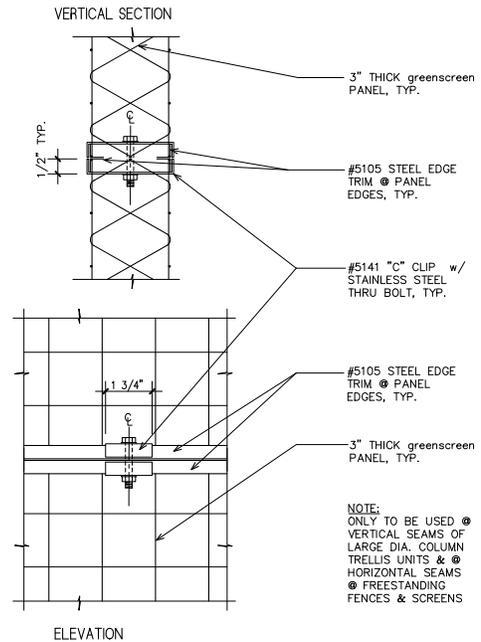
\*Only requires access to front face of panel  
 \*Maximum horizontal span 4'.  
 Note: Mounting hole in clip is sized for 1/4" diameter fastener.



○ #5141 "C" CLIP - POST MOUNTED



○ #5141 "C" CLIP / SLAB MOUNTED



○ #5141 "C" CLIP - PANEL TO PANEL

\*Requires #5104 or #5105 edge trim @ panel edges with clips

\*Can be used on large diameter Column Trellis units or @ horizontal seams at flat or curved freestanding panels.

Note: Mounting hole in clip is sized for 1/4" diameter fastener.

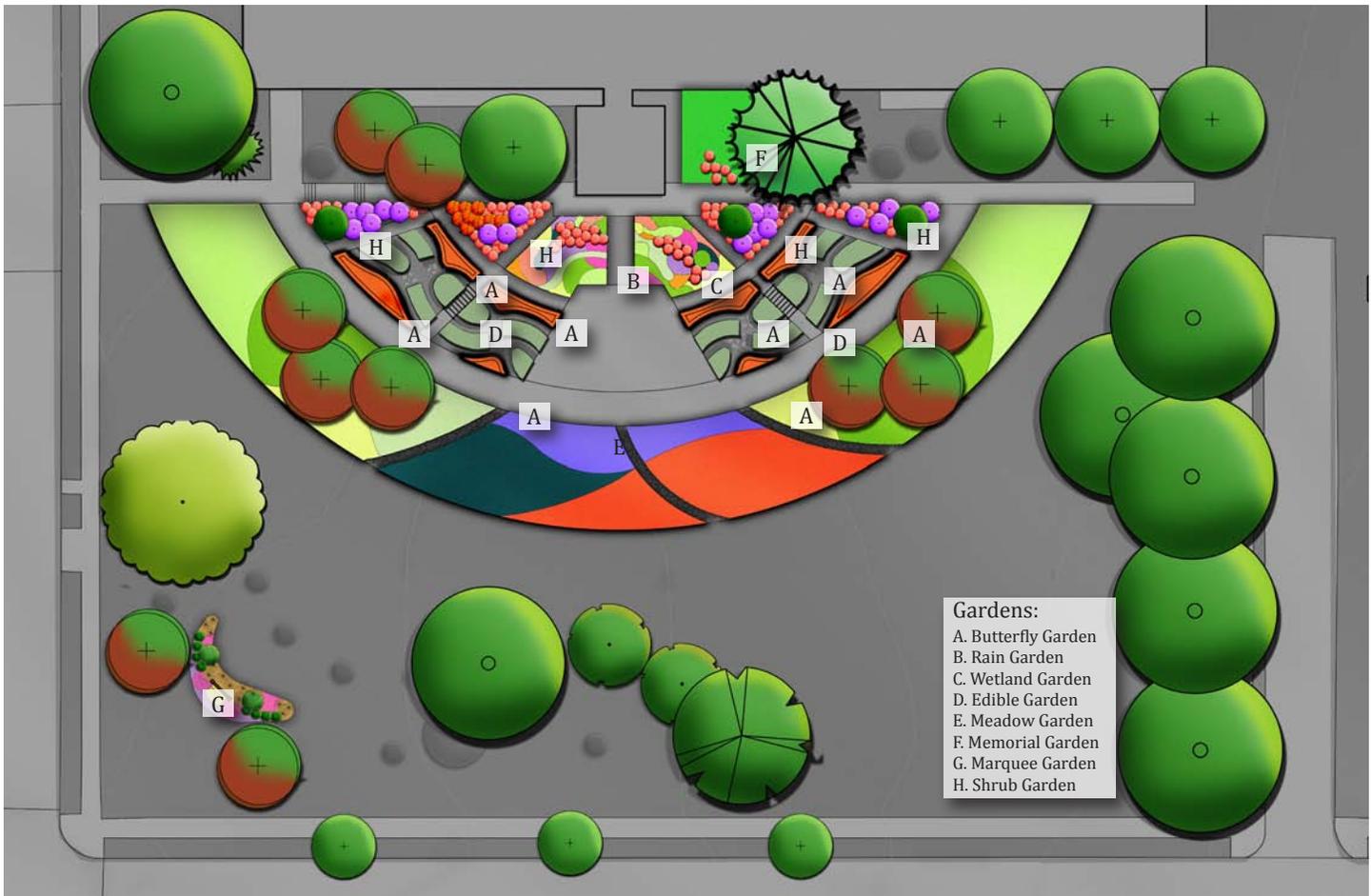
## Lighting

**Pathway Lighting:** Provide visibility along the garden paths during the evening hours and use uplighting highlights to the Coolidge High School marquee sign.

- **Manufacturer:** FX Luminaire
- **Products:**
  - Pathway Lighting - DelMare Model DM-20 with Xenon G4 Lamp
  - Uplighting - MachiaUltimo Model: MU-20 with Halogen MR-16 Lamp
- **Installation:** The lights are staked with concrete collars. All wiring repairs should be performed by an electrical professional. Transformer box is located in the greenhouse storage room.
- **Care and Maintenance:** Pathway lighting should be checked on at a minimum of once a month to insure lamps have not burned out and/or fixtures have not been pushed over or pulled out.



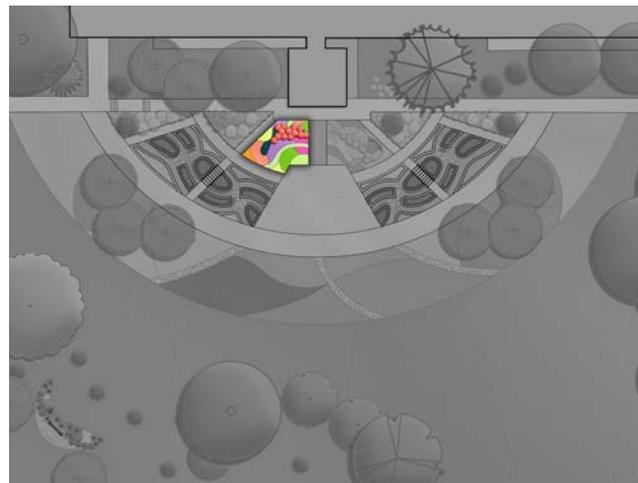
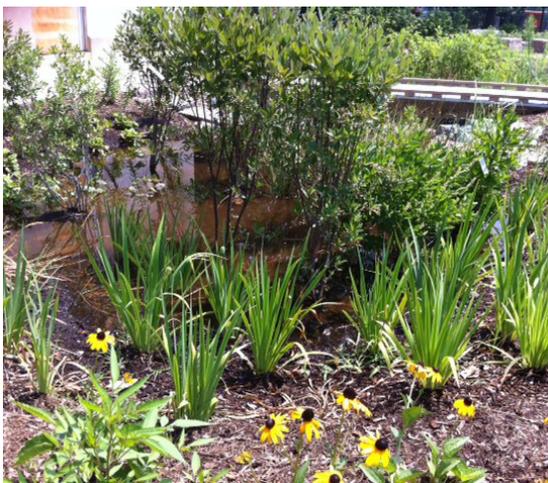
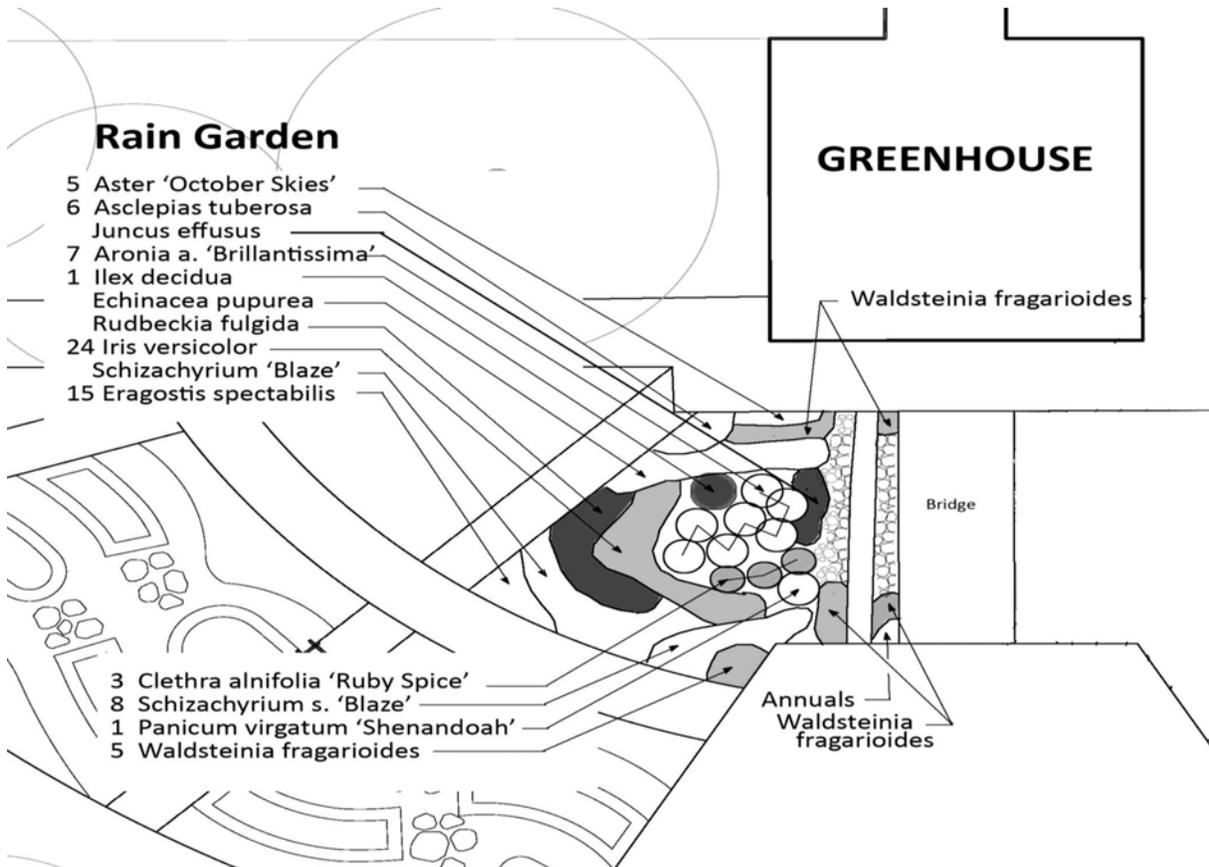
## Garden by Garden



# Rain Garden

## Ecological purpose of Rain Gardens

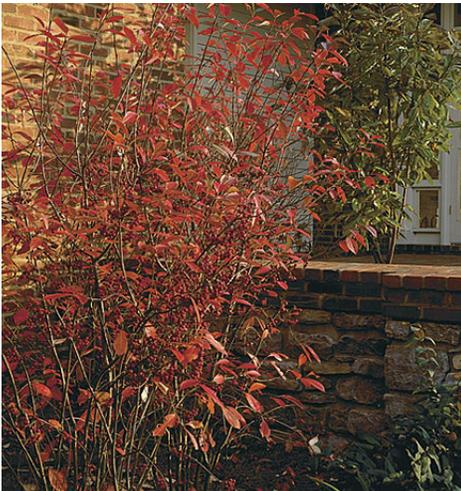
Rain gardens are designed to capture and filter rainwater from impervious surfaces before the rainwater has a chance to enter the storm drain. After a rainstorm, water enters the garden and is detained until it is absorbed by plants or the soil. Plants, mulch and soil clean the excess water before it leaves the garden. While the garden processes the dirty stormwater, it also supports the pollinator friendly plants in the garden, thus cleaning water and enhancing habitat at the same time. Silt, nitrogen and phosphorous are all reduced by the garden rather than those elements running into a storm drain or creek. Rain Gardens are one tool to manage stormwater that will help restore the health of our creeks, rivers, bays, and oceans.



**Rain Garden Plant List**

<b>Rain Garden SHRUBS</b>	
<i>Aronia arbutifolia</i> 'Brilliantissima' ( <i>Photinia pyrifolia</i> 'Brilliantissima')	Red Chokeberry
<i>Clethra alnifolia</i> 'Ruby Spice'	Summersweet
<i>Ilex decidua</i>	Possumhaw

<b>Rain Garden PERENNIALS</b>	
<i>Asclepias tuberosa</i>	Butterfly Weed
<i>Aster novae angliae</i> 'October Skies'	New England Aster
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Eragrostis spectabilis</i>	Purple Lovegrass
<i>Iris virginiana</i>	Southern Blue flag
<i>Juncus effusus</i>	Soft Rush
<i>Panicum virgatum</i> 'Shenandoah'	Switch Grass
<i>Rudbeckia fulgida</i>	Black Eyed Susan
<i>Schizachyrium scoparium</i> 'Blaze'	Little Bluestem
<i>Waldsteinia fragarioides</i>	Barren Strawberry



Red Chokeberry



Summersweet



Possumhaw



Purple Coneflower



Switch Grass



Purple Lovegrass



Barren Strawberry



Black Eyed Susan



Butterfly Weed



Southern Blue Flag



Soft Rush



Little Bluestem



New England Aster

### ***Rain Garden Maintenance schedule (after year 1)***

- Early Spring (Valentine's Day – St. Patrick's Day)
  - ✓ Rake out dead leaf debris and old mulch.
  - ✓ Spread the leaf debris and old mulch around the base of trees on the property.
  - ✓ Clean out trash that has accumulated 1time per month.
  - ✓ Cut down any perennials to their basal rosettes (within 4" of the ground). Grasses should be cut back to 8-12" tall if not done prior to this time period.
  
- Late Spring - Summer (St. Patrick's Day - Labor Day)
  - ✓ Check the status of labels; replace as necessary, consulting with photographs and the plan diagram.
  - ✓ Begin weeding every week as weeds emerge; be careful to not weed out emerging perennials.
  - ✓ Clean out trash that has accumulated 1 time per month.
  - ✓ Remove old mulch and replace with fresh 3" layer of mulch every other year; in years when not doing the full replacement, remove the top 1" and replace 1" of mulch. If doing a complete remulch, spread a 3" layer leaving a 2" gap around the base of perennials and shrubs so that no mulch is piled up on the stems of any plants.
  - ✓ Spread the removed mulch and any leaf debris around the base of trees on the property.
  - ✓ Stake the asters the middle of June or plan to cut back to 12" tall by July 4<sup>th</sup> to prevent floppiness.
  - ✓ Check the irrigation system. Irrigation should not be required in the spring. During the summer, if there is no rain for four weeks, use the irrigation system to deliver 1" of water/ week in a single application.
  - ✓ Check the ECO COBBLE path for levelness and reset if necessary.
  - ✓ In May, evaluate the garden population and replace plants as necessary.
  
- Fall – (Labor Day- Christmas)
  - ✓ Water during times of drought (over 4 weeks without rain).
  - ✓ Between Labor Day and Thanksgiving, pick up all trash which may have accumulated over the summer.
  - ✓ Weed as required for the last time in the season by Thanksgiving.
  - ✓ Do a trash pick up 1time per month.
  - ✓ Divide perennials every 3-5 years. Fill in any gaps as per the plan. Extra plants can be sold or transplanted to other places if the divisions are done by mid-October.
  
- Winter (Christmas – Valentine's Day)
  - ✓ Inspect garden / pull out trash that blows in 1 time per month.
  - ✓ Prune, if necessary, during the winter when you can see the branching structure.
  - ✓ Grasses and perennials may be cut back to 8-12" tall (grasses) or their basal rosettes (perennials) between Christmas and mid-March.

### ***Rain Garden Learning Activities***

- ❖ Skill Development
  - Horticulture: Study of plant life cycles,, growing experiments, chromatography, maintenance procedures, and lifecycles.
  - Environmental Science: Describe process of hydrologic cycle, nitrogen and carbon cycles, study of microclimates, weather patterns and climate investigations, and biome concepts. Develop a school water conservation challenge, using skills of observation, record keeping, monitoring, and measuring.

