



# NPSNJ Native Plant School Guide



## What are native plants?

Native plants grew in New Jersey before European colonists arrived. They have formed symbiotic relationships with native wildlife over thousands of years, and therefore offer the most beneficial and biodiverse habitats.

## Why are native plants important?

Native plants create sustainable landscapes by sequestering carbon, managing stormwater runoff and regenerating soil. They are better adapted to their environment than non-natives, require no fertilizer and are better equipped to defend against disease and predators, eliminating the need for pesticides. Watering is required during the first summer. After the first season, no additional watering beyond rainfall is usually necessary.

## Why should schools plant natives?

### Foster an understanding of healthy ecosystems

Native plants and animals are intricately tied to one another for survival. Most insects lay their eggs on one or a few native plants, called host plants. Monarch butterflies, a well-known example, lay eggs only on milkweed. That milkweed is crucial food as the larvae emerge from their eggs and grow into caterpillars. No milkweed, no monarchs.

Most land birds rely on the insects that native plants attract. Birds need caterpillars to feed their babies. According to Dr. Doug Tallamy, chickadees need 350-570 caterpillars a day to feed three chicks. It takes sixteen days for chicks to leave the nest. That totals roughly 6000-9000 caterpillars to raise one brood.

Plants provide food and habitat for all types of insects, which in turn pollinate the plants that grow into the fruit and vegetables we eat.



*Garden at Watchung School in Montclair, NJ*

### Bring the classroom outside

Native plants attract insects and birds for study up close. Exploring nature in all its seasons helps children concentrate better, has a calming effect and improves mood.

### Promote environmental literacy

Students are the future stewards of the earth. To succeed, they need an understanding of how all life forms are interconnected, with plants being the backbone of all ecosystems.

We are in the midst of a biodiversity crisis, with insects and birds decreasing rapidly. Even a small garden provides a wondrous place to learn while offering a safe haven for wildlife.

Inside you'll find a garden design, a selection of recommended native plants, gardening best practices and ways to reinforce the New Jersey student learning standards. In addition to online resources, we've specified plants for the northern part of the state, which can be adapted to most of NJ except coastal areas.

# The Native Garden Ecosystem

All of life's energy comes from the sun. Plants turn that energy into an edible buffet of berries, nectar, pollen, leaves and roots. They do something humans and animals cannot do — make food out of sunlight through the process of photosynthesis. A healthy ecosystem starts with a balance of producers and consumers, and sustainable conditions for the interdependent groups to survive and thrive. Pollinators are critical: 87% of plant species require insects in order to pollinate, bear fruit and make more plants.

**“Without insect pollinators, 80% of all plants and 90% of all flowering plants would disappear, as would the food webs that support mammals, reptiles, amphibians, birds, and freshwater fishes.”**

— Douglas W. Tallamy, Professor of Entomology and Wildlife Ecology, University of Delaware



One of the first plants to bloom in spring, columbine's elongated, tubular flowers require pollinators adapted to this kind of flower with long tongues — like hummingbirds, bees and the hawk moth.



The Monarch lays its eggs on milkweed, which is the only plant its caterpillars can eat. The caterpillars have evolved to tolerate the toxins in the sap that make them taste bitter, which deters predators.

## PRODUCERS

Most plants create their own nutrients from sunlight and are the foundation of the food web.



Asters grow all over North America and support an array of pollinators in fall, when many other flowers have faded. Asters are a favorite nectar source for migrating Monarchs.

## CONSUMERS

These eat producers, sometimes other consumers, or both. Insects are primary consumers, eating leaves and providing themselves as a protein feast for a diverse variety of food webs. Many species need insects in order to digest plant protein.

Birds such as the American Goldfinch, Blue Jay and Northern Cardinal all eat the seeds of aster and coneflower.



© Janet Markman



This White-eyed Vireo and 96% of terrestrial birds survive by eating insects. For young birds, soft-bodied, easy-to-swallow caterpillars are high in protein and contain lipids, antioxidants and carotenoids that contribute to the colorful pigment of their feathers.

© Douglas Tallamy



The native lady beetle consumes up to 50 aphids per day. Beneficial insects can help control garden pests naturally. Avoid pesticides, which harm these friends of the garden.