- Language arts: Essay writing, poetry study, comparison of nature writer Henry Thoreau, poets Robert Frost, Walt Whitman and Mary Oliver. Study, their writings on temporal qualities of landscape as life/death metaphor, nature as sublime, analyzing symbolism of water in nature writing.
- Math: Geometry – measuring volume of water runoff, rain gauges; Trig – angles, estimating. Algebra – solving word problems and rate problems.
- Social Studies: Geography research (plant ranges), social values of plants, and economic values of plants.
- Art: Printmaking, observation, still life, photography, and watercolor studies.
- Programming Ideas for Rain Gardens in other places focus on water quality and multiple benefits for environmental health. Since it is a garden with multiple benefits (pollinator health, water treatment, bay health) and the plants in the garden are native, programs could be developed that are regionally specific (how have these plants been used traditionally? How do these plants identify this as a DC garden?).
  - *Create a bloom calendar for the garden over the course of a year. Use it to key events or other routine activities or as part of website content.*
  - *Create personal artwork reflections that illustrate metaphor of “flow.”*
  - *Build a model that mimics how a rain garden acts as sponge and lung, illustrating how the elements work together to form an interdependent system.*
  - *Design a poster that shows the layers of a rain garden.*
  - *Compare nature writer Henry Thoreau, and poets Robert Frost, Walt Whitman and Mary Oliver. How do their writings address the temporal qualities of landscape? Discuss metaphors of garden, analyze symbolism of water in nature writing.*

### **Rain Garden References**

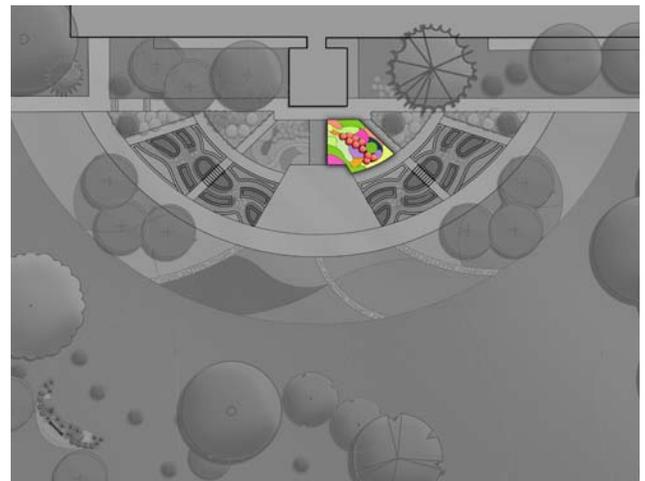
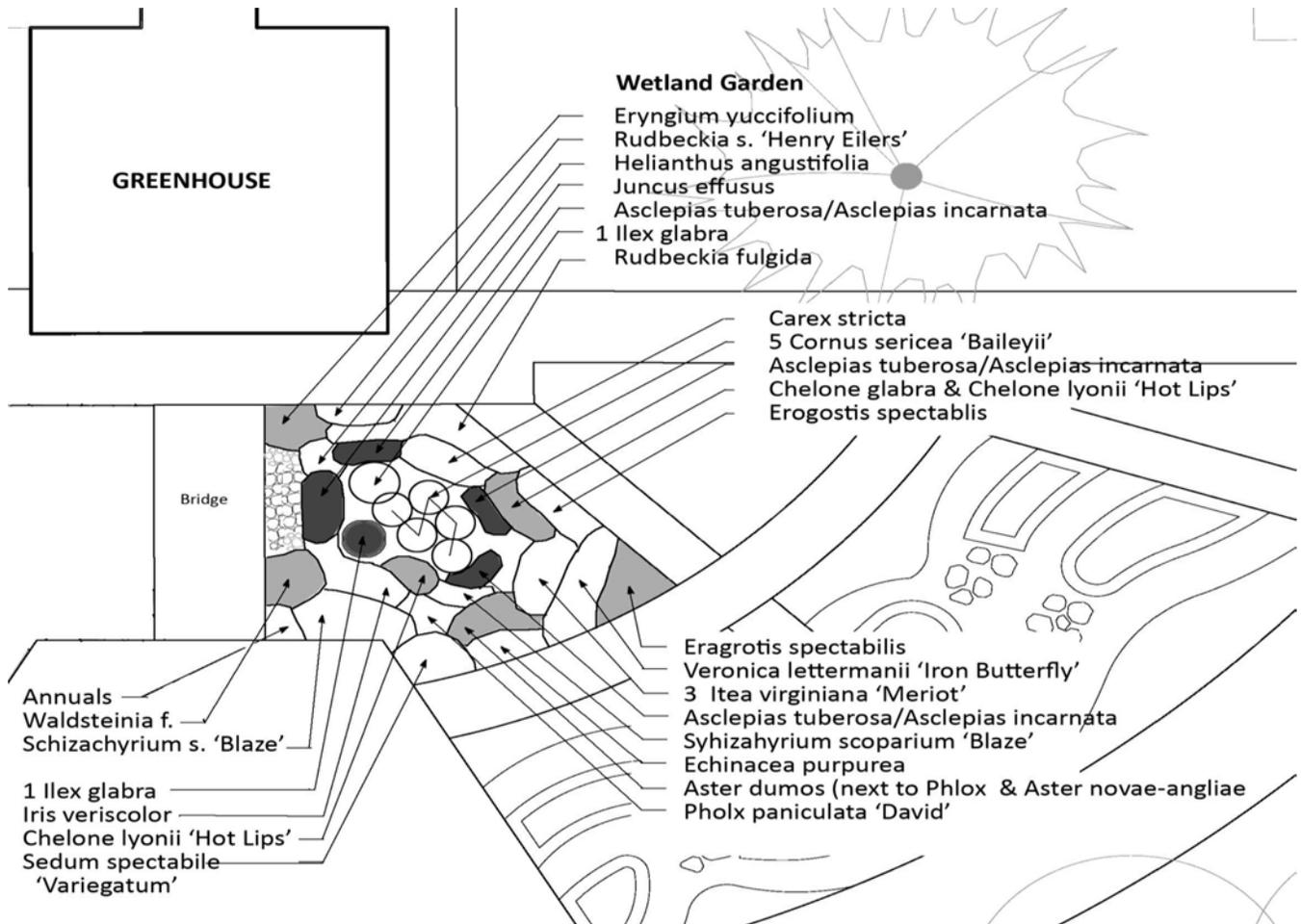
- *Rain Garden templates for the Chesapeake Bay Region/ rain garden info [www.lowimpactdevelopment.org/RainGarden\\_Design](http://www.lowimpactdevelopment.org/RainGarden_Design)*
- *Montgomery County MD Rain Garden info [www.rainscapes.org](http://www.rainscapes.org)*
- *RiverSmart Schools / Environ. Ed: <http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,498515,ddoeNav,31007/.asp>*
- *DC Urban Gardeners <http://dc-urban-gardeners.com/index.html>*



# Wetland Garden

## Ecological Purpose of Wetlands

Wetlands support the base of the food chain. Many species of insects, birds and fish depend on wetlands and the plants that live there. Plants that live in wetlands are adapted to live in soils which are full of water (anaerobic). Constructed wetlands mimic natural processes and are efficient biological systems which remove pollutants from the water and clean the water as it passes through.



**Plant List**

<b>WETLAND SHRUBS</b>	
<i>Cornus sericea</i> 'Baileyii'	Red Twig Dogwood
<i>Ilex decidua</i>	Possumhaw
<i>Ilex glabra</i>	Inkberry
<i>Itea virginiana</i> 'Merlot'	Virginia Sweetspire

<b>WETLAND PERENNIALS</b>	
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Asclepias tuberosa</i>	Butterfly Weed
<i>Aster dumosa</i> ( <i>Symphotrichum dumosum</i> )	Michaelmas Daisy
<i>Aster novae-angliae</i> ( <i>Symphotrichum novae-angliae</i> )	New England Aster
<i>Carex stricta</i>	Tussock Sedge
<i>Chelone glabra</i>	White Turtlehead
<i>Chelone lyonii</i> 'Hot Lips'	Pink Turtlehead
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Eragrostis spectabilis</i>	Purple Love Grass
<i>Eryngium yuccifolium</i>	Rattlesnake Master
<i>Helianthus angustifolia</i>	Swamp Sunflower
<i>Iris versicolor</i>	Harlequin Blue Flag
<i>Juncus effusus</i>	Soft Rush
<i>Phlox paniculata</i> 'David'	Garden Phlox
<i>Rudbeckia fulgida</i>	Black Eyed Susan
<i>Rudbeckia subtomentosa</i> 'Henry Eilers'	Sweet Coneflower or Sweet Black-Eyed Susan
<i>Schizachyrium scoparium</i> 'Blaze'	Little Blue stem
<i>Sedum spectabile</i> 'Variegatum'	Sedum
<i>Vernonia lettermanii</i>	Butterfly Ironweed
<i>Waldsteinia fragarioides</i>	Barren Strawberry



Possumhaw



Inkberry



Virginia Sweetspire



Red Twig Dogwood



Swamp Milkweed



Tussock Sedge



Pink Turtlehead



Purple Coneflower



Rattlesnake Master



Swamp Sunflower



Harlequin Blue Flag



Little Bluestem



Butterfly Weed



Michaelmas Daisy



New England Aster



Purple Love Grass



Garden Phlox



Black Eyed Susan



Sweet Coneflower



Butterfly Ironweed



Barren Strawberry

## ***Wetland Maintenance Schedule***

- Early Spring (Valentine's Day – St. Patrick's Day)
  - ✓ Clean out dead leaf debris and old mulch.
  - ✓ Spread old mulch and collected leaf debris around the base of trees on the property.
  - ✓ Clean out trash that has accumulated 1 time per month.
  - ✓ Cut down any perennials to their basal rosettes (within 4" of the ground) that were not cut back in the winter. Grasses should be cut back to 8-12" tall if not done prior to this time period.
- Late Spring - Summer (St. Patrick's Day Labor Day)
  - ✓ Begin weeding every week as they emerge.
  - ✓ Clean out trash that has accumulated 1 time per month.
  - ✓ Remove old mulch and replace with fresh 3" layer of mulch every other year. In years not doing the full replacement, remove the top 1" and replace 1" of mulch. If doing a complete remulch, spread a 3" layer leaving a 2" gap around the base of perennials and shrubs so that no mulch is piled up on the stems of any plants.
  - ✓ Spread the old mulch and the collected leaf debris around the base of trees on the property.
  - ✓ Stake the tall growing perennials or cut back to 12" tall by July 4<sup>th</sup> to prevent floppiness.
  - ✓ Check the irrigation system. Irrigation should not be required to be turned on in the wetland in the spring but it should be checked for functionality after winter after the last frost. During the summer, if there is no rain for four weeks, use the irrigation system to deliver 1" of water/ week in a single application. .
- Fall – (Labor Day- Christmas)
  - ✓ Water during times of drought (over 4 weeks without rain).
  - ✓ Between Labor Day and Halloween pick up all trash which may have accumulated over the summer.
  - ✓ Weed as required for the last time in the season by Thanksgiving.
  - ✓ Do a trash pick up 1 time per month.
- Winter (Christmas – Valentine's Day)
  - ✓ Inspect garden and pull out trash that blows in 1 time per month.
  - ✓ Pruning, if necessary is done during the winter when you can see the branching structure.
  - ✓ Cut back grasses/perennials after January 1 – grasses get cut back to 8" tall and perennials get cut down to their basal rosette (4"). Leaving grasses and perennials standing for the majority of the winter provides valuable winter cover and food for birds.

## ***Wetland Garden Learning Activities***

- ❖ Skill Development
  - Horticulture – any – plant health, growing experiments, chromatography, maintenance procedures, lifecycles
  - Environmental/Earth Science: Describe and illustrate process of hydrologic cycle, nitrogen and carbon cycles, study of microclimates, weather patterns and climate investigations, biome concepts; water quality and land use studies, using skills of observation, record keeping, monitoring, measuring,
  - Language arts – writing, study of nature poets, study writer.
  - Math – Geometry – volume, measuring, Trig – angles, estimating, Algebra – solving word problems, rate problems.
  - Social Studies – land use studies and connection between water quality and land types (Enviroscape), geography research (plant ranges), social values of plants, economic values of plants.
  - Art – printmaking, observation, still life, photography, watercolor, collage.

- Programming Ideas
  - *Washington DC is in the coastal plain and wetlands are an important ecotype land cover for the sustained health of the rivers, the Chesapeake Bay and the city. Programming ideas for this wetland could focus on the relationship between healthy wetlands and healthy communities. It is a garden with multiple benefits (pollinator health, water treatment, bay health, and the plants in the garden are native). Develop regionally specific programs (how have these plants been used traditionally? How do these plants identify this as a DC garden?).*
  - *Create a bloom calendar for the garden over the course of a year; use it to key events or other routine activities or as part of website content.*

### **Wetland References**

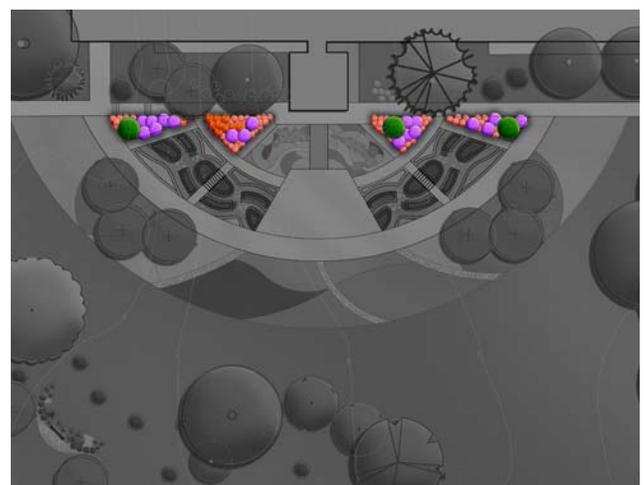
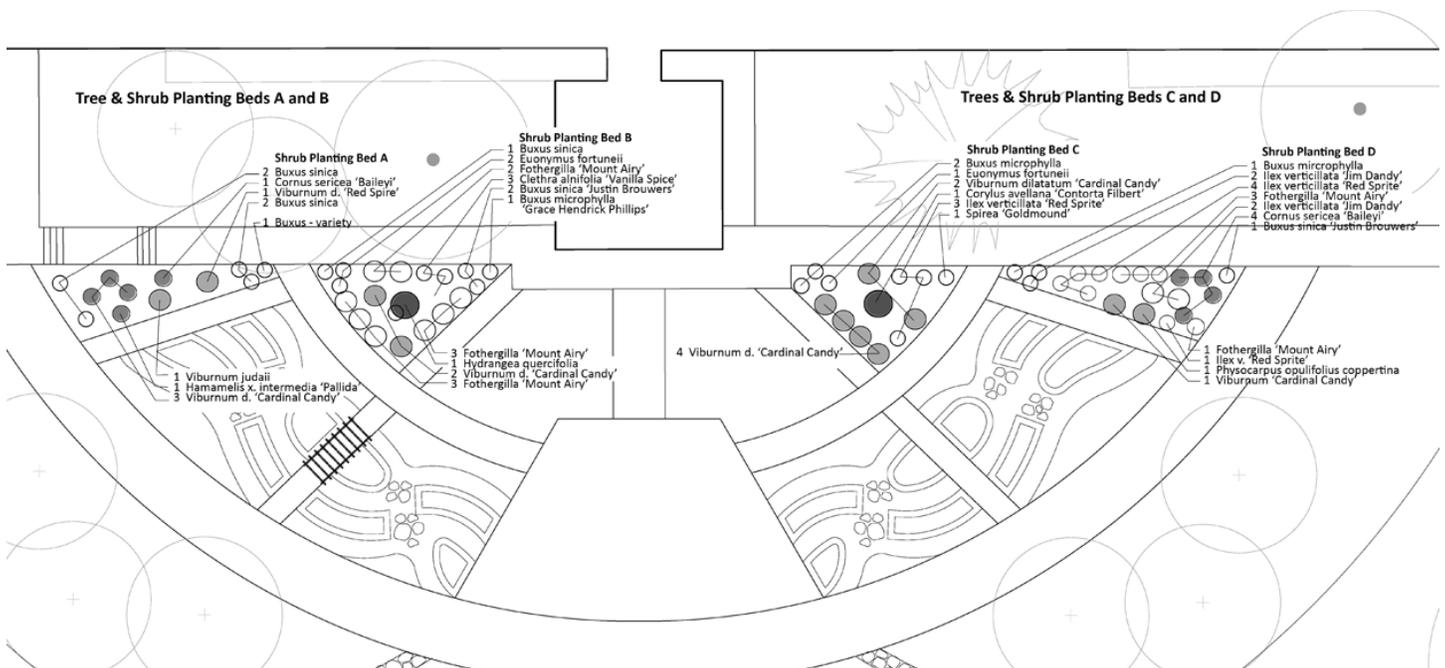
- EPA: [http://water.epa.gov/type/wetlands/outreach/education\\_index.cfm](http://water.epa.gov/type/wetlands/outreach/education_index.cfm)
- Project WET: <http://www.projectwet.org/>
- Environmental Concertn: <http://www.wetland.org/> (note: the plants for this garden largely came from Environmental Concern – they offer both professional development and programming: <http://www.wetland.org/educationhome.htm>)
- Society of Wetland Scientists: <http://www.sws.org/education/> - science focus
- Ducks Unlimited: [http://www.greenwing.org/dueducator/lesson\\_plans.html](http://www.greenwing.org/dueducator/lesson_plans.html)
- The Wetland Foundation: [http://web.mac.com/karenmckee1/The\\_Wetland\\_Foundation/Home.html](http://web.mac.com/karenmckee1/The_Wetland_Foundation/Home.html)
- Enviroscope: (based in Chantilly, Virginia) <http://www.enviroscapes.com/>  
- a watershed learning tool/model that helps students understand the connection between land use and water quality.

# Shrub Garden

## Ecological Purpose of the Shrub Gardens

The Shrub garden, together with the raised planters in the Plaza Container Garden, provides major spatial definition for the overall Garden design. Shrubs offer some of the same ecological benefits as trees, especially in a more urban context-- they enhance microclimatic effects, help filter airborne pollutants, and aid water/nutrient absorption in the landscape. The Shrub garden offers color, texture and plant diversity—both with evergreen and deciduous species--to provide habitat for small birds, butterflies, etc.

There are 4 shrub garden areas that contain a variety of plant materials. There is a Shade Tolerant Garden to the west of the greenhouse; two Perennial Gardens flanking the edges of the inner arcs and raised planter beds; and the Marquee Garden that identifies the high school. These gardens attract butterflies and insects, and pollinators that are required for plants to bloom and regenerate.



**Plant List**

<b>SHRUBS</b>	
<i>Buxus microphylla</i> 'Grace Hendrick Phillips'	Grace Hendrick Phillips Boxwood
<i>Buxus microphylla</i>	Littleleaf Boxwood
<i>Buxus sinica</i>	Korean Boxwood
<i>Buxus sinica</i> 'Justin Brouwers'	Justin Brouwers Korean Boxwood
Buxus sp.	Boxwood
<i>Clethra alnifolia</i> 'Vanilla Spice'	Coastal Sweetpepperbush
<i>Corylus avellana</i> 'Contorta'	Harry Lauder's Walking Stick
<i>Cornus sericea</i> 'Baileyi'	Red twig dogwood
<i>Cornus sericea</i>	Redosier Dogwood
<i>Euonymus fortunei</i>	Wintercreeper
<i>Fothergilla</i> 'Mt Airy'	Dwarf fothergilla
<i>Hamamelis x intermedia</i> 'Arnold Promise'	Witch hazel
<i>Hydrangea quercifolia</i>	Oak-leaf hydrangea
<i>Ilex verticillata</i> 'Red Sprite'	Red Sprite Winterberry
<i>Ilex verticillata</i> 'Jim Dandy'	Jim Dandy Winterberry (male)
<i>Physocarpus opulifolius</i> 'Coppertina'	Coppertina Ninebark
<i>Spiraea</i> 'Goldmound'	Goldmound Spiraea
<i>Viburnum juddii</i>	Judd Viburnum
<i>Viburnum dil.</i> 'Cardinal Candy'	Arrowwood Viburnum



Grace Hendrick Phillips Boxwood



Littleleaf Boxwood



Korean Boxwood



Justin Brouwers Korean Boxwood



Boxwood



Coastal Sweetpepperbush



Harry Lauder's Walking Stick



Red twig dogwood



Redosier Dogwood



Wintercreeper



Dwarf fothergilla



Witch hazel



Oak-leaf hydrangea



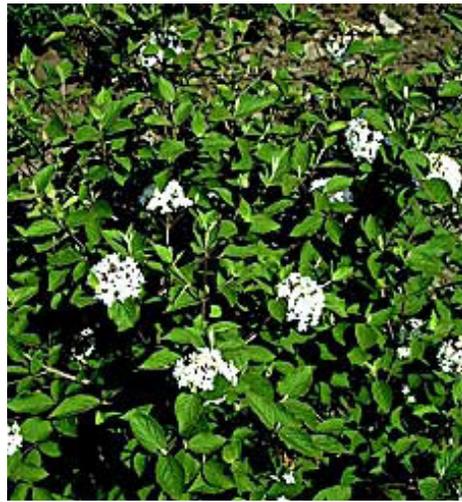
Red Sprite Winterberry



Coppertina Ninebark



Goldmound Spiraea



Judd Viburnum



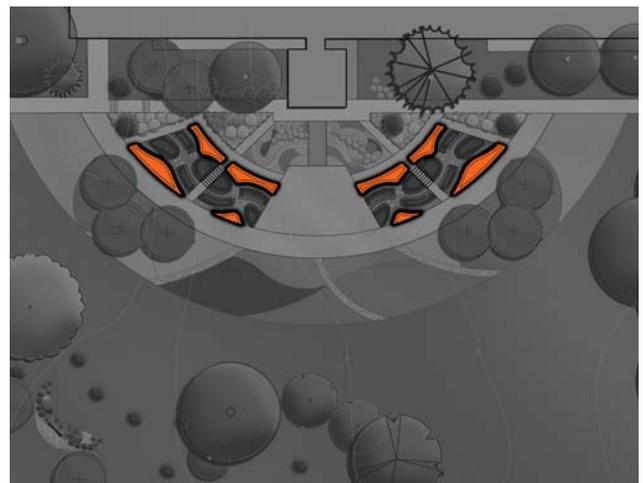
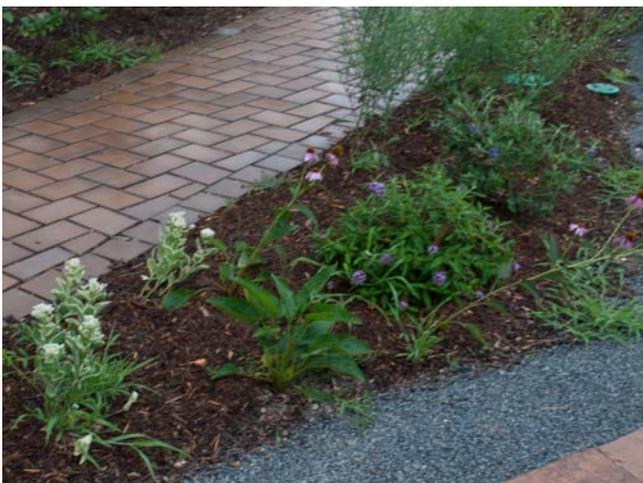
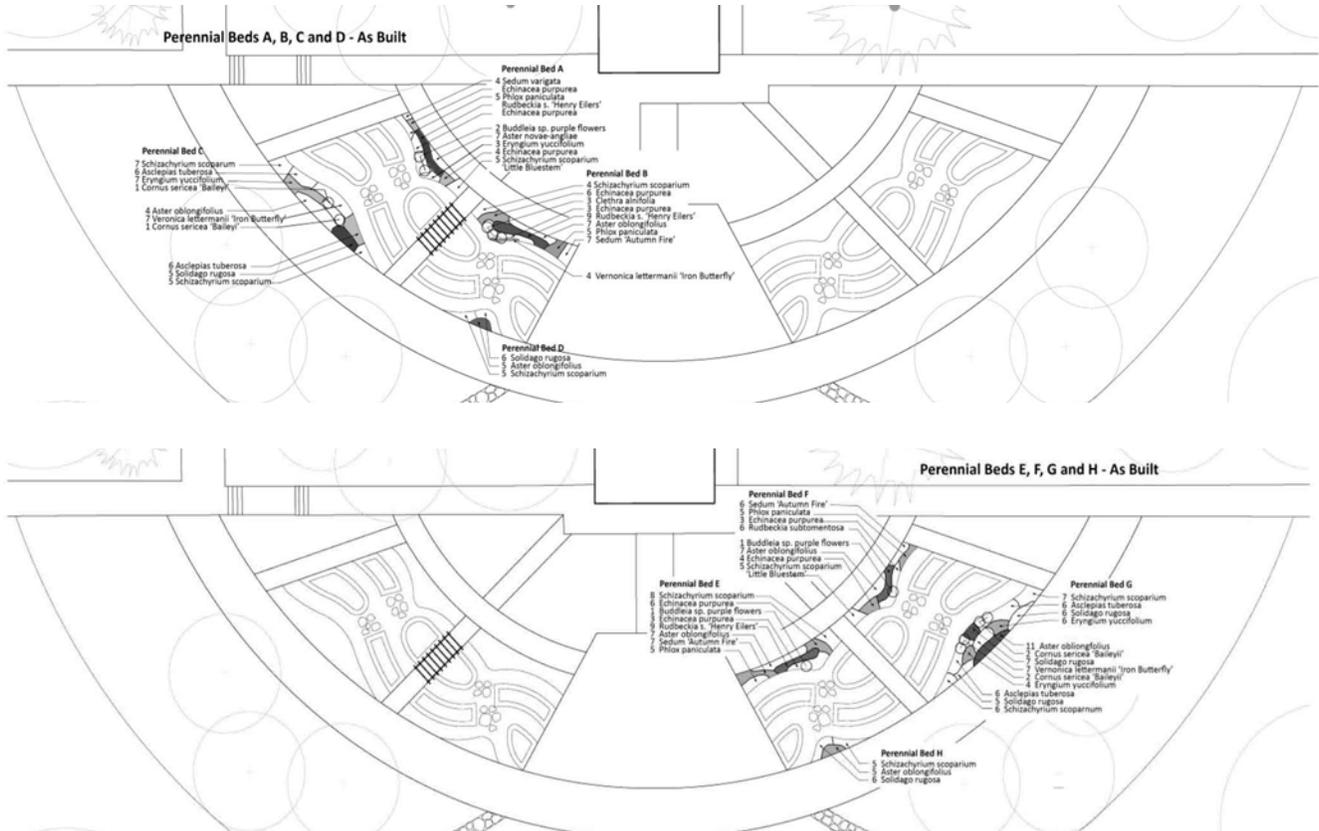
Arrowwood Viburnum

### ***Maintenance Schedule***

- Early Spring (Valentine's Day - St Patrick's Day)
  - ✓ Clean out dead leaf debris and old mulch. Apply fresh mulch around the base of the shrub, creating a shallow basin that will help hold water.
  - ✓ Weed if necessary.
- Late Spring - Summer (St Patrick's Day - Labor Day)
  - ✓ Weed around the shrub beds every week and throughout the summer to keep weeds from spreading.
  - ✓ Water if it hasn't rained in over 10 to 12 days. Water with a soaker head attachment on the hose. Do not use a spray nozzle. (Does the irrigation line cover this area, if so how should the system be set, automatic settings or manually) Note: need assistance w/ irrigation section here, not sure of specifics of the design....
- Fall (Labor Day- Thanksgiving)
  - ✓ Water during times of drought (over 10 days without rain).
  - ✓ Weed as required for the last time in the season.
  - ✓ Apply fresh mulch to create a shallow basin.
- *Program Ideas*
  - *Create a bloom/fall color calendar for the garden over the course of a year. Use it to key in events or other routine activities or as part of website content.*

# Butterfly Garden

The Butterfly garden comprises perennials and deciduous shrubs that support insect species (within the Lepidoptera family), butterflies and moths, throughout various stages and cycles of their life. The Butterfly garden provides a habitat, a place to lay (deposit) eggs, provide food for larvae growing into caterpillars, and eventually nectar sources that feed butterflies during their adult stage. Plant species within the Butterfly garden exhibit year-round seasonal color starting in mid-spring, and most importantly, in mid-summer through the fall. These are the most vital stages of the butterfly's development after they emerge from their cocoon. Species such as Asters (*Symphotrichum*) and Goldenrods (*Solidago sp.*) can support up to 120 types of butterflies and moths.



## Butterfly Garden Plant List

<b>Perennials</b>	
<i>Asclepias tuberosa</i>	<i>Butterfly Weed</i>
<i>Aster oblongifolius</i> 'Raydon's Favorite'	<i>Raydons Favorite Aromatic Aster</i>
<i>Echinacea purpurea</i>	<i>Purple Coneflower</i>
<i>Eryngium yuccifolium</i> (	<i>Rattlesnake Master</i>
<i>Hylotelephium telephium</i> 'Lajo's Autumn Charm	<i>Variegated Sedum Autumn Joy</i>
<i>Phlox paniculata</i> 'David'	<i>David Garden Phlox</i>
<i>Rudbeckia subtomentosa</i> 'Henry Eilers'	<i>Henry Eilers Sweet Coneflower</i>
<i>Schizachyrium scoparium</i> 'The Blues'	<i>The Blues Little Bluestem</i>
<i>Schizachyrium scoparium</i> 'Blaze'	<i>Blaze Little Bluestem</i>
<i>Solidago rugosa</i> 'Fireworks'	<i>Fireworks Goldenrod</i>
<i>Vernonia lettermanii</i>	'Iron Butterfly' Ironweed
<b>Deciduous Woody Shrubs</b>	
<i>Cornus</i> "Arctic Fire"	<i>Arctic Fire Dogwood</i>
<i>Buddleia</i> sp.	<i>Butterfly Bush</i>
<i>Clethra alnifolia</i> 'Hummingbird'	<i>Dwarf Summersweet Clethra</i>

Just like people who prefer different foods, butterflies are also attracted to different plants. The following species of butterflies are attracted by the following plants:

- Monarchs, Sleepy Orange: *Butterfly Weed*
- Sulphurs: *Raydons Favorite Aromatic Aster*
- Hairstreak: *Purple Coneflower*
- Swallowtail: *Rattlesnake Master*
- Spring Azures: *Variegated Sedum Autumn Joy*
- Sachem: *David Garden Phlox*
- Checkerspot: *Henry Eilers Sweet Coneflower; Fireworks Goldenrod*
- Wood Nymph: *The Blues Little Bluestem; and Blaze Little Bluestem*
- Peck's Skipper: *Ironweed*



Raydons Favorite Aromatic Aster



David Garden Phlox



Henry Eilers Sweet Coneflower



Blaze Little Bluestem



Fireworks Goldenrod



'Iron Butterfly' Ironweed



Arctic Fire Dogwood



Butterfly Bush



Dwarf Summersweet Clethra



Butterfly Weed



Purple Coneflower



Variegated Sedum Autumn Joy

### ***Butterfly Garden Maintenance Schedule***

- Early Spring (Valentine’s Day - St Patrick’s Day)
  - ✓ Clean out dead leaf debris and old mulch.
  - ✓ Cut down any perennials to their bases that were not cut back in the fall.
  - ✓ Apply fresh mulch, up to 1.5 inches, leaving a donut hole around the base of perennials and shrubs.
  - ✓ Apply fertilizer lightly and immediately water.
  - ✓ (How should the irrigation system be managed, with automatic settings or manually?) Irrigation should be applied manually. Many of these species are drought tolerant once established and only until there are drastic long periods of drought conditions and lack of precipitation and high temperatures should irrigation applied.
  
- Late Spring – Summer (St Patrick’s Day - Labor Day)
  - ✓ Begin weeding every week. Continue weeding throughout the summer to keep weeds from overtaking the perennials.
  - ✓ Stake the tall growing perennials.
  - ✓ Water if it hasn’t rained in over 10 to 12 days.
  - ✓ Remove (deadhead) spent flowerheads and blossoms to encourage continued blooming throughout the summer and into the fall.
  
- Fall (Labor Day- Thanksgiving)
  - ✓ Water during times of drought (over 10 days without rain).
  - ✓ Before Thanksgiving, cut down perennials to their base (except Iris and Ornamental Grasses and Shrubs) and any seedhead species that should remain as food for birds (Rattlesnake Master, Sedum, and Echinacea Weed as required for the last time in the season).
  - ✓ Apply fresh mulch up to 1.5 inches leaving a donut hole around the base of all perennials and shrubs.