© Douglas Tallamy

Oaks are a keystone species, supporting the largest number of insects and birds. Blue Jays love the acorns, and their habit of burying them for later can result in new oak trees!



The springtail is one of many arthropods that shred dead plant material and other organic materials, starting the process of becoming soil again.



Fungi in the soil help decompose and exchange nutrients with plants. Mostly unseen organisms process dead plant or animal material, recycling nutrients back into soil and creating clean air and water.

## DECOMPOSERS

Decomposers are consumers that play a special role in the flow of energy through an ecosystem. Insects, microorganisms, fungi, bacteria, and larger scavenger animals break apart dead organisms into simpler inorganic materials, making nutrients available to primary producers.

Many insects, mites, worms and fungi do their work under leaf piles, in decaying wood, and in dead plants that have fallen to the ground.

# Supporting A Native Ecosystem

Native plants act as vital support for insects and wildlife. From trees to shrubs to herbaceous perennials and ground covers, native plants fit gardens of every size and type. The food chains created by native plants are everywhere: meadows, forests and rivers, as well as our own yards, parks and school grounds. One example is the serviceberry, which allows students to observe up close the ways it provides nectar, pollen, berries, leaves and shelter.



## POLLINATORS

More than 300 species of native bees live in NJ. In early spring when there are few flowers, emerging native bees and butterflies appreciate the blooms of the serviceberry.



## BIRDS

In early summer, robins, thrushes and Cedar Waxwings feast on the berries.



## NESTING

Trees provide structure for nests. Even fallen logs and dried twigs can be used for nests or winter cover.



## CATERPILLARS

Serviceberry leaves are a favorite of the Red Spotted Purple butterfly, which lays its eggs on the tips of the leaves. When larvae emerge, they have an instant food source. Over 100 butterflies and moths depend on the leaves to survive.



© GNPS/Ellen Honeycut



## LEAVES

When the serviceberry drops its leaves in fall, leave them on the ground. As leaves decompose, nutrients are carried back to the soil. It's nature's perfect mulch.



© Douglas Tallamy

## Leave the leaves around your trees to create a soft landing for insects.

In autumn and winter, fallen leaves protect life, offering insects refuge from winter and protection from predators. Many caterpillars drop from the tree and complete their life either in the ground as a pupa or cocoon in the leaf litter. Fireflies spend 95% of their lives as larvae and up to two years in leaf litter before pupating into adults. Rake the leaves into a protected space and tread lightly so that new life can emerge once again in spring. Avoid using leafblowers because they harm overwintering insects.



Fritillary egg



Late instar caterpillar



Great Spangled Fritillary

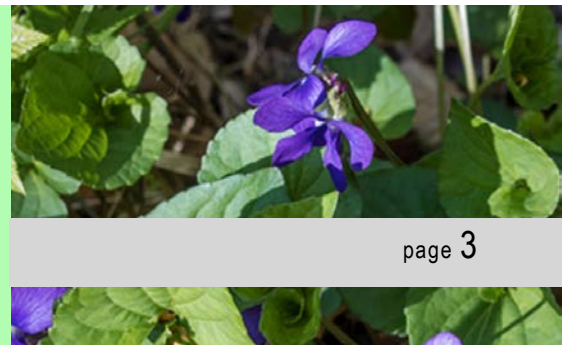
A chrysalis camouflaged in leaves



© 2009 Sara Bright

## Fritillary Butterflies

The violet, NJ's state flower, is the host plant on which fritillary butterflies lay eggs and feed larvae. The violet patch works as a safe cover for growing caterpillars.










# Garden Design for Sun or Part Sun

This garden design is one example of how you can attract pollinators and provide food and habitat for insects and birds all year. We've chosen plants that require some sun, medium moisture, are easy to grow in most conditions and perennial, meaning they come back each spring. They are mostly deer-resistant and together support hundreds of species of butterflies and moths.

Trees and shrubs support insects, provide winter habitat for birds and wildlife and offer shade for students.

Plants with overlapping bloom times provide bees, butterflies and birds with a steady source of food. Early blooms give vital nutrients after winter.