## ***Butterfly Garden Learning Activities***

### ❖ Skill Development

- Arts- Interpretative artwork on camouflage, patterns, textures, & symmetry. Create a mosaic or collage that incorporates the lifecycle of a butterfly.
- Photography and drawing of butterfly metamorphosis and species observation.
- Biology- Insects and lifecycles, beneficial insects and relationship to plants, habitats, biodiversity, and ecosystems.
- Language arts: Explore symbolism of butterfly in mythology, religion and contemporary culture (life, change, freedom, inner/outer beauty, mortality/immortality). Compare contemporary and historical writings/art that incorporate these metaphors.
- Horticulture/Plant Sciences – plant physiology, and anatomy, and species identification.  
Ecology- Plant communities and biodiversity, native plants as food source, and plants as habitats for insects. Create a map of the typical daily route in a butterfly's life.
- Programming Ideas
  - *Importance of pollinators and butterflies in sustaining the food population.*
  - *Migration patterns and butterflies (Monarchs).*
  - *Climate Change and the Impact on Butterfly species.*
  - *Life cycle and metamorphosis.*
  - *Plant type identification for butterfly support (Umbellifers, Corymbs etc).*
  - *Pupa/Chrysalis indoor cultivation.*
  - *Track and document types of species found/seen in garden, create a visual guidebook of butterfly and moth types.*

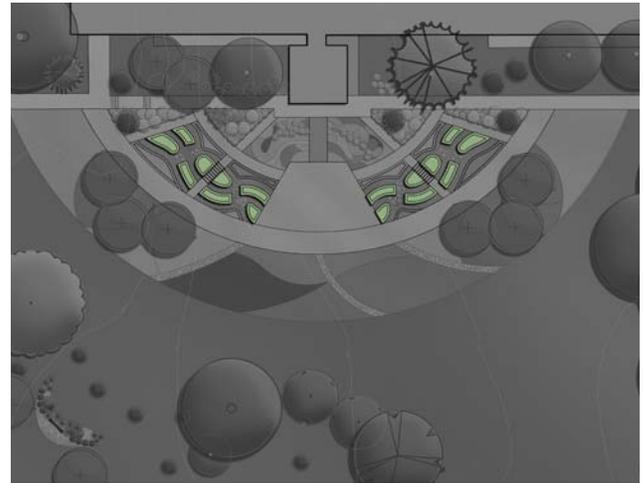
## ***Butterfly Garden References***

- *Bringing Home Nature*, Doug Tallamy (Book) [www.bringingnaturehome.net](http://www.bringingnaturehome.net)
- *National Wildlife Federation: American Beauties Plants* [www.abnativeplants.com](http://www.abnativeplants.com)
- *National Wildlife Federation Outdoor Garden Activities*  
<http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx>
- *Smithsonian Institute Butterfly Garden*  
<http://gardens.si.edu/horticulture/gardens/nmnh/butterfly.html>
- *Xerces Society* <http://www.xerces.org/>
- *The Butterfly Book: An Easy Guide to Butterfly Gardening, Identification, and Behavior*, Donald & Lillian Stokes and Ernest Williams
- *Butterfly Gardening: Creating Summer Magic in Your Garden*, by The Xerces Society and Smithsonian Institution

## Raised Bed Seasonal Edible Garden

### **Ecological Purpose**

The raised garden beds allow for seasonal cultivation and harvest of vegetables, fruits, herbs, and flowers. In addition to providing student exposure to food production, these plants also increase biodiversity, attracting pollinators and beneficial insects. The raised beds capture rainwater and slowly filtrate through the soil before being absorbed into the ground beneath the beds. The plants in the beds will also absorb some of the water. The proximity of the edible and butterfly gardens are important because vegetables and flowers also support host and nectar plants for butterfly species. During the winter, when vegetable and flowers don't grow, cover crops are used to improve soil fertility, soil texture and quality, ability to absorb moisture, minimize weeds, and provide food for insects. It is important to plant vegetables, annual flowers, and herbs to create an ecological, symbiotic system to balance and benefit pests, soil, and water needs.



### **Plant List: Samples**

<b>Vegetables:</b>	The selection and types of vegetables will vary based on curriculum interest and on rotational /space/seasonal preference
<b>Sample vegetable crops</b>	
<i>Spring</i>	Lettuce, Spinach, Kale, Collards, Broccoli, Cabbage, Peas, Carrots
<i>Summer</i> (before end of school year)	Tomatoes, Peppers, Potatoes, Beans (Runner/ Pole/ Bush), Okra, Tomatillos, Squash (winter/ summer), Eggplant, Cucumber
<i>Fall</i> (Back to school late summer)	Beans, fall round of, Broccoli, Peppers, Carrots, Onions & Garlic (for overwintering), Chard, Lettuce, Kale, Greens
<b>Herbs</b>	
Sample garden herbs: Basil, Sage, Chives, Spring Onions, Parsley, Cilantro, Rosemary, Thyme, and Oregano	
<b>Annuals</b>	
Sample annuals: Marigolds, Nasturtiums, Sunflowers, Zinnias, Cosmos, Calendula, Borage, Lemon Balm	

## ***Installation Schedule***

Planting should be in accordance with frost dates and optimal soil temperatures. Some seeds and seedlings planted in the spring can be harvested while others will have a longer growing period and will be ready for harvest in late spring or early summer. Likewise, planting seed in early summer/late spring can result in summer and fall harvest. Fall plantings such as garlic have an 8-month growing window, with harvest occurring in early summer.

A planting guide for germinating seeds, planting, maintenance, and harvest of vegetables, flowers, and herbs should be followed. The National Gardening Association Guide to Plants and Vegetables is one of many good sources. <http://www.garden.org/foodguide/browse/veggie>

The planting of vegetables varies based on the type of species. Some seeds can be planted in a greenhouse in the winter (January-February) and installed in the garden in spring, while other seeds can be planted directly outdoors when the soil has reached temperatures appropriate for germination. In such cases, row covers should be used to encourage germination and minimize damage from excess weather or pests.

- Most cool season (spring pre-summer and even again in fall) vegetables should be planted based on the frost dates for the region; some can be planted prior to the last estimated frost date. Cool season plants require planting in soils as cool as 45 degrees, and warm season vegetables in soils 75-85 degrees. Frost dates vary from year to year and are typically based on the average last spring frost date. The 2011 frost-free date for Washington DC is March 29. Consult with a Farmer's almanac and local extension agency to confirm dates.
- Most warm season vegetables (Summer Vegetables) should be planted based on soil and air temperatures and planted in succession throughout the summer based on the optimum number of days for fruit production. However, summer vegetables that have a take longer to mature from seed to fruit should be started indoors and planted outdoors as seedlings once the weather and timing is appropriate.

### ***Sample Installation Schedule (from seed):***

#### Early Spring- Mid Spring

Peas (around St. Patricks Day), Lettuce, Chard, Spinach and other leafy green vegetables, Carrots, Beets, Onion sets

Mid Spring- Late Spring (Mid-March-May) Cilantro, Radish, Broccoli, Cabbage, Beets, Corn, Melons, Beans, Squash

Early Summer (May-June) Continuum of Melons, Squash, and Beans, Okra, Potato sets

Late Summer- Mid Fall Repeat planting of spring vegetables and introduce long cool season crops such as garlic.

## **Edible Garden Maintenance Schedule**

Maintenance of the Edible Gardens depend on the various types of vegetables and herbs grown by the faculty and students. Based on seasonality of the gardens, a schedule will need to be created to monitor and document when plants are sowed indoors, and or transplanted outdoors, harvested, and eventually removed.

A general maintenance schedule and practice guide should be prepared for pre-planting, post planting, pre-fruiting, fruiting through harvest, and post harvest timeframes.

### Pre-Planting (Spring)

Prior to planting or transplanting the edible crops, the planting beds should be weed free and replenished with compost. If the beds have a winter cover crop, these should be turned into the bed 2-4-6 weeks prior to planting for the season, depending on the crop. Heavy feeder crops (Tomatoes, Peppers, Eggplants, Melons etc) will require more soil nutrients via compost and aged manure, prior and during the growing season. Moderate feeder crops will rely on a moderate amount of compost, organic mulch, and not reliant on heavy feeding throughout their growing season (Lettuce, Spinach, Kale etc.). The lightest feeder crops, primarily root crops (Carrots, Radishes and Garlic) will not need heavy nutrient application to the soil, as their root systems are sensitive to excess nutrient feeding. It is good to consider planting similar soil feeding families together, where they work in conjunction in regards to soil and nutrient needs.

### Transplanting (Spring)

Once vegetables and herbs are first planted, they should be irrigated well to avoid drying out. If the weather is still cool, a row cover may be needed to protect tender crops from potential frosts in early spring. Compost of green mulch should be used as a top dressing to help retain moisture of the plants.

### Pre-Fruiting/Growth period (Summer)

All areas around the plants should be cleared of weeds during the growing season. Irrigation should be monitored and scheduled in response to the day and night temperatures and overall weather conditions. Monitoring of the presence of pests and any signs of stress, be it yellowing or browning leaves from overwatering or stress of heat, should be noted. Unsightly and unhealthy appearing foliage should be removed and thrown away, not used as compost waste. If pests become a problem a row cover can be used as a means of protection. If infestation occurs, full removal of the plant will be required.

### Fruiting/Harvest (Summer-Fall)

Removal of weeds, browning/aging foliage and monitoring of stress and disease are continual through fruiting and harvesting of vegetables in the garden. Harvesting is a method of maintenance for crops as it enables them to continue yielding fruits until fruiting naturally ceases. Fruits consume a lot of energy for a plant to produce, the more fruits that are on a plant, the less it can continually produce. Timely harvesting is also necessary to avoid hardening and overgrowth of fruit which leads to unpalatable harvests and poor tasting fruit.

Harvesting will occur at different times throughout the year. Leafy green crops typically are ready for harvest within 30-60 days of planting. This will be plant specific and cultivar specific as well. Factors such as heat and cold can alter this timeframe as well. Maintenance for leafy greens is also the means of harvesting, by cutting back the larger foliage and letting it grow back again. Once plants start to set seed, known as 'bolting', leafy vegetables should be removed.

Fruiting crops are harvested based on the appearance, size, and texture of the fruit. Fruit should be harvested often, as they near ripening. Ripening can occur rapidly during warm weather so daily inspection will be applicable, sometimes in the morning and the evening depending on the temperature. Overripe and fallen fruit should be immediately removed to minimize disease and rot. If the fruit is rotten and diseased, this should be thrown away versus used as compost waste, as a means to mitigate the spread of disease. During the summer months, for heavy feeders, compost should be added as top-dressing to the beds to help keep the soil cool and retain moisture, and provide continual feeding for the vegetables.

### Post-Harvest (Fall-Winter)

Once the growing season has slowed down and come to an end, all vegetable parts should be removed, including their roots, and composted if healthy and not diseased. Removal of any weeds should also occur. If a winter cover crop is intended, it could be sowed and protected with straw in the fall until it has sprouted and grown. If a secondary successional planting is planned post harvest, the area should be weed-free and disease free, replenished with the appropriate amount of nutrients via compost/aged manure.

In all stages of maintenance when pruning and removing diseased plant parts to minimize the spread of disease pruners should be cleaned between cuttings and diseased parts should be cleared immediately from the garden beds.

### ***Harvest Schedule***

The harvest schedule is determined based on selection of species. The timing of harvesting is very sensitive to maintain quality nutrition and taste, avoid woody and pithy growth, decrease disease and associated pest infestation, and encourage continued production and fruiting and for long term maintenance and vitality.

#### Sample Harvest schedule:

##### Mid-Late Spring

Peas Lettuce, Chard, Spinach and other leafy greens (Bok Choi, Mustards)

Use the 'Cut-and-Come' again method to encourage growth. This method involves cutting back young foliage every 10-20 days depending on the growth rate of the species to increase production and amount to be harvested. This method can provide 2-3 harvests from on planting. The cuttings can be used as salad greens!

##### Late Spring-Early Summer (Mid-March-May)

Cilantro, Radish, Broccoli, Cabbage, Cauliflower, Beets, Carrots, Garlic, Onions, Leafy Greens/Lettuce, Strawberries

##### Mid-Summer (May-June)

Beets, Squash (summer), Beans, Carrots, Tomatoes

##### Late Summer- Mid Fall:

Melons, Squash (Winter), Corn, Okra, Tomatoes, Eggplant, Peppers, Leafy Greens/Lettuce, Carrots, Potatoes

### ***Edible Garden Learning Activities***

- Skill Development
  - Mathematics & Science (measuring, spacing, quantity, weight)
    - Entomology (feeding habits, life cycles)
    - Soil Science, pH, chemistry, soil nutrition, nutrient cycles
    - Economics and business development
    - Entomology and integrated pest management
    - Meteorology and climate assessment/study
    - Seed collection and plant propagation
    - World food and agricultural trade
    - Horticultural studies and attributes
    - Companion planting species and relationships

- Development & Motor Skills
  - Pruning and harvesting
  - Digging and planting
  - Observation
  
- Arts/Literature
  - Photography
  - Culinary/food sciences
  - Painting and sculpture
  - Creative writing, poetry
  - Grant writing and technical writing and documentation
  - Music and garden relationships
  
- Social Studies & Policy
  - History and cultural studies of food history
  - Anthropological studies
  - Food distribution
  - World health and nutrition
  - Seed genetics/organic awareness
  
- Program Ideas
  - Growing seeds over winter
  - Salsa Garden: Onion and garlic fall planting with early summer harvest
  - School farmers' market and seedling sale
  - Food and Culture & Anthropological series, festivals with cooking demonstrations
  - DC Chefs series with garden herbs and fruits/vegetables
  - Harvest festivals
  - 'Themed' garden beds by historic and current cultural uses (Native American vegetable bed, African vegetable bed, Asian and Southeast Asian vegetable beds etc) 'Rainbow Gardens'

### ***Edible Garden References***

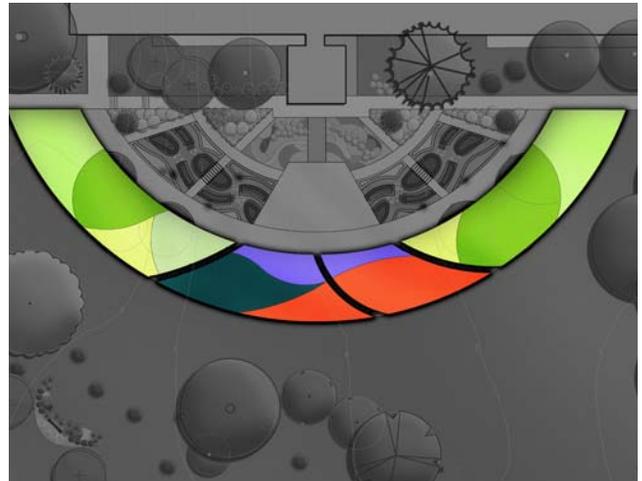
- <http://www.garden.org/foodguide/browse/veggie>
- Kidsgardening.org (Teacher's Room)
- *Gardening with Kids*, Catherine Woram
- *All New Square Foot Gardening*, Mel Bartholomew
- *Raised-Bed Vegetable Gardening Made Simple*, Raymond Nones
- *Carrots Love Tomatoes*, Louise Riotte
- *The Vegetable Gardener's Bible*, Edward Smith
- *Grow it Eat It- UMD* <http://www.growit.umd.edu/VegetableProfiles/index.cfm>
- *Virginia Extension- Farmers Market* <http://www.pubs.ext.vt.edu/448/448-502/448-502.html>

## Meadow Garden

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### Ecological purpose

Meadow gardens have become one alternative solution to the American lawn. Meadows are remarkably diverse and perform several important ecological functions. They provide biodiversity in the landscape for both plants and animals. Because of the abundance of flowers, a wide range of insects and birds, including butterflies and humming birds, make the meadow their home. Because of the thick roots and varying heights of vegetation, the meadow garden has the capacity to slow stormwater runoff and hold rain-water, helping to improve water quality because of their ability to trap sediments and other pollutants.



<b>Plant List</b>	
<i>Asclepias syriaca</i>	Common Milkweed
<i>Aster laevis</i>	Smooth Aster
<i>Aster novae-angliae</i>	New England Aster
<i>Aster prenanthoide</i>	Zig Zag Aster
<i>Aster sagittifolius</i>	Arrow Leaved Aster
<i>Baptisia australis</i>	Blue False Indigo
<i>Chamaecrista fasciculata</i>	Partridge Pea
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Elymus virginicus</i>	Virginia Wild Rye
<i>Eragrostis spectabilis</i>	Purple Lovegrass
<i>Eryngium yuccifolium</i>	Rattlesnake Master
<i>Eupatorium coelestinum</i>	Mistflower
<i>Liatris graminifolia</i>	Grassleaf Blazing Star
<i>Liatris spicata</i>	Spiked Gayfeather
<i>Liatris squarrosa</i>	Scaly Blazing Star
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Parthenium integrifolium</i>	Wild Quinine
<i>Penstemon digitalis</i>	Tall White Beardtongue
<i>Penstemon laevigatus</i>	Appalachian Beardtongue
<i>Ratibida pinnata</i>	Gray Coneflower
<i>Rudbeckia fulgida</i>	Orange Coneflower
<i>Rudbeckia hirta</i>	Black Eyed Susan
<i>Senna hebecarpa</i>	Wild Senna
<i>Schizachyrium scoparium</i> 'Camper'	Little Bluestem
<i>Solidago juncea</i>	Early Goldenrod
<i>Solidago nemoralis</i>	Gray Goldenrod
<i>Sorghastrum nutans</i> 'Prairie View'	Indiangrass
<i>Tradescantia ohiensis</i>	Ohio Spiderwort
<i>Tridens flavus</i>	Purple Top



Purple Lovegrass



New Zealand Aster



Tall White Beardtounge



Blue Falso Indigo



Rattlesnake Master



Virginia Wild Rye



Grassleaf Blazing Star

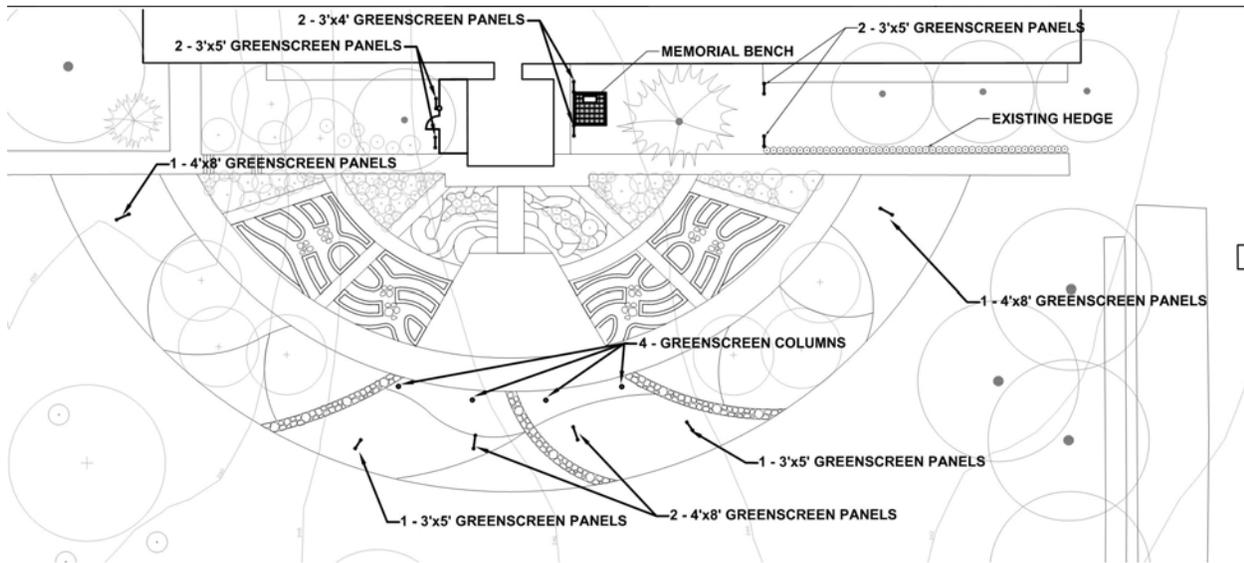


Appalachian Beardtounge



Gray Goldenrod

## Green Screen Plant Lists



Plant List	
<i>Ampelaster carolinianus</i>	Climbing Aster
<i>Aristolochia tomentosa</i>	Common Pipevine
<i>Asimina triloba</i>	Paw Paws
<i>Aster novae-angliae</i>	English Countryside
<i>Bignonia capreolata</i>	Crossvine
<i>Campsis radicans</i>	Trumpet Vine
<i>Clematis virginiana</i>	Virgin's Bower
<i>Decumaria barbara</i>	Climbing Hydrangea
<i>Lindera benzoin</i>	Spice Bushes
<i>Lonicera sempervirens</i>	Woodbine
<i>Ptelea trifoliata</i>	Hoptrees



Crossvine



Trumpet Vine



Woodbine

## ***Meadow Establishment and Maintenance schedule***

- **First Year**

During the first year, the slow-growing seedlings will grow a few inches while the weeds will grow much faster. If not maintained the weeds will out-compete the meadow plants for needed sunlight, water and nutrients.

- ✓ Collect and dispose of trash and other litter before each mowing
- ✓ Mow the meadow 3 times a year to a height of 6 inches in mid-June, mid-July and mid-August to minimize seed formation of unwanted biennial and annual plants. Do not wait until weeds are taller than one foot tall, as the mowed material can smother the small meadow seedlings.
- ✓ Do not mow when soils or plants are wet.
- ✓ Minimize weed pulling and not that meadow seedlings are easily disturbed, and are often pulled up along with the weeds. If pulling weeds in necessary along the edges of the garden follow the following guidelines:
  - Know what is being pulled (is it a weed or a meadow seedling)
  - Pull perennial weeds as they germinate being careful not to disturb the young meadow plants.
- ✓ Irrigation should not be required in the spring. During the summer, if there is no significant rain for 4 weeks, use the irrigation system to deliver 1" of water/ week in a single application over the course of the summer.

- **Second Year**

The Meadow plants will grow taller in the second year; however, annual and biennial weeds must be addressed.

- ✓ Collect and dispose of trash and other litter before each mowing
- ✓ Mow the meadow 2 times a year at a height of 12 inches in mid-June and mid-August to minimize seed formation of unwanted biennial and annual plants.
- ✓ Do not mow when soils or plants are wet.
- ✓ Continue to spot weed as needed using the guidelines as stated in the First Year.
- ✓ Irrigation: same as the First Year above.

- **Third Year**

- ✓ Mow the meadow in mid spring at 2" height between March 15 and April 1. Since most of the meadow plants are still dormant, they will be unharmed by the close mowing.
- ✓ Rake out and compost the mowed material from the meadow area.
- ✓ Do not mow when soils or plants are wet.
- ✓ Continue to spot weed as needed using the guidelines as stated in the First Year.
- ✓ Irrigation: same as the First Year above.
- ✓ Collect and dispose of trash and other litter 1 time a month.

- **Every Year After**

- ✓ Continue to spot weed as need using the guidelines as stated in the First Year
- ✓ Irrigation: same as the First Year above.
- ✓ Collect and dispose of trash and other litter 1 time a month.
- ✓ Mow the meadow in late-November to early-December at 6-10" height and disperse the clippings throughout the meadow garden

## ***Meadow Garden Learning Activities***

- ❖ Skill Development
  - Horticulture – plant health, growing experiments, chromatography, maintenance procedures, lifecycles
  - Environmental Science - observation, record keeping, biome concepts, monitoring, measuring, lifecycles
  - Language arts – writing
  - Math / Geometry – volume, measuring, Trig – angles, estimating, Algebra – solving word problems, rate problems
  - Social Studies – geography research (plant ranges), social values of plants, economic values of plants
  - Art – printmaking, sculpture, illustration, painting, still life, photography
- Suggested Meadow Activities
  - Create a bloom calendar for the garden over the course of a year; use it to key events or other routine activities or as part of website content. Emphasize pollinator support.

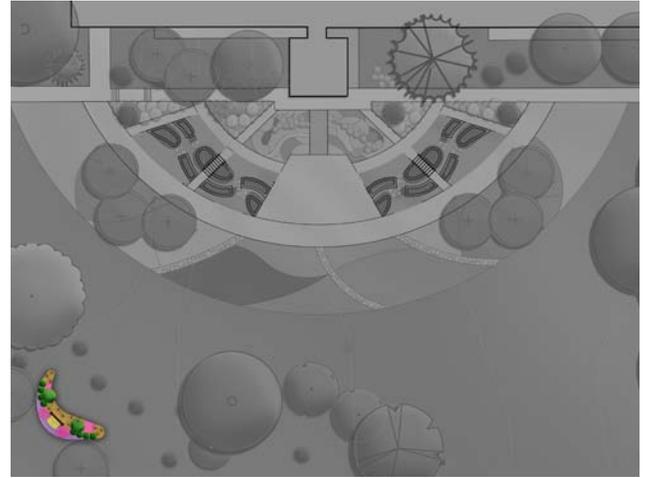
## ***Meadow Garden References***

- a. Urban and Suburban Meadows: Bringing Meadowsclaping to Big and Small Spaces
- b. Establishing And Maintaining Ornamental Flower Meadows For Low Maintenance Sites. <http://www.hgic.umd.edu/content/documents/TT-70.pdf>
- c. [www.cornellplantations.org/our-gardens/arboretum/baird-field](http://www.cornellplantations.org/our-gardens/arboretum/baird-field)
- d. <http://www.wildflower.org/howto/show.php?id=5&frontpage=true>
- e. [www.marylandpublicschools.org/NR/rdonlyres/...284D.../Meadows.pdf](http://www.marylandpublicschools.org/NR/rdonlyres/...284D.../Meadows.pdf)

# Marquee Garden

## *Ecological Purpose*

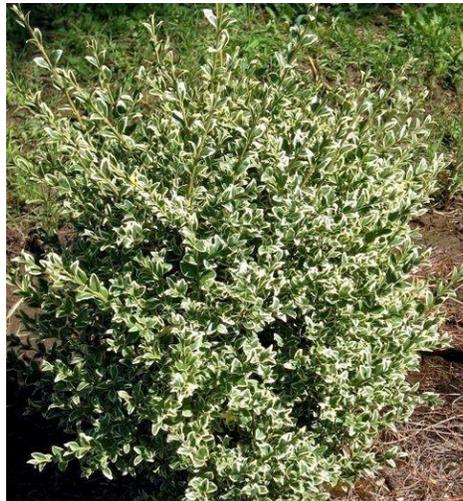
The Marquee Garden is designed to accent the schools marquee and serve as foreground feature to the garden. The mix of evergreen shrubs, small ornamental trees, ornamental grasses and perennials introduce components and ecological values exhibited within the overall garden.



<b>Plant List</b>	
<b>Woody Deciduous Shrubs</b>	
<i>Lavendula intermedia</i> 'Provence'	Provence lavender
<b>Evergreen Shrubs</b>	
<i>Buxus sempervirens</i> 'Elegantissima'	Variegated boxwood
<i>Ilex cornuta</i>	Chinese Holly
<i>Ilex crenata</i> 'Sky Pencil'	Sky pencil Holly
<i>Juniperus</i> spp.	Prostrate Juniper
<b>Trees</b>	
<i>Betula Nigra</i>	River Birch
<b>Other</b>	
<i>Achillea</i>	Yarrow
<i>Coreopsis verticillata</i> 'Zagreb'	Coreopsis
<i>Panicum virgatum</i> 'Shenandoah'	Shenandoah Switch Grass



Provence Lavender



Variegated Boxwood



Chinese Holly



Yarrow



Coreopsis



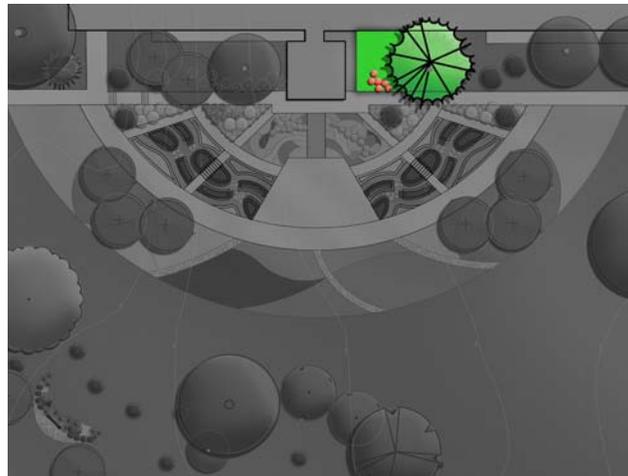
Shenandoah Switch Grass

## ***Marque Garden Maintenance schedule***

- Early Spring (Valentine's Day - St. Patrick's Day)
  - ✓ Clean out dead leaf debris and old mulch.
  - ✓ Cut down perennials—including ornamental grasses—to their bases that were not cut back in the fall. Take care not to cut down shrubs.
  - ✓ Apply fresh mulch throughout the beds, up to 1 ½" in depth.
  - ✓ Lightly apply general fertilizer, a 10-10-10 fertilizer mix and water immediately. (Is this area connected with the irrigation line? How should the irrigation system be managed, with automatic settings or manually?)
  
- Late Spring – Summer (St. Patrick's Day - Labor Day)
  - ✓ Weed every week throughout the summer to keep weeds from overtaking the beds.
  - ✓ Stake tall growing perennials.
  - ✓ Water if it hasn't rained in over 10 to 12 days. This area is on a separate spray irrigation zone; the timer here needs to be set to accommodate the smaller perennials needs (though these are largely drought-tolerant species, e.g., lavender prefers neglect!)—some supplemental hand-watering may be needed, especially for the first season or two.
  
- Fall (Labor Day - Thanksgiving)
  - ✓ Water during times of drought (over 10 days without rain).
  - ✓ Before Thanksgiving, cut down perennials to their base (except Iris and Ornamental Grasses and Shrubs).
  - ✓ Weed as required for the last time in the season.
  - ✓ Apply fresh mulch up to 1 ½" in depth throughout the bed.

## Memorial Garden

The Memorial Garden is designed as a contemplative space to honor Coolidge veterans. The evergreen shrubs symbolize endurance and provide winter cover for small birds. The planters introduce both color and plant diversity to provide perching and nesting spaces for birds. The primary ecological purpose is to enhance the human ecological context at the garden, providing a quiet retreat space and small group gathering space from which to think about the rest of the garden.



<b>Plant List</b>	
<i>Buxus sempervirens 'Justin Brouwers'</i>	Justin Brouwers boxwood
<i>Buxus sinica var. insularis</i>	Dwarf Boxwood
<i>Buxus sempervirens 'Elegantissima'</i>	Variegated boxwood
<i>Buxus sempervirens 'Fastigiata'</i>	Upright boxwood
<i>Decumaria barbara</i>	climbing hydrangea
<i>Chaemacyparis</i>	Blue green evergreen in pot
<i>Cotoneaster</i>	Weeping cotoneaster
<i>Helleborous</i>	New Himalayan hellebore from Monrovia
<i>Passiflora incarnata</i>	Passionflower

Note: perennials were added in around the benches - on either side of the bench facing the steps



Dwarf Boxwood



Chaemacyparis



Passionflower

## ***Memorial Garden Maintenance Schedule -***

- Early Spring (Valentine's Day – St. Patrick's Day)
  - ✓ Clean out dead leaf debris
  - ✓ Clean out trash that has accumulated 1 time a month
  - ✓ Inspect planters for winter damage
  - ✓ Remove last year's green screen vine growth
  - ✓ Check furniture condition for necessary maintenance
  
- Late Spring - Summer (St. Patrick's Day Labor Day)
  - ✓ Weed every week as needed.
  - ✓ Plant Spring annuals if desired
  - ✓ Clean out trash that has accumulated 1 time per month
  - ✓ When adding mulch, spread a 1" layer leaving a 2" gap around the base of perennials and shrubs so that no mulch is piled up on the stems of any plants. Mulch should not be deeper than 3".
  - ✓ Spread the leaf debris and old mulch around the base of trees on the property.
  - ✓ Hand water boxwoods if it hasn't rained in over 4 weeks; water planters 2X/week.
  - ✓ Replace planter plants if necessary after the winter.
  - ✓ Plant shade tolerant annual vines at the base of each green screen
  - ✓ Check pavers for level; repair as necessary after last frost – replenish stone dust
  
- Fall – (Labor Day- Christmas)
  - Water during times of drought (over 4 weeks without rain)
  - Pick up all trash which may have accumulated over the summer
  - Weed as required for the last time in the season by Thanksgiving
  - Do a trash pick up 1 time per month
  
- Winter (Christmas – Valentine's Day)
  - ✓ Inspect garden / pull out trash that blows in 1 time per month
  - ✓ Pruning, if necessary, is done during the winter prior to the spring flush of growth that occurs after last frost.

## **Memorial Garden Learning Activities**

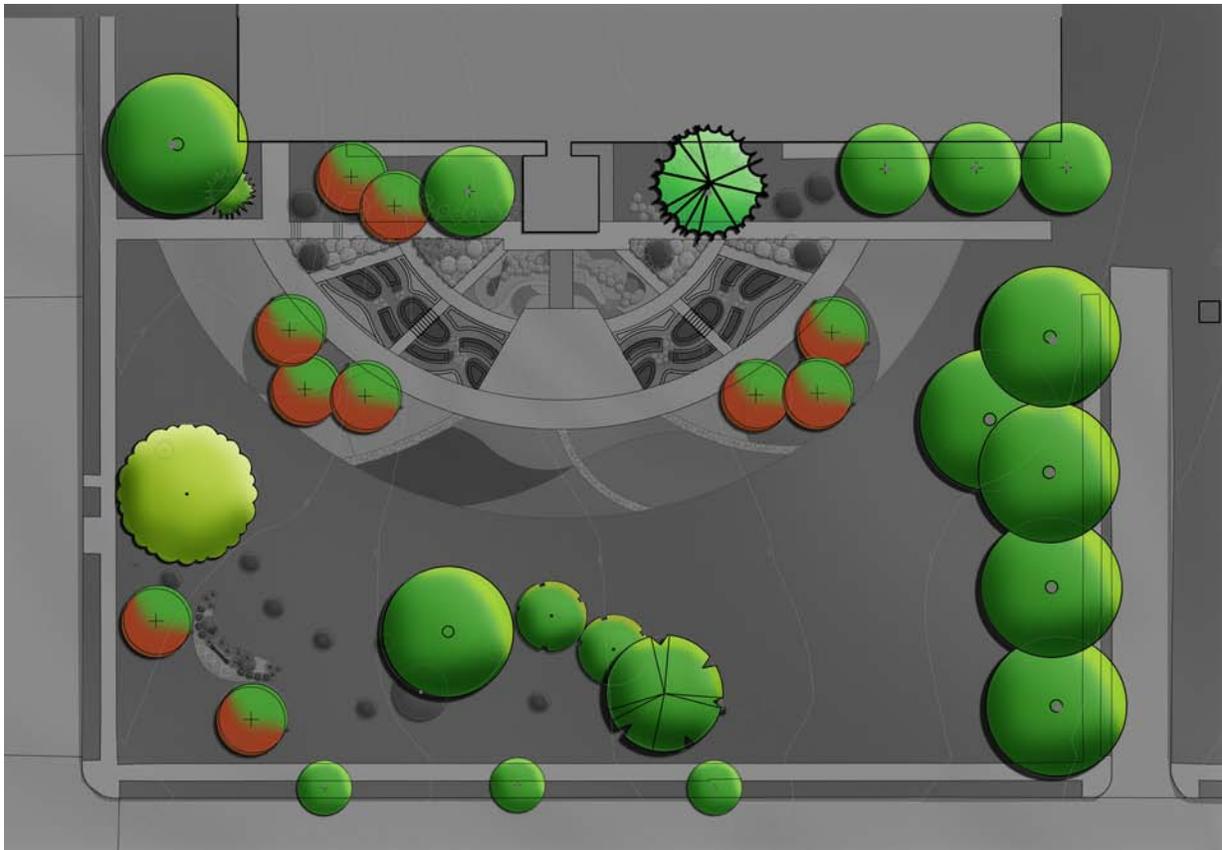
- ❖ Skill Development
  - Group discussion area
  - Reading/ Writing/ Drawing
  - Measuring
  - Reflection
  - Observation
  - Program Ideas
    - Living wall project
    - Art project
    - History
    - Veteran's Day
    - Field trip to 3 DC Memorial sites which incorporate water as central element: FDR Memorial, WWII Memorial, Japanese War Memorial: Explore how the physical presence of water serves to define memorial elements of reflection, contemplation, procession and renewal (i.e. life).
    - Tactile Project: Rubbings of veteran names to promote tactile connection and research experience in family history and genealogy.