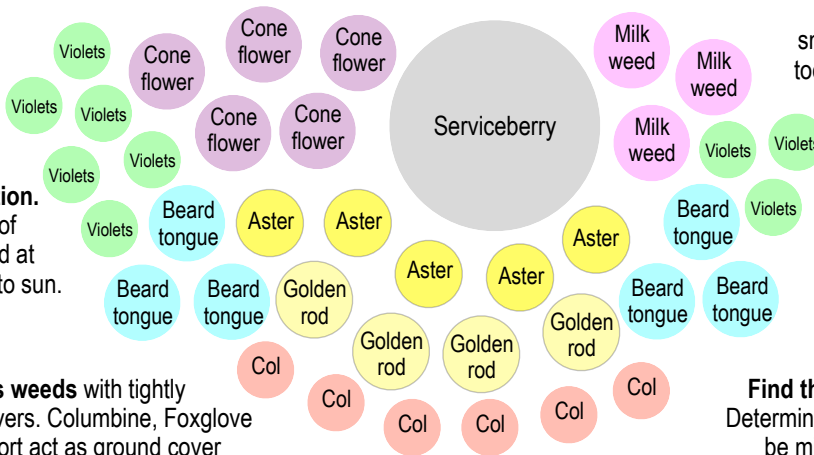
Late season flowers help insects prepare for winter. Leave the leaves, stems and seed heads for food and nesting sites.

Trees/Shrubs	Ground Cover	Spring	Late Spring	Summer	Late Summer	Fall
						
<b>Serviceberry</b> White flowers in March-April offer valuable nectar for native bees. Edible purple berries follow in June and are eaten by birds and mammals.	<b>Violets</b> In March-May, blooms of the NJ state flower are an important food source for emerging bees and insects. Add more ground covers like Moss Phlox and Pussytoes if room.	<b>Red Columbine</b> Red and yellow bell-like flowers appear in April-May to provide nectar for insects and hummingbirds. Plants form seed pods and can self seed.	<b>Foxglove Beardtongue</b> Clump-forming with white flowers in May-June. Semi-evergreen foliage and long-lived blooms. Not to be confused with non-native foxglove.	<b>Purple Coneflower</b> Pink flowers with spiny centers bloom throughout summer, offering nectar for insects. Its seeds are loved by the American Goldfinch, New Jersey's state bird.	<b>Swamp Milkweed</b> Fragrant pink flowers appear in July-August, followed by large pods full of seeds and floss. It's a food source for pollinators and Monarch caterpillars.	<b>Wreath Goldenrod &amp; Aromatic Aster</b> This brilliant yellow and purple combination is a beacon for pollinators in August-October when nectar sources diminish.

## Design your garden

**Start small and grow from there!** Use this 10 x 20 foot garden design as a guide. Depending on garden size, increase or reduce the numbers of each plant you use. Add one or two of the suggested shrubs (on page 5) to establish a garden quickly. Coral Honeysuckle adds beauty to vertical surfaces like a trellis or fence.

**Plant in groups of 3-5** of the same plant so they will be easier to study and for insects to find their way.



**Create a focal point and structure** with a small tree or a shrub. For small gardens where a tree may be too large, try Highbush Blueberry or Chokeberry, which flower and produce fruit.

**Experiment with color and proportion.** Varying heights create better choice of habitat. Put smaller plants in front and at edges so they get enough exposure to sun.

**Leave space along borders** for students to experiment with growing new plants from seed each fall.

**Retain moisture and suppress weeds** with tightly spaced, low-growing ground covers. Columbine, Foxglove Beardtongue and Golden Ragwort act as ground cover once spent flower stems are trimmed away.

**Find the right plant for the right place.** Determine soil type and site conditions and be mindful of mature size so you select plants appropriate for the space.

Have fun! Experiment and expect the garden to evolve from year to year. Most perennials will seed and spread when planted in favorable conditions. Students will enjoy caring for and moving plants around. Some plants will bloom in the first year, but it can take two to three years for a garden to fully establish.

# Expanded Plant List for Sun/Part Sun

The native plants below were selected for beauty and interest while students are in school, and their value to insects, native bees, birds and wildlife throughout the year. They are grouped into color-coded sections based on the design shown on the previous page with the recommended plant denoted in **bold**, as well as alternates. We've chosen plants considered easy to grow and adapted to a variety of soil and moisture conditions. See pages 6-7 for more information.