# Trees

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## *Ecological purpose*

Trees gracefully serve as the lungs and heart of our urban environment. They take carbon dioxide and convert it to oxygen via photosynthesis, and help to filter out irritants and gases so we can breathe cleaner air. Trees help to absorb stormwater runoff and keep slopes stable in areas like stream valleys, parking lots and our own backyards. They also provide shelter and food for a wide variety of animals, shade us on sunny days, and even help to regulate temperatures and reduce energy use in our homes by providing summer shade and winter sun for buildings. Neighborhoods with established trees and well-maintained landscapes even increase the property values of our homes. Trees provide a psychological respite from the hardscape of our urban environment and a direct connection back to nature.



## Plant List

Botanical Name	Common Name
<p><b><i>Amelanchier 'Autumn Brilliance'</i></b></p> <p><u>Description:</u> Serviceberry, a Mid-Atlantic native, ranges in size from 15 to 25 feet tall with a similar spread. Leaves are purplish when young but turn dark green at maturity, then turn orange and coral in fall. The fruit is blue/black and sweet. The buds are green tinged with red, silky white hairs. A "precocious" tree, it blooms before it leafs out and is covered with clusters of white flowers in mid- to late spring. The stem is slender, glabrous, reddish brown. Bark is grayish and exfoliates for fall/winter interest.</p> <p><u>Maintenance:</u> The tree is naturally multi-stemmed, but it can be trained into a single stem. Train and prune the branches after they bloom in late spring/early summer so that they don't rub against each other. Soil preference is acidic. Potential pests include borer or leaf miner. Potential diseases include fire blight and leaf blight.</p>	<p><b>Serviceberry</b></p>
<p><b><i>Betula nigra</i></b></p> <p><u>Description:</u> Native to river banks in eastern North America, this tree is both drought- and flood-tolerant, and is perfect for the urban landscape. Ideally, it prefers a moist, well-drained soil. It is often grown with multiple trunks, and the peeling bark provides year-round interest. The leaves are alternate, ovate and serrated. Instead of flowers, the tree produces catkins that turn into small seed pods in late spring. At full maturity, it can grow to about 80 feet, though most river birches in an urban setting grow to about 40 feet.</p> <p><u>Maintenance:</u> This tree is susceptible to bronze birch borer, but less so than other birch species. Do not prune birch trees between May and August, as this may spread the bronze birch borers to other areas. Prune diseased or dead wood any time of the year. If desired, prune the tree to refine its shape and to remove rubbing branches in late spring after full leaf growth. Do not remove any more than 20% of the trees branches when pruning.</p>	<p><b>River Birch</b></p>
<p><b><i>Cedrus deodara</i></b></p> <p><u>Description:</u> This is a slow-growing, large, native shade tree which usually tops out around 30' - 40' high and wide. The bark is gray with deep furrows and scaly ridges. The leaf is distinctively lobed with shallow sinuses at the tip and deeper sinus on the sides. It is called the overcup oak because the cup of the acorn covers the nut. A lowland tree, it tolerates poorly drained soil, and has good drought tolerance.</p> <p><u>Maintenance:</u> If desired, prune the tree to refine its shape and to remove rubbing branches in the late winter, before buds have formed on the branches. Avoid major pruning to the crown or body of the tree, as this may permanently damage the growth habit of the tree. Evergreen trees do not grow back the same way deciduous trees do, so take great care in minimizing pruning only to necessary limbs. This species is not susceptible to any known major pests or diseases.</p>	<p><b>Deodar Cedar</b></p>
<p><b><i>Celtis occidentalis</i></b></p> <p><u>Description:</u> This tree is a North American native that grows 40 to 60 feet high by an equal width. A member of the <i>Ulmaceae</i> (Elm) family, it has a zig-zag bud and leaf twig structure similar to that of the elm. The leaf is toothed and has a notch at the stem. It's a matte light to medium green in summer and a yellow-green in fall. The value of this tree is the bark - it's gray with corky ridges that stand out in fall and winter - and the fruit produced in fall can be very showy. Birds love the fruit, a drupe, which is fleshy, like a berry, and can be yellow, red or purple. It's a sturdy tree that prefers rich moist soils, but tolerates wind, acidic and alkaline conditions and dry, heavy and rocky soils. This tree thrives in an open landscape such as a field.</p> <p><u>Maintenance:</u> This tree tends to grow branches at a very tight angle. While the wood is strong, these angles tend to put added stress on the branches, which can be damaged during heavy snow/ice events or sustained periods of high wind. As such, prune the trees annually to discourage the development of tight angles between the leader trunk and branches. The overall goal is to create a uniform, well-shaped crown and discourage multi-trunked trees with tight branch angles. Pests and diseases that may impact the hackberry include nipple gall, leaf spot and powdery mildew, which can be treated by using fungicides. Mistletoe, a parasitic plant, colonizes in hackberries and can kill the tree if it's not removed.</p>	<p><b>Hackberry</b></p>

<p><b><i>Cercis canadensis</i></b></p> <p><u>Description:</u> This is a beautiful, ornamental tree and is a North-American native. Height, width: 20 to 30 feet by 25 to 35 feet. Distinctive purple-red flowers sit on the branches, blooming in early spring, followed by large, heart-shaped leaves. Bark is dark brown to black and gets darker with age. Redbuds prefer deep, well-drained acidic soil and are stressed by lack of water and extensive exposure to hot, dry periods of weather.</p> <p><u>Maintenance:</u> Because this tree is small and tends to have weak limbs, minimize the amount of activity around it (including landscape equipment). As the tree grows, prune the lowest branches to avoid contact with lawnmowers and weed wackers. Common diseases include cankers, leaf spots, and verticillium wilt. Common insect problems include spider mites and scale insects. Often, infected areas of the tree will have to be treated with a fungicide or pesticide; if possible, specify an organic solution.</p>	<p><b>Redbud</b></p>
<p><b><i>Pistacia chinensis</i></b></p> <p><u>Description:</u> The height of this tree is 30 to 35 feet, and the spread is equal or slightly narrower. The crown is oval with some upward arching branches. The leaves are pinnately compound, about 10 inches long, similar to a walnut with 10 to 12 leaflets on each leaf. Leaflets are 2 to 4 inches long and are dark green in summer, becoming brilliant orange or orange red in fall. Stems are light brown with orange lenticels. Flowers are small and greenish, and bloom in the spring; the fruit is a ¼-inch drupe that matures to a robin’s egg blue or red. Native to Asia, this tree is very drought tolerant.</p> <p><u>Maintenance:</u> As the canopy on this tree develops very slowly, avoid major pruning until the tree is at least 6 years old. Prune for general shape and dead branch removal in the late winter, prior to the buds forming.</p>	<p><b>Chinese Pistache</b></p>
<p><b><i>Quercus lyrata</i></b></p> <p><u>Description:</u> This is a slow-growing, large, native shade tree which usually tops out around 30’ – 40’ high and wide. The bark is gray with deep furrows and scaly ridges. The leaf is distinctively lobed with shallow sinuses at the tip and deeper sinus on the sides. It is called the overcup oak because the cup of the acorn covers the nut. A lowland tree, it tolerates poorly drained soil, and has good drought tolerance.</p> <p><u>Maintenance:</u> If desired, prune the tree to refine its shape and to remove rubbing branches in the late winter, before buds have formed on the branches. Avoid major pruning to the crown of the tree, as this may damage the growth habit of the tree. This species is not susceptible to any known major pests or diseases</p>	<p><b>Overcup Oak</b></p>
<p><b><i>Quercus phellos</i></b></p> <p><u>Description:</u> This is a large, deciduous tree native to eastern North America and has leaves shaped similar to that of a willow tree – they are long and narrow, unlike the more commonly recognized lobed leaves the red and white oaks. The tree is very urban and drought tolerant, and often grows up to 60’ tall or more in the city.</p> <p><u>Maintenance:</u> If desired, prune the tree to refine its shape and to remove rubbing branches in the late winter, before buds have formed on the branches. This species is not susceptible to any known major pests or diseases.</p>	<p><b>Willow Oak</b></p>
<p><b><i>Quercus bicolor</i></b></p> <p><u>Description:</u> While this tree grows up to 100 feet tall in the open, it is typically much smaller (usually around 50’ – 70’ tall) in urban settings. The crown is spreading and irregular. Leaves range in size, up to 7 inches long and 8 inches wide. They are dark glossy green on top, and velvety white-green on the underside. The coloration difference remains distinct in fall, when top of leaf is rich, leather brown and underside is pale tan. Swamp white oaks produce acorns annually, 1 or 2 on a peduncle, up to four inches long. The acorn cap is gray-green with scales and bristles along the edge. This tree is native to the Northeast and Mid-Atlantic areas.</p> <p><u>Maintenance:</u> Prune this tree in the late winter before buds begin to show. White oak has been shown to be susceptible to oak wilt, which can be treated with fungicide. Avoid pruning the crown of the tree, which tends to have an irregular shape and will create major growth problems. Otherwise, prune for general shape and dead branch removal in the late winter, prior to the buds forming.</p>	<p><b>Swamp White Oak</b></p>



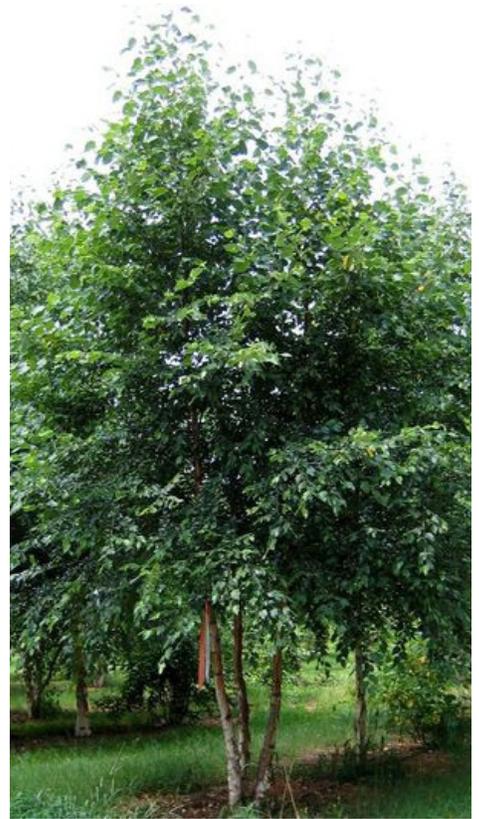
Serviceberry (Summer Foliage)



Serviceberry (Spring Foliage)



Serviceberry (Fall Foliage)



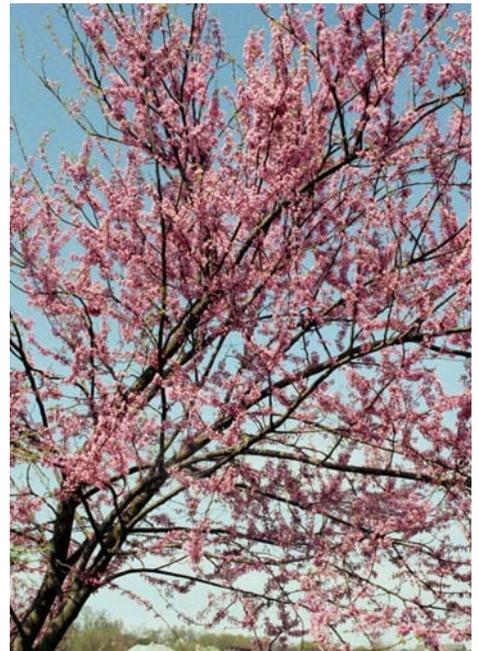
River Birch



Deodar Cedar



Hackberry



Redbud

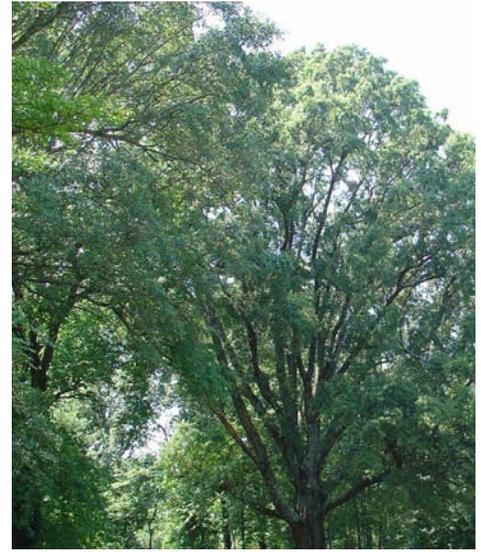




Chinese Pistache



Willow Oak



Swamp White Oak



### ***General Tree Care and Maintenance Schedule***

More information on tree maintenance can be found through Casey Trees, a non-profit organization committed to improving the quality and quantity of trees in Washington, DC. Please visit their website at [www.caseytrees.org](http://www.caseytrees.org).

#### **• Late Winter - Early Spring: (Christmas - Valentine's Day)**

- ✓ Clean out old mulch from around the base of the trees. Apply fresh mulch around the base creating a shallow basin, about 2" in depth, making sure it is pushed away from the trunk of the tree.
- ✓ Apply a light fertilizer and root stimulator (such as UpStart), and slowly but deeply water the first two years to encourage deep root growth.
- ✓ Install the gator bags to water during the spring and summer of the first two years. Fill up the bags with water every week if there hasn't been a soaking rainfall in the last 10 days.
- ✓ Prune away any dead or diseased limbs you find, and make sure to dispose of diseased limbs – they can't be used for mulch! Some trees should be pruned this time of year – check each species for more information.

#### **• Late Spring – Summer: (St. Patrick's Day - Labor Day)**

- ✓ Weed around the base of the tree. Continue weeding throughout the summer to keep weeds from establishing within the mulched basin.
- ✓ Cut back any suckering stems from the base of the tree to encourage growth on upper branches.
- ✓ Water using the gator bags if it hasn't rained in over 10 to 12 days.
- ✓ Look for signs of disease or insect damage.
- ✓ Some trees should be pruned this time of year – check each species for more information.

- **Fall – Early Winter:** (Labor Day - Christmas)
  - ✓ Water during times of drought (over 10 days without rain).
  - ✓ Before Thanksgiving, apply 2” of fresh mulch around the base of the tree creating a shallow basin, making sure to avoid covering the tree trunk with mulch.
  - ✓ Some trees should be pruned this time of year – check each species for more information.

*Note: Tree stakes should remain on the trees for the first year or two to help keep the tree upright. Adjust stakes if they have been twisted or pulled up. Remove stakes after two years when the root system is established.*

### ❖ **Trees and Learning Ideas**

- *Leaf out/leaf drop calendar.* Include fall color and bloom times.
- *Urban Forestry Program.* Work with the DC Department of Transportation (DDOT)’s Urban Forestry Administration and the DC Department of the Environment (DDOE) to train high school students in the seasonal maintenance of urban trees. Place students in summer internships (academia or professional practice) with federal agencies, local government agencies, universities or private companies specializing in arboriculture/dendrology.
- *Lifecycle study leaf*
- *Family Tree project*
- *Urban Ecology Program/AP Environmental Science Class.* Develop a curriculum as a subset of biology (or as a separate AP course) to investigate a variety of scales from plant propagation up to hydrology + atmospheric processes, community dynamics, etc. [http://en.wikipedia.org/wiki/Advanced\\_Placement\\_Environmental\\_Science](http://en.wikipedia.org/wiki/Advanced_Placement_Environmental_Science)

### **Tree Care References**

- Tree Owner’s Manual: <http://www.montgomerycountymd.gov/content/dep/downloads/treeownersmanualweb.pdf>
- Casey Trees: <http://www.caseytrees.org/>
- District of Columbia Cooperative Extension Services: [http://www.udc.edu/cooperative\\_extension/coop\\_ext.htm](http://www.udc.edu/cooperative_extension/coop_ext.htm)
- Virginia Cooperative Extension: <http://www.ext.vt.edu/>
- Virginia Tech Urban Forestry Program: <http://cnre.vt.edu/urbanforestry/>
- Maryland Cooperative Extension: <http://extension.umd.edu/gardening/index.cfm>
- University of Maryland Urban Forestry Program [http://www.psla.umd.edu/plsc/C\\_urban.cfm](http://www.psla.umd.edu/plsc/C_urban.cfm)
- Brickell, Christopher. American Horticultural Society Pruning & Training (American Horticultural Society Practical Guides). DK Adult Publishing, 1996. [http://www.amazon.com/American-Horticultural-Society-Training-Practical/dp/1564583317/ref=sr\\_1\\_1?ie=UTF8&qid=1298408061&sr=8-1](http://www.amazon.com/American-Horticultural-Society-Training-Practical/dp/1564583317/ref=sr_1_1?ie=UTF8&qid=1298408061&sr=8-1)
- American Forests <http://www.americanforests.org/resources/urbanforests/>
- International Society of Arboriculture <http://www.isa-arbor.com/>
- American Society of Consulting Arborists <http://www.asca-consultants.org/>

## **Supporting the Garden: Funding and Grant Opportunities – (See Appendix 1)**

### **Friends of the Garden**

A suggested organizational structure and work plan is outlined below to help facilitate this collaboration between the school and the community. The Garden Guide, put together by the American Society of Landscape Architect's Potomac Chapter, is an extensive maintenance guide to help the Friends of the Garden provide the care that the garden will need. All supplies will be provided. Friends of the Garden will just require a little of your time.

Friends of Coolidge's Garden – suggested organizational structure:

- Co-Chairs: Community representative and school representative
- Vice Chair: Community representative and school representative

#### Tasks

- Monitor the Garden Guide maintenance schedule
- Coordinate with the school to keep list of program resources that can help maintain garden based on guide schedule (see resources on next page)
- Research out to program representatives to line up manpower for scheduled maintenance
- Maintain contact list of volunteers and program representatives
- Monitor resource program opportunities and communicate with school

### **Program Resources**

- ACE Mentoring Program
  - Contact Trisha Grant, Executive Director for current Coolidge High School mentor - <http://www.acementor.org/592> 202.577.3028
- Community Service Credit Program
  - See School Administrator
- Mayor's Programs - <http://green.dc.gov/green>
  - Conservation Corp
  - Mayor's Green Summer Jobs Program

- DC Department of Environment

See Environmental Learning Programs link - <http://ddoe.dc.gov/ddoe>

- RiverSmart Program – Trinh Doan
- Project WET, WILD and Project Learning Tree (PLT) - For teachers K - 12th - Trinh Doan
  - Trinh Doan, Environmental Program Specialist, (202) 535-1653 [patricia.doan@dc.gov](mailto:patricia.doan@dc.gov)
- Environmental Education Resource Center for Teachers – Gilda Allen
  - Gilda Allen, Environmental Program Specialist, (202) 535-2239 Email: [gilda.allen@dc.gov](mailto:gilda.allen@dc.gov)
- DC Environmental Education Consortium
  - D.C. Schoolyard Greening contact: Grace Manubay – 202 236 5856
    - [www.dcschoolyardgreening.org](http://www.dcschoolyardgreening.org)
    - [www.dcnaturally.org](http://www.dcnaturally.org)
- USDA's University of DC Master Gardeners Program  
**Sandra Farber Bandier** 202.274.7166 [sfarber@udc.edu](mailto:sfarber@udc.edu)
- DC Urban Gardener's Program
  - <http://www.dc-urban-gardeners.com>

## Pest Management Resources

Below is a list of available pest management resources within Washington, D.C. and Maryland.

### Washington D.C. & Maryland

- **All American Pest Control Inc.**
  - <http://www.novapest.com/commercial-pest-management.asp> (703-659-9562 5613 Leesburg Pike Ste 12 Falls Church, VA 22041-2912)
- **Bio-Logical Pest Management, Inc.**
  - <http://biologicalpestmanagement.com/> (Alan Cohen 202-237-7509 PO Box 9578 Washington DC 20016)
- **American Pest**
  - <http://www.americanpest.net/> (1-877-282-1886 11820 West Market Place Fulton, MD 20759)
- **Affordable Pest**
  - <http://www.affordablepest.com/> (301-365-HOME Offices throughout Maryland, Virginia, and Washington, D.C.)
- **Pest Services Company**
  - <http://www.pestservicescompany.com> (301-779-5800 Servicing all of metro D.C. )

- **Elrich**
  - <http://www.jcehrlich.com> (1-800-837-5520 Offices throughout Maryland, Virginia, and Washington, D.C.)
- **Home Paramount Pest Control**
  - <http://www.homeparamount.com/> (1-888-888-HOME Offices throughout Maryland, Virginia, and Washington D.C.)

## Other Promising Gardening Programs

- City Blossoms
  - [www.citblossoms.org](http://www.citblossoms.org) (Lola Bloom, 202-870-8158 or Rebecca Lemos 443-854-1669)
- Alliance for a Healthier Generation (American Heart Assoc. and William J. Clinton Foundation)
  - [www.healthiergeneration.org](http://www.healthiergeneration.org)
- Neighborhood Farm Initiative Summer Teen Teams
  - [Neighborhoodfarminitiative.org](http://Neighborhoodfarminitiative.org) (301)779-2321
- DC Field to Fork Network: Rooting DC
  - [www.fieldtoformnetwork.org](http://www.fieldtoformnetwork.org)
- Healthy Living Inc.
  - [www.healthylivinginc.org](http://www.healthylivinginc.org), Juliette G. Tahar, President 202-497-5269
- Farm to Desk
  - [www.FARMTODESK.ORG](http://www.FARMTODESK.ORG) 415-796-3713

## Donors and Volunteers

### **Garden Donors:**

#### **\$20,000+**

E.P. Henry

#### **\$10,000 - \$20,000**

F.A. Bartlett Tree Experts

Victor Stanley, Inc.

#### **\$5,000 - \$10,000**

Casey Trees

Greenscreen/BV Associates

ICON Shelter Systems, Inc.

Ultra Play LLC

#### **\$1,000 - \$5,000**

American Wick

Dumar Site Furnishings, Inc.

Green King LLC

Hunter FX Lumiere

Hunter Industries

Landscape Forms, Inc.

Ohio Gratings, Inc.

Rainbird

Rainwater Pillow

South Wood Corporation

Stabilizer Solutions, Inc.

Tournesol Siteworks, LLVC

#### **\$1,000 or less**

Abbott Cobb

Brookfield Company

Chief Mountain Farm

Environmental Concern

EuroCobble

Heather Farms Nursery, Inc.

L&H Enterprises

ManorView Nursery

Meteor Solar LED Lighting

Moss Acres

Newsom Seed

North Creek Nurseries, Inc.

Pearl's Premium

*These firms and organizations supported the core contributors participation:*

## **Volunteer Core**

### **Firms and Organization**

AECOM

American Arts Association

A. Morton Thomas Associates

Bradley Site Design

DC Department of Transportation Urban Forestry Administration

Delon Hampton Associates Chartered

General Services Administration

Montgomery County Department of Environmental Protection

Montgomery Co. National Capital Parks and Planning Commission

National Capital Planning Commission

Niles Bolton Associates

Oehme, van Sweden & Associates, Inc.

StudioLFG

Toole Design Group

USDA Natural Resources Conservation Service

### **Services**

Barbara Nolan, Inc.

Champion Expo

Greater DC Cares

Playcore

Private Garden and Greenhouses

Keystone Construction

### **Sponsors**

American Society of Landscape Architects and its Potomac Chapter

Architecture, Construction, Engineering Mentoring Program and its Greater Washington Area Chapter

Calvin Coolidge High School

Calvin Coolidge Alumni Association

DC Department of the Environment

DC Office of Public Education Facilities Modernization

National Society of Black Engineers

## **Teams and Contributors**

### **ASLA Leadership Team**

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Mark Banks  
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Thelma Jarrett  
Frank Jones  
Mona-Cheri Pollard  
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Carter Young  
Stephanie Winnicki  
David Foster

## **Appendix 1**

### **Service Learning Grant Opportunities**

#### **National:**

**State Farm Good Neighbor Service-Learning Grants (Deadline: Mid-Fall)-[www.YSA.org/goodneighbor](http://www.YSA.org/goodneighbor)**-Eligible programs will engage youth in service-learning, an effective teaching and learning strategy that promotes student learning, academic achievement, workplace readiness, and healthy communities. Eligible candidates include teachers, service-learning coordinators and students in a public school, or staff and youth in a community-based organization working with a public school.

**UnitedHealth HEROES Service-Learning Grants (Deadline: Mid-Fall)-[www.YSA.org/HEROES](http://www.YSA.org/HEROES)**-UnitedHealth HEROES is a service-learning, health literacy initiative designed to encourage young people, partnering with schools and nonprofits, to create and implement local hands-on programs to fight childhood obesity. Educators, nonprofit leaders, and students are encouraged to apply.

**Prudential Spirit of Community Awards (Deadline: Fall)-<http://spirit.prudential.com>** -The program's goals are to applaud young people who already are making a positive difference in their towns and neighborhoods, and to inspire others to think about how they might contribute to their communities.

**Youth Garden Grants (Deadline: Fall)-[www.kidsgardening.org/ygg.asp](http://www.kidsgardening.org/ygg.asp)**-Priorities will be given to programs that emphasize: educational focus or curricular/program integration, nutrition or plant-to-food connections, environmental awareness/education, entrepreneurship, social aspects of gardening such as leadership development, team building, community support, or service-learning. Schools, youth groups, community centers, camps, clubs, treatment facilities.

**Office Depot Foundation Grants (Deadline: Fall)-[www.officedepotfoundation.com/funding.asp](http://www.officedepotfoundation.com/funding.asp)**-The foundation's focus includes: to support activities that serve, teach and inspire children, youth and families; to support civic organizations and activities that serve the needs of our community; and to support disaster relief efforts of recognized national, regional and local agencies.

**WaysToHelp.org Grants (Deadline: Ongoing)-[www.waystohelp.org](http://www.waystohelp.org)** -WaysToHelp.org invites teens in the United States to apply for grants to fund their community service ideas across any one of 16 issue areas. Grant requests are reviewed and responded to on a monthly basis.

#### **USDA People's Garden School Pilot Program**

<http://www.kidsgardening.org>

[http://www.classbrain.com/artmoney/publish/youth\\_garden\\_grants.shtml](http://www.classbrain.com/artmoney/publish/youth_garden_grants.shtml)

**4-h council**-provides grants for many different initiatives and topics including biotechnology, tree planting, community service, building community inclusion and many others.

**Adopt-A-Classroom**-A sponsor donates \$500 and provides moral support to a classroom of their preference or based on economic need. Teachers select and order resources to enrich the classroom.

**America the Beautiful Fund**-Grants of 100 to 2,000 seed packets are being offered on the basis of availability and relative need through the Free Seed! program. These seeds have germination rates of 90-95%.

**Captain Planet Foundation**-The mission of the Captain Planet Foundation is to fund and support hands-on environmental projects for children and youths. Their objective is to encourage innovative programs that empower children and youth.

**The Coca-Cola Foundation**-The Coca-Cola Foundation Classroom Teaching and Learning grants support: innovative K-12 public school programs, teacher development programs, and smaller projects dealing with specific activities in the elementary and secondary classroom.

**Corning Foundation**-Supports community service programs for students, curriculum enrichment, student scholarships, facility improvement, and instructional technology projects for elementary and secondary schools, community colleges and four-year institutions of higher learning.

**Do Something!**-Awards \$500 grants to change-makers and potential community leaders age 18 and under who identify problems in their communities, and then create game plans to do something to change their world.

**The DUNN Foundation**-The grant program focuses on the development or enhancement of K-12 and adult education programs designed to develop an awareness of community character and appearance, or to provide students with the skills necessary for conservation and enhancement of the visual environment, both natural and built.

**FujiFilm**-The Products for Learning program is Fujifilm's way of rewarding individual educators who understand the value of integrating imaging and information technology into everyday classroom lessons.

**Jordan Fundamentals Grant Program**-The initiative benefits, recognizes and rewards teachers in underprivileged schools who strive beyond challenges and limited resources to achieve excellence through instructional creativity, innovative teaching and high learning expectation for students.

**Lowe's Companies Inc.**-Offering an outdoor classroom grant program to help schools improve their science curriculum by engaging students in hands-on experiences outside the traditional classroom. This Grant program is for outdoor classroom proposals by K-12 public schools in the United States.

**[Lorrie Otto Seeds for Education Grant Program](#)**-Gives small monetary grants to schools, nature centers, or other non-profit educational organizations for the purpose of establishing outdoor learning centers. The grant recipient learning centers are those which most successfully reflect the Wild Ones mission to educate and share information about the benefits of using native plants in our landscape.

**[National Education Association Foundation](#)**-Supports a variety of efforts by teachers, education support professionals, and higher education faculty and staff to improve student learning in the nation's public schools, colleges, and universities.

**[National Gardening Association](#)**-Awards Youth Garden Grants to schools, neighborhood groups, community centers, camps, clubs, treatment facilities, and intergenerational programs throughout the United States. These grants provide an assortment of quality tools, seeds, and garden products.

**[National Geographic Society Education Foundation](#)**-Seeks work that directly engages students and encourages them to understand the power and relevancy of geographic skills, the uses of geography, and a spatial perspective. Projects that have outreach to urban areas are particularly encouraged.

**[National Wildlife Foundation](#)**-Offers grants of \$250 to schools and organizations across the country for assistance in creating a certified schoolyard habitat. For information on the schoolyard habitat program, visit [NWF's web site](#) or [download an application](#) for a schoolyard habitat grant.

**[Newman's Own](#)**-Makes grants to a wide variety of nonprofits (including schools and other public-benefit institutions). Eligible categories include children and youth, health, education, elderly, the environment, the arts, literacy, substance abuse education, and housing and food programs.

**[Patagonia](#)**-Patagonia supports environmental activism by committing at least one percent of sales or 10 percent of pre-tax profits – whichever is more – to grassroots environmental groups.

**[Project Learning Tree](#)**-*GreenWorks!* projects should address an environmental issue and involve students from pre-school to high school in hands-on community action. Some examples of past grant projects include stream clean-up, graffiti paint-over, outdoor classrooms, and gardens.

**[SAM's CLUB Foundation](#)**-The grant can be used for projects such as: environmental education, recycling, planting of trees and shrubs, pollution control or clean air/clean water efforts. Please see the community involvement coordinator at the location closest to you.

**[Seeds of Change](#)**-Gives seeds to organizations that promote education and sustainable living through organic gardening projects. Committed to providing 100% certified organic, open-pollinated seeds of the highest quality including many heirloom, traditional, and unique varieties.

**[SHOPA Kids in Need Foundation](#)**-Funds creating classroom projects according to the rubric that emphasizes innovativeness and merit, clarity of objectives, replication feasibility, suitability of evaluation methods, and cost effectiveness.

**[Symbol Technologies, Inc.](#)**-Symbol Community Grants fund innovative educational programs in schools and community organizations with special consideration given to programs that promote math, science, engineering, and technology.

**[Timberland](#)**-Timberland's Community Investments Grants provide support for projects that encourage volunteerism and environmental responsibility.

**[Tom's of Maine](#)**-Focused on four areas: the environment, human needs, the arts, and education. Of Education grants, Tom's of Maine favor programs that address innovative educational programs for children and adults, especially ones that foster understanding of the natural environment and encourage community outreach.

**[Toshiba America Foundation](#)**-Contribute to the quality of science and mathematics education in U.S. communities by investing in projects designed by classroom teachers to improve science and mathematics education for students in grades K thru 12.

**[Toyota Motor Sales, USA, Inc.](#)**-Offers grants to K-12 science teachers for innovative projects that enhance science education in the school and/or school district. They focus on projects that emphasize the efficient use of natural resources and protection of the environment.

**[US Department of Agriculture: Wildlife Habitat Incentives Program \(WHIP\)](#)**-Provides financial incentives to develop habitat for fish and wildlife on private lands. Participants agree to implement a wildlife habitat development plan and USDA agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices.

**[Wal-Mart Foundation](#)**-The Wal-Mart Foundation provides grants in the areas of Community, Education, Children and the Environment. All requests for funding must be directed through your local Wal-Mart.

### **Local and Regional:**

**[The Boeing Company](#)**-The Boeing Company contributions program welcomes applications in five major areas: [education](#), [health and human services](#), [arts and culture](#), [civic](#) and [environment](#).

**[Chesapeake Bay Trust](#)** - Recipients include nonprofit organizations, civic and community groups, schools and public agencies. Priorities are given to two principal areas: education projects that promote a behavior change toward the Bay and the performance of restoration activities that utilize volunteers.

**[DC Green Trees](#)** -supports school gardens and farm to school initiatives in the district of columbia. Dc greens runs the glover park – burleith farmers’ market in upper georgetown, and channels proceeds from the market back into local food education and access in dc schools.

**[DC Office of Partnerships and Grants Development](#)** -This site offers comprehensive information about local grant opportunities as well as grant writing and seeking tips.

**[District Department of the Environment](#)** -These innovative schoolyard greening projects focus on incorporating landscape design principles that create habitat for wildlife, emphasize the use of native plants, highlight water conservation, and/or retain and filter storm water runoff, while having the added benefits of an outdoor classroom that supports effective teaching practices and promotes student learning.

**[Mars Foundation](#)** -The Mars Foundation supports K-12 programs including basic skills, enrichment, and math and science curriculum development; mentoring; and literacy. They also support projects for professional development for teachers, equipment and computer acquisition, and capital projects.

**[Redskins All-Stars](#)** -Redskins All Stars is designed to encourage and promote community service and volunteerism among youth. The council provides each registered group with \$100 voucher good at participating Home Depot locations in MD, VA, and D.C.

**[TKF Foundation](#)** -Dedicated to supporting organizations whose goals and programs benefit the connection of the human environment with the natural environment. Their two main grant programs are “Open Space, Sacred Spaces” and “Community Greening”.