	Name Common, Scientific	Height	Bloom/Fruit Time & Color M A M J J A S O							Characteristics (DR = Deer Resistant*)	
Trees/Shrubs/Vine	<b>Serviceberry</b> , <i>Amelanchier canadensis</i> **	15-25'								DR	
	Highbush Blueberry, <i>Vaccinium corymbosum</i>	6-12'								Colorful fall foliage, requires acidic soil	
	Red Twig Dogwood, <i>Cornus sericea</i>	7-9'								Colorful fall foliage, winter interest	
	Arrowwood Viburnum, <i>Viburnum dentatum</i>	6-15'								DR, fall foliage, need two for berries	
	Coral Honeysuckle, <i>Lonicera sempervirens</i>	8-15'								Vine with intermittent blooms until frost	
	Winterberry Holly, <i>Ilex verticillata</i>	6-12'								DR, need male for berries on female	
	Inkberry Holly, <i>Ilex Glabra</i>	6-8'								Evergreen, need male for berries	
	Virginia Sweetspire, <i>Itea virginica</i>	3-8'								Colorful fall foliage	
	Black Chokeberry, <i>Aronia melanocarpa</i>	3-5'								Colorful fall foliage	
Ground Covers	<b>Violet</b> , <i>Viola sororia</i>	4-6"								DR	
	Moss Phlox, <i>Phlox subulata</i>	3-6"								DR, semi-evergreen	
	Pussytoes, <i>Antennaria plantaginifolia</i>	3-6"								DR, semi-evergreen	
Herbaceous Perennials	<b>Eastern Red Columbine</b> , <i>Aquilegia canadensis</i>	12-36"								DR	
	Heartleaf Golden Alexander, <i>Zizia aptera</i>	12-30"								DR	
	Golden Ragwort, <i>Packera aurea</i>	6-18"								DR, semi-evergreen, spreads rapidly	
	<b>Foxglove Beardtongue</b> , <i>Penstemon digitalis</i>	36-60"								DR, semi-evergreen, spreads rapidly	
	Blue False Indigo, <i>Baptisia australis</i>	24-48"								DR, seed pods that rattle, slow growing	
	Eastern Bluestar, <i>Amsonia tabernaemontana</i>	24-36"								DR, yellow fall foliage, slow growing	
	<b>Purple Coneflower</b> , <i>Echinacea purpurea</i>	24-48"									
	Cardinal Flower, <i>Lobelia cardinalis</i>	24-48"									DR
	<b>Swamp Milkweed</b> , <i>Asclepias incarnata</i>	36-60"									DR, interesting seed pods
	False Sunflower, <i>Heliopsis helianthoides</i>	36-60"									DR
	<b>Wreath Goldenrod</b> , <i>Solidago caesia</i>	18-36"									DR
	<b>Aromatic Aster</b> , <i>Symphotrichum oblongifolium</i>	24-36"									DR, compact shrub-like form
Little Bluestem, <i>Schizachyrium scoparium</i>	24-48"									DR, turns bronze-orange after frost	

\*Deer resistance varies widely depending on environment/conditions.

\*\*For smaller gardens, consider the cultivar 'Autumn Brilliance'.

= Flower color  
 = Berry color

# Ecological Value of Native Plants

All of these plants provide high-quality pollen and nectar that attracts native bees, pollinators and beneficial insects. Additionally, many of the trees and shrubs offer berries that bring birds to the garden. In choosing these recommendations, we have prioritized **host plants**, which are plant species that a caterpillar must feed upon to become a butterfly or moth.

## Trees & Shrubs



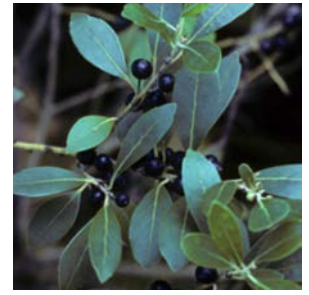
**Arrowwood Viburnum**  
*Viburnum dentatum*  
Host to 100+ butterflies & moths,  
including Spring Azure



**Black Chokeberry**  
*Aronia melanocarpa*  
Host to 5+ butterflies & moths,  
including Coral Hairstreak



**Highbush Blueberry**  
*Vaccinium corymbosum*  
Host to 270+ butterflies & moths,  
such as Pink-edged Sulfur



**Inkberry Holly**  
*Ilex glabra*  
Host to 40+ butterflies & moths,  
such as Henry's Elfin



**Red Twig Dogwood**  
*Cornus sericea*  
Host to 115+ butterflies & moths,  
including Spring Azure



**Serviceberry**  
*Amelanchier canadensis*  
Host to 100+ butterflies & moths,  
like Red Spotted Purple and  
Striped Hairstreak



**Virginia Sweetspire**  
*Itea virginica*  
Provides an important nectar  
and pollen source in late spring



**Winterberry Holly**  
*Ilex verticillata*  
Host to 40+ butterflies & moths,  
such as the Harris's Three Spot

## Vines



**Coral Honeysuckle**  
*Lonicera sempervirens*  
Host to 30+ butterflies & moths,  
such as Snowberry Clearwing

## Plant Names: Straight Species or Cultivars?

Our plants have both common and scientific names. A plant can have several common names so the scientific name is more accurate. We list only straight species, which are plants that have just two words in their scientific name, such as *Amelanchier canadensis*. We generally recommend buying them because they co-evolved with native pollinators and thus support the most wildlife.

Cultivars are selected for size, hardiness, or aesthetic reasons and denoted with a third name in single quotes, such as *Amelanchier canadensis* 'Autumn Brilliance,' a more compact variety of the serviceberry. Some cultivars, like Autumn Brilliance, are useful if a smaller size is needed. However, it is wise to avoid any cultivars that change the color of flowers or leaves, because pollinators may not be able to identify them.

## Herbaceous Perennials



**Aromatic Aster**  
*Symphotrichum oblongifolium*  
Host to 100+ butterflies & moths;  
nectar source for migrating Monarchs



**Blue False Indigo**  
*Baptisia australis*  
Host to 20 butterflies & moths,  
such as Wild Indigo Duskywing



**Cardinal Flower**  
*Lobelia cardinalis*  
Host to 5+ butterflies & moths,  
such as Pink-washed Looper



**Eastern Bluestar**  
*Amsonia tabernaemontana*  
An important nectar source in  
late spring/early summer

## Herbaceous Perennials, continued



**Eastern Red Columbine**  
*Aquilegia canadensis*  
Host to 10+ butterflies & moths;  
attracts hummingbirds



**False Sunflower**  
*Heliopsis helianthoides*  
Supports bees, butterflies, beneficial  
insects & hummingbirds



**Foxglove Beardtongue**  
*Penstemon digitalis*  
Host to 5+ butterflies & moths;  
a native bee favorite



**Golden Ragwort**  
*Packera aurea*  
Host to 2 butterflies & moths, like  
the Northern Metalmark



**Heartleaf Golden Alexander**  
*Zizia aptera*  
Host to 3 butterflies & moths,  
such as Black Swallowtail



**Purple Coneflower**  
*Echinacea purpurea*  
Supports a multitude of  
pollinators throughout the  
season; attracts goldfinches



**Swamp Milkweed**  
*Asclepias incarnata*  
Host to 10+ butterflies & moths,  
including the Monarch



**Wreath Goldenrod**  
*Solidago caesia*  
Host to 120+ butterflies & moths,  
such as the Brown Hooded Owllet

## Ground Covers



**Little Bluestem**  
*Schizachyrium scoparium*  
Host to 8+ butterflies & moths,  
like the Leonard's Skipper



**Moss Phlox**  
*Phlox subulata*  
Host to 5+ butterflies & moths,  
such as Olive Arches



**Pussytoes**  
*Antennaria plantaginifolia*  
Host to 3 butterflies & moths,  
such as American Painted Lady



**Violets**  
*Viola sororia*  
Host to 25+ butterflies & moths,  
like the Great Spangled Fritillary



Columbia  
High School  
Maplewood, NJ

## How to Buy

To get the most value for your budget, for perennials other than trees or shrubs we suggest planting plugs. For around \$2-4, you'll get a plant that may look small but has an extensive root system that establishes quickly. For a list of native plant nurseries, visit <https://npsnj.org/native-plants/where-to-buy-natives/>. Groups such as the Native Plant Society host spring and fall plant sales. Order online from:

*For plugs:*

Izel Plants ([izelplants.com](http://izelplants.com))  
Pinelands Direct ([pinelandsdirect.com](http://pinelandsdirect.com))  
The Pollen Nation ([thepollennation.com](http://thepollennation.com))

*For plants:*

Toadshade Wildflower Farm ([toadshade.com](http://toadshade.com))  
Wild Ridge Plants ([wildridgeplants.com](http://wildridgeplants.com))

# Bringing the Classroom Outside

Creating a native plant garden opens the door to experiential learning for students. An extension of the traditional classroom, it serves as a gateway to exploring the natural world. Although sectioned by subject, many lessons are interdisciplinary. These ideas are meant to inspire or enhance existing lessons. Children make unforgettable connections to academic content when given the opportunity for personal observation and hands-on learning.

50 lesson  
plan ideas

## Math

Math is everywhere in the garden. It's a place to collect and interpret data, count, measure and graph. Gardens put math in a real-life context, making it more engaging and accessible to students who struggle with abstract theory.

**Scavenger hunt:** Hunt for shapes, symmetry, colors, textures.

**Symmetry:** Find objects with one or more lines of symmetry or different types of symmetry.

**Counting:** Create counting cards using objects from the garden: 3 red leaves + 2 pine cones =

**Data collection:** Sort items by color, shape, size, species or individual characteristics. Count and display data in charts like pictographs or bar graphs.

**Graphing:** Make a line graph of plant growth over a period of time. Make bar graphs or pictographs to show quantities of different plants.

**Estimating:** Collect multiples of objects (seeds, pile of leaves, rocks, etc.) in jars and have students estimate quantities.

**Estimating the height of a tree:** Use the pencil-partner method, look between the legs method, "stick trick" or the shadow method.

**Ratios and percentages:** Collect and sort leaves and seeds or tally different types of plants according to a characteristic. Then calculate ratios and percentages.

**Mapping:** Draw a map of the garden to scale.

**Calculating perimeter:** Trace a leaf, use string to outline the leaf, then measure string.

**Area:** Give each student 4 feet of yarn with ends tied together. Allow them to make a square foot out of yarn and task them to calculate the area of the garden or section thereof.

**Identifying patterns:** Find patterns in nature and calculate the Fibonacci sequence.



Fold a paper in half with one-half of insect's body. Paint body.

**Symmetry**  
Identify insects in the garden and explore how their anatomy is bilaterally symmetrical.



Fold paper over and press. Unfold and reveal symmetry.

## Educational Resources

These resources can help in developing lesson plans for the outdoor classroom. Many of the activities can be adapted for students with diverse learning needs.

**gardening.org** Gardening tips, DIY projects, educational resources  
**homegrownnationalpark.org/book-launch/** Nature's Best Hope (young readers edition)  
**jmgkids.us** Junior Master Gardener training and curriculum  
**kidsgardening.org** Lesson plans, webinar series, activities and grants  
**nwf.org** National Wildlife Federation Connecting Kids and Nature  
**njaudubon.org** "Bridges to the Natural World" Natural History Guide  
**njclimateeducation.org** Climate change resources built on NJ Learning Standards  
**outdoorlearningstore.com** Supplies, funding sources, workshops  
**plt.org** Project Learning Tree educator guide and activities  
**seedyourfuture.org** Horticultural careers, resources, blog and research  
**wildflower.org** LBJ Wildflower Center's Outdoor Learning Environments  
**xerces.org/xkids** Activities, education resources and badges



## A Lesson on Camouflage

**Materials:** Ten pieces each of at least five different colored 2- to 3-inch pipe cleaners.

**Essential Questions:** What is camouflage and how does it benefit insects?

**Method:** Prior to bringing students outside, scatter pipe cleaners, some well camouflaged, others not.

- Tell students they will be hungry birds looking for caterpillars (pipe cleaners).
- Allow students 20 seconds to find as many “caterpillars” as they can.
- Gather and ask students to explain where they found each caterpillar. Sort findings.
- Discuss: Are there more of one color than another? Why? Was it easier to find green pipe cleaners on something brown or something green?
- Discuss what camouflage is and how it helps insects like caterpillars hide from predators.



## Science

**A garden is an outdoor laboratory — a place to observe the interdependence of organisms, biodiversity, sustainability and climate change. A garden full of life gives students the opportunity to observe, question and reflect as scientists.**

**One square foot:** Mark out one square foot with string. Students observe what they see and draw and describe their findings.

**Leaf classification:** Sort leaves by shape, by edge or margin, and by veins.

**Identifying birds:** Take pictures of common birds seen in the garden and create a dichotomous key, which is an identification chart students can use to identify birds.

**Seed dispersal methods:** Explore the ways plants distribute their seeds — by wind, water, animal, gravity, explosion. Create your own dispersal systems with paper (glider, rotocopter, spinner).

**Life cycles:** Study an insect life cycle, such as the Monarch butterfly, including migration.

**Food chains and food webs:** Using pictures of animals, plants and the sun, have students sit in a circle and create a food web by passing a ball of yarn between animals and plants that depend on one another.

**Ecological relationships between species:** Learn the meaning behind 5 symbiotic relationships in nature — predation or parasitism, competition, mutualism, commensalism and amensalism. Look for examples of the relationships in the garden.

**Seasonal habitat study:** Pick an animal seen in the schoolyard habitat and research where the animal lives and how it behaves in different seasons. Make a diorama depicting the animal’s behavior.

**Early spring invertebrates:** Tally invertebrates as insect and non-insect, observe their activity and record air and soil temperatures to understand how temperature affects animal activity.

**Weather tracking:** Use different methods for tracking and measuring weather patterns and seasonal changes.

**Biogeochemical:** Show how water, carbon, nitrogen and phosphorus cycle through the garden.

**Geotropism:** Examine the effects of gravity on plant growth, and difference between positive and negative geotropism.

**Biomimicry:** Identify forms, patterns, processes and ecosystems found in nature that inform human technology or design.

**Soil testing:** Perform soil testing to determine if soil is nutrient deficient for types of plants in your garden. Create your own compost and test that to compare. Use results to amend garden soil if needed.

**Soil composition:** Perform sieve, jar and ribbon tests to determine composition of soil samples.

**Worm race:** Time how long it takes worms to burrow into loose soil versus compact soil.

**Gardening to restore soil health:** Understand phytoremediation or using plants to remove contaminants from soil.

# Bringing the Classroom Outside (continued)

**See Think Wonder charts:** Pick a natural object or area of the garden. What do you SEE? What do you THINK to be true about what you see? What do you WONDER about what you see?

**Poetry quick-writes:** Start with an item, a topic or a line of a poem about nature and give students 2-3 minutes to write everything that they thought of about the topic — words, phrases, feelings, observations. Do this several times with different topics/lines of poems. What they come up with are great poem starters.

**Adjectives:** Explore the garden using all 5 senses. Write down observations using as many adjectives as possible.

**Garden vocabulary:** Identify and recognize letter sounds of flowers and pollinators that visit the garden. Create a glossary of terms learned in the garden.

**Plant growth journaling:** Use math, observation and writing skills to create a journal about stages and characteristics of plant growth.

**Object-based storytelling:** Find an object in the garden that holds personal meaning and write about the memory.

**Circle storytelling:** Group a small number of students together in the garden in a circle. Together they will create a verbal story using where they are as a setting. One person starts and says 1-3 sentences, then passes the storytelling to the next person, who builds off the previous person's story.

**Senses garden walk:** Individuals can journal or students can partner up to identify what they see, hear, smell and touch.

**Research project:** Choose a species or plant from the garden to research.

## History, Foreign Language, Visual & Performing Arts

Gardens are a setting for historical and cultural practices, events, art and music. Find topics to study where the garden acts as a living background.

**History in the garden:** Research historical practices in agriculture that emerged in different cultures and/or the origins of specific plants or planting customs in different parts of the world.

**Herbal remedies:** Explore both cultural and scientific uses of plants.

**Indigenous plant use:** Research how Native Americans viewed and used plants.

**Plant labels:** Use tags/labels to identify plants or flower colors in different languages.

**Leaf rubbings:** Discover how nature inspires art by studying shapes, edges and venation.

**Chlorophyll prints:** Develop images directly onto leaves through the action of photosynthesis or create cyanotype prints using SunPrint Solar Paper.

**Still life painting:** Compose and paint a plant or flower, or even the whole garden.

**Sculpture:** Add texture and dimension by creating 3D art to place among plantings.

**Dramatize a seed's journey:** Have children act out what happens when a seed travels from its mother plant to the place it lands and begins to grow.

## Language Arts

Mounting research suggests that spending time outdoors in a garden soothes the mind, lowers stress hormones and improves mood. It's the optimal state of mind for reading and writing. The plants in a garden are fodder for vocabulary building, journaling, poetry and narrative writing.



Students of all ages can sharpen their observation skills by keeping a garden journal. Data and insights captured can enhance learning of the core curriculum:

- date and time of day
- observations in words, sketches and numbers (count)
- how does it make you feel?
- what other questions arise as you record your experience?

# Gardening Best Practices

*Here are some key considerations when growing a native plant garden at your school*

**Get permission from your principal and school district**, especially if construction is involved. Contractors may need certain state licenses to work on public land.



**Form a group to help with planning, funding and planting.** Have a long-term plan for maintenance. Create partnerships with the PTA, county Master Gardeners or local gardening club. In-kind donations and grant money are available from local organizations.



**Know your soil.** Good soil feels crumbly and drains well. Natives are adapted to grow in many types of soil, requiring little to no fertilizer. Soil tests are available through Rutgers.

**Retain moisture with mulch** or use groundcovers as a living mulch to minimize weeds.

**Start small.** Get to know a small group of plants and then expand the garden. This requires a modest budget. Raised beds or pots can be used.



**Document and keep records**, including plant inventory, garden sketches and photos, to track what has been planted and to note observations of how it's growing.



**Label each plant or grouping.** It's important to know what has been planted when the plants emerge the following spring.

**Avoid pesticides in native gardens** because they kill the wildlife you are trying to attract. Birds and beneficial insects will eat the insects that are considered pests.

**Have a plan for watering** the first year while the roots establish. Natives will need watering the first summer after you plant but not usually thereafter, as native plants are adapted to local weather patterns.



**In the fall, leave the leaves and stems** to create a winter garden. Birds feed on seed heads and many pollinators overwinter in leaves and stems.



**Wait until mid-May or later to clean up the garden** after new growth emerges and pollinators and other insects have emerged from overwintering.

**Protect your garden.** Add signs and borders to let people know it's a garden.

**Make it easy for all to care for the garden** by providing accessible raised height beds and tools and equipment that are easy to use (universal design).

# Garden Maintenance Checklist

Maintaining a school garden requires teamwork and long-term planning. Often gardens are started by enthusiastic parents, and when their kids graduate the gardens lack continuity of care.

Here is a checklist of best practices to guide caretakers of the garden for success:

- ✓ **Have a designated teacher as school advocate** and check in regularly with teachers to include the garden in lesson plans.
- ✓ **Form community partnerships.** For example, partner with Master Gardeners for knowledgeable volunteers and resources.
- ✓ **Secure resources from school or PTA budget.** Gardens need periodic mulch and plant replenishment, which cost money. Pursue fundraising or grant money if needed.
- ✓ **Involve students, teachers, scout troops and volunteers** to help with upkeep and check in on the garden during the summer if not on an extended school year schedule.
- ✓ **Keep records that can be passed on year-to-year** so that future caretakers are familiar with the plants and what has been done to maintain the garden.
- ✓ **Include professional development for teachers** to make use of the garden to enhance their curriculum and lesson plans.
- ✓ **Educate school groundskeepers about the garden** so they don't weed whack it and instead can help with its upkeep.

## Additional Resources

Native Plant Society of New Jersey ([npsnj.org](http://npsnj.org))  
Jersey-Friendly Yards ([jerseyyards.org](http://jerseyyards.org))  
The Native Wildlife Federation ([nwf.org/nativeplantfinder/](http://nwf.org/nativeplantfinder/))  
Lady Bird Johnson Wildflower Center ([wildflower.org](http://wildflower.org))  
Home Grown National Park, Douglas Tallamy ([homegrownnationalpark.org](http://homegrownnationalpark.org)) & "What's the Rush" video  
Mt. Cuba Center Research ([mtcubacenter.org/research/](http://mtcubacenter.org/research/))  
Audubon Society Plants for Birds ([audubon.org/plantsforbirds](http://audubon.org/plantsforbirds))  
Pollinator Pathway ([pollinator-pathway.org](http://pollinator-pathway.org))  
Monarch Watch ([monarchwatch