**[The Washington Post](#)** -Provides an opportunity for teachers to apply for funds over and above those in the approved school budget to implement creative and innovative ideas that enrich the standard curriculum.

**[Westinghouse Electric Company](#)** -Actively contributes to programs that benefit nonprofit organizations. Areas of emphasis for this program are education, and civic and social pursuits.

**[Garden ABCS](#)** -To help you get funding for your garden project, we’re keeping track of every youth and community garden grant we come across. Also check out these resources: [Fundraising Educator Awards & Recognition Student Contests & Scholarships](#)

**[Grant Application Advice: Native Plant Gardens for Schools and Urban Areas](#)** -Betsey Landis © 2009. Landis shares how to avoid basic pitfalls of the grant application process, especially grants with very specialized requirements for funding.

[\*\*Great American Gardeners Award\*\*](#) -The American Horticultural recognizes individuals and institutions that have made significant contributions to American horticulture.

[\*\*2011 Youth Garden Grant\*\*](#) -Youth Garden Grants recognize outstanding youth-focused garden programs throughout the country. This year 100 recipients will receive a \$500 gift card from our The Home Depot and educational materials from the National Gardening Association.

[\*\*AeroGrow Growing Kids Awards\*\*](#) -Providing 300 educators nationwide with an AeroGarden, a useful, hands-on tool to enrich and enhance the study of nutrition and life science in the classroom.

[\*\*American Academy of Dermatology's Shade Structure Program \(Spring\)\*\*](#) -Grants in the amount of \$8,000 each will be awarded to nonprofits or public schools to purchase permanent structures that provide shade and ultraviolet (UV) ray protection for outdoor areas.

[\*\*American Honda Foundation\*\*](#) -Funding for youth education, specifically in the areas of science, technology, engineering, mathematics, the environment, job training and literacy.

[\*\*America the Beautiful Free Seeds - While Supplies Last\*\*](#) -Grants of free seeds to community groups striving to better our world through gardening. Nominal shipping charge applies.

[\*\*Annie's Grants for Gardens - Open\*\*](#) -Small grants that connect children directly to gardening.

[\*\*Arizona Teacher Training Garden Grant Program - Western Growers Foundation\*\*](#) -Who should apply: Arizona schools interested in receiving teacher training and resources to create a school garden. Three school representatives must commit to the summer training in order for schools to be accepted to the program.

[\*\*Arizona School Garden Grant - Western Growers Foundation\*\*](#) -Each school chosen to participate will receive \$1,250 to purchase garden and teacher supplies to create a school garden on their campus to be used for nutrition education. The schools will also receive their choice of a raised bed kit, or a portable container garden kit.

[\*\*Barbara's Bakery and \*Organic Gardening\*: Organic Learning Garden Grant\*\*](#)

[\*\*Bayer Advanced "Grow Together with Roses" School Garden Award\*\*](#)

[\*\*Bing's Our School Needs Contest\*\*](#) -Bing, the search engine from Microsoft, is having a contest and wants to know what your school needs. The contest is a fun, interactive campaign designed to encourage students, teachers and administrators to come together for a united cause: improving schools.

[\*\*Brita Filter For Good Eco Challenge\*\*](#) -Enter to win one of fifty **\$1,000 grants** to make your school more sustainable. From kindergarten to college, students, teachers and schools are discovering new ways to make our planet more sustainable.

[\*\*Build A Bear Workshop Bear Hugs Foundation\*\*](#) -Supporting children in the areas of health and wellness such as childhood disease research foundations, child safety organizations, and organizations that serve children with special needs.

[\*\*California Fertilizer Foundation School Garden Grant Program\*\*](#) -Provides 24 grants for \$1,200 each to schools throughout California.

### [\*\*Center for Ecoliteracy\*\*](#)

[\*\*Classroom Earth 2010 National High School Challenge\*\*](#) -Classroom Earth is committed to helping teachers integrate environmental education into their curricula to inspire their students to help solve environmental problems. Teachers from all subject areas are encouraged apply.

[\*\*Clorox Clean-Up Power A Bright Future Grant\*\*](#) -Nominate a local non-profit kids program on Facebook for a chance a \$10,000 grant.

[\*\*Community Food Projects Competitive Grants Program \(CFP\)\*\*](#) -USDA Cooperative State Research, Education and Extension Service (CSREES)

### [\*\*Cornell University Celebrate Urban Birds Mini-Grants\*\*](#)

[\*\*CVS Caremark Community Grants\*\*](#) -Awards funds to nonprofit organizations for programs targeting children with disabilities; programs focusing on health and rehabilitation services; and public schools promoting a greater level of inclusion in student activities and extracurricular programs, and initiatives that give greater access to physical movement and play.

[\*\*Disney Planet Challenge / Donor's Choose\*\*](#)  **Late Winter** -In partnership with DonorsChoose.org, Disney's Planet Challenge is offering matching funds to hands-on environmental projects submitted by 3rd through 8th grade public school teachers who request up to \$650 in materials.

### [\*\*DoSomething.org Increase Your Green School Competition\*\*](#)

[\*\*Earth Day Network Grant Program\*\*](#) -For projects that green a school -- from bricks-and-mortar and schoolyard improvements to implementing environmental education, performing civic action and achieving policy reform.

### **Ecology/Environmental Science Teaching Awards**

**Entomological Society of America President's Prizes for Outstanding Achievement in Primary and Secondary Education** -Recognizing educators who use insects as educational tools

### **Environmental Excellence Awards**

### **EPA Environmental Education Grants**

### **Fruit Tree Planting Foundation**

**Fiskars Project Orange Thumb**-Grants for gardens and/or gardening projects geared toward community involvement, neighborhood beautification, sustainable agriculture and/or horticultural education.

**Fruit Tree 101 Open**-The Fruit Tree Planting Foundation and Stretch Island Fruit Co. are giving fruit trees to K-12 parents who submit their children's school.

### **Gardenburger Community Garden Grants**

**Gardener's Supply Garden Crusader Awards** -Winners (no age limit) in the areas of garden education, feeding the hungry, urban renewal and restoration receive cash and supplies.

**General Mills' Champions for Healthy Kids** -Fifty grants of \$10,000 each to community-based groups that develop creative ways to help youth adopt a balanced diet and physically active lifestyle

### **Greencorps Chicago - City of Chicago**

**Green Spaces Alliance Community Garden Starter Grants** -South Texas

### **GreenNet Mini-Grants - Chicago's Greening Network**

**Green Thumb Challenge 2010** -The award is designed to support the continued sustainability of an exceptional youth garden program that has demonstrated success, and has impacted the lives of kids and their community.

**Go Green for the Earth DVD Contest** -TeachersCount invites teachers to tell them about the "green" ideas they bring into their classrooms to ensure that future generations will continue to enjoy all of nature's splendor.

**Golden Carrot Awards – Open**-The Physicians Committee for Responsible Medicine is seeking nominations for its Golden Carrot Awards for outstanding school food service professionals who have developed and implemented a healthful and successful school lunch program.

**GOOD Magazine Garden Design Contest** (Los Angeles) -Design a garden module that can be applied to a 20' by 20' space on any K through 12 campus.

**Goody's Good Deeds for Schools**

**2009 Hansen's Natural and Native School Garden Grant** -Promoting the benefits of using native plants and fostering the installation of naturalized gardens in San Francisco Bay schoolyards.

**Healthy Farm, Healthy Schools Grant** -Pennsylvania Department of Agriculture

**Healthy Sprouts Awards** -Projects should positively impact the community while simultaneously equipping participants with the skills necessary to maintain a healthy lifestyle that is compatible with environmental stewardship.

**Heinz Wholesome Memories Intergenerational Garden Award** -Fostering family-focused garden efforts in communities across the country

**Herb Society of America Grant for Educators – Winter**-The grant recognizes innovative projects that enhance herbal education in school systems, in communities, or in any public forum (electronic or person-to-person). It requires learning goals and a mechanism to measure the educational outcomes.

**Hewlett Packard Innovations in Education Grants** -Math and science innovations for middle schools and high schools.

**Hooked on Hydroponics** -For schools and youth organizations planning to engage in a hydroponics project with at least 15 children between the ages of 6 and 18 during the 2010 school year.

**Home Depot Building Healthy Communities Grants** -Available to registered 501(c)(3) nonprofit organizations, public schools or tax-exempt public service agencies in the U.S. who are using the power of volunteers to improve the physical health of their community.

**Illinois DNR Biodiversity Field Trip Grants** -Grants to take your students on a field trip to study some aspect of Illinois' natural or cultural biodiversity.

**Illinois DNR Schoolyard Habitat Action Grant** -The Schoolyard Habitat Action Grant is designed to engage students in hands-on stewardship.

**Illinois DNR Rainwater Initiative Grant** -Students can construct a rain garden to help control storm water runoff, improve wildlife habitat and address flooding concerns.

**Illinois Rain Garden Initiative Grants** -Provides resources to students and community organizations to construct a rain garden to help control storm water runoff, improve wildlife habitat and address flooding concerns.

**ING Unsung Heroes Awards** -100 teachers are selected (based on their creative, innovative classroom projects and unique educational programs) to receive \$2,000. Of the 100 finalists, three will be selected for additional financial awards, ranging from \$5,000 to \$25,000.

**Inspired by Bulbs! Educational Grant**

**Intel Schools of Distinction Awards in Math and Science**

**International Paper Foundation** – **Open**-Environmental education for young children: outdoor classrooms, forestry, and air and water quality programs.

**Jamba Juice - It's All About the Fruit! Grant Program**-Passionate about supporting schools and communities by promoting health, wellness and physical activities, Jamba Juice is sponsoring the It's All About the Fruit Grant Program to provide schools with fruit trees to create engaging nutrition and gardening experiences.

**Jenny's Heroes** - **Open**-The Jenny Jones Foundation will give up to \$25,000 to everyday citizens who want to improve their communities.

**Kroger Co. Foundation** - **Open**-Feed-the-hungry programs in communities where Kroger employees live and work.

**Love Your Veggies Grant** -With support from its partner the School Nutrition Foundation (SNF), the grant program will once again seek to help schools provide innovative programs to increase consumption of fresh fruits and vegetables in the lunchroom.

**Levitt Foundation** -Children and environment - New York City / Long Island

**Live Monarch Foundation Educator Award Program**

[\*\*Lowe's Toolbox for Education Outdoor Classroom Grant\*\*](#) -Lowe's Charitable and Educational Foundation (LCEF) has helped more than 1,000 schools across the country create reading gardens, build playgrounds and implement other improvement projects that help strengthen their schools and their communities.

[\*\*Mantis Awards for Community & Youth Gardens – Late Winter\*\*](#)-The Mantis Awards recognize charitable and educational garden projects that enhance the quality of life in their host communities. The 25 recipients receive Mantis tiller/cultivators.

[\*\*Melinda Gray Ardia Environmental Foundation\*\*](#) -Helping facilitate the development and implementation of holistic environmental curricula that incorporate basic ecological principles and field environmental activities within a primary or secondary school setting.

[\*\*Midwest School Garden Grant\*\*](#) -Educators should be planning to use the garden to teach students life skills, reinforce academics, develop environmental stewardship, and encourage students to make positive choices for themselves and the planet.

[\*\*Muhammad Ali Center Peace Garden Grant\*\*](#) **Mid-Winter**-In an effort to help all schools sow the seeds of respect, the Muhammad Ali Center Peace Garden is designed to help schools teach lessons of peace and hunger awareness through garden activities.

[\*\*National Association of County and City Health Officials \(NACCHO\) Action Communities for Health, Innovation, and Environmental Change \(ACHIEVE\) Proposals\*\*](#)-This program seeks to strengthen community coalitions to develop an action plan that addresses comprehensive chronic disease prevention through policy, systems, and environmental change strategies.

### [\*\*National Education Foundation Student Achievement Grants\*\*](#)

[\*\*National Garden Clubs\*\*](#) -Organic + Native Plant School Garden Partnership

[\*\*Nature Hills Nursery Green America Awards\*\*](#) -Eligible applicants include community groups who are committed to improving their local environment by planting trees, bushes, and shrubs to make their communities a better place to live.

[\*\*NEA Foundation Learning & Leadership Grant\*\*](#) -Funds educator participation in high-quality professional development experiences or collegial study

[\*\*NEA's Green Across America\*\*](#) -Grants of up to \$1,000 are available to help you implement your innovative education program, activity, lesson or event to excite students about going green, caring for the earth and creating a sustainable future.

**[NEA Foundation Student Achievement Grants](#)** -For projects that engage students in critical thinking and problem solving that deepen their knowledge of standards-based subject matter and improve habits of inquiry, self-directed learning, and critical reflection.

**[Nickelodeon's Big Green Grants](#)** -Supporting environmentally-friendly projects that educate and inspire kids to take care of the environment; be active and live healthier; and/or engage in community service.

**[North Central Region Sustainable Agriculture Research and Education \(SARE\) Farmer Rancher Grants](#)** -SARE is a competitive grants program providing grants to researchers, agricultural educators, farmers and ranchers, and students in the United States.

**[North Central Region Sustainable Agriculture Research and Education \(SARE\) Youth Grants – Mid-Winter](#)**-Research and demonstration projects are for hands-on efforts to explore Sustainable Agriculture issues and practices. Education projects can involve teaching others about Sustainable Agriculture or attending a Sustainable Agriculture conference, workshop, or camp.

**[North Central Region Sustainable Agriculture Research and Education \(SARE\) Youth Educator Grants – Mid-Winter](#)**-These are grants for educators to provide programming on sustainable agriculture for youth. \$2,000 maximum.

**[NC SARE Youth & Youth Educator Sustainable Agriculture Grants](#)** -Providing opportunities for youth and youth educators in the North Central Region to learn more about Sustainable Agriculture

**[Openlands' 2009 Building School Gardens Grants](#)** -For Chicago Public Schools, [Download Application](#)

**[Oppenheimer Family Foundation Teacher Incentive Grant](#)** Chicago

**[Park Seed Get My Classroom Growing Essay Contest](#)**

**[Plant the Seeds of Learning Contest](#)** -Annie's Homegrown & National Gardening Association

**[Play with Your Produce Healthy Challenge Teacher Contest](#)** -The Play with Your Produce Classroom Challenge also challenges K-6 classrooms to create a classroom activity focused on healthy eating using fresh fruits or vegetables.

**[Project Learning Tree GreenWorks! Pollinator Garden Grants](#)** -A Distance Learning Adventure. Participating teachers can apply for *GreenWorks!* funding to create pollinator gardens in their schoolyard or community.

**[Project Learning Tree Greenworks! MonarchLIVE Butterfly Garden Grants](#)**

## **[PTO Today, Inc. Parent Group of the Year 2009](#)**

**[The Quaker Go Project](#)**-Awards for community-based projects that combat hunger

**[Organic School Garden Awards](#)** -Rodale Institute's Kidsregen.org®

**[Samsung Solve for Tomorrow Technology Giveaway](#)** -Samsung and its partners are asking teachers to participate in its contest which will address a key academic challenge in our country: to increase the pursuit of Science, Technology, Engineering, and Math (STEM) education.

**[State Farm Good Neighbor Service-Learning Grants](#)** -Eligible programs will engage youth in service-learning. Eligible candidates include teachers, service-learning coordinators and students in a public school, or staff and youth in a community-based organization working with a public school.

**[STEMester of Service Grants from Youth Service America](#)** -Helping middle school science teachers and service-learning coordinators strengthen their classroom practices through service-learning, a teaching method that combines meaningful service with curriculum or program-based learning. Emphasis on the environment.

**[Student Conservation Association Green Your School Grant](#)** -High school grant program

**[2010 Syngenta IPM in School Gardens Grant](#)** -Educators must be planning to use the garden program to teach students about integrated pest management practices used in gardens and commercial agriculture.

**[Taproot Foundation](#)** -Service Grants for Non-Profits

**[Target K-12 Outdoor Classroom Field Trip Grants](#)**-Funds to give students the opportunity to explore more of the world outside the classroom.

**[Toyota Tapestry Grants for Science Teachers](#)** -Recognizing projects that provide an innovative approach and a hands-on learning environment for K-12 science classes.

**[UNA-USA National High School Essay Contest](#)**

**[UnitedHealth Heroes Service Learning Grants](#)** -Youth-led community education projects in select states

**[United States Department of Agriculture Beginner Farmer & Rancher Development Program](#)** -Cooperative State Research, Education and Education Service (CREES)

**USDA Rural Development's Community Facilities Grants** -Grants for Farm to School initiatives in rural communities with less than 20,000 people.

**USDA Peoples Garden School Pilot Program** -One grantee will be selected to enter into a cooperative agreement for the purposes of developing and running community gardens at eligible high-poverty schools; teaching students involved in the gardens about agriculture production practices, diet, and nutrition; contributing produce to supplement food provided at eligible schools, student households, local food banks, or senior center nutrition programs.

**Volvo Adventure with the United Nations Environment Program** -Rewarding environmental activities outside of the classroom. To enter, students must form a team of two to five members, ages 13 to 16 years, and perform an environmental project in their local communities.

**Washington Parks & People Community Harvest Mini-Grants** -Washington DC

**Welch's Harvest Grants - Feb 11, 2011**-Winning schools will receive a customized indoor or outdoor garden package filled with a variety of tools, seeds, educational materials, and more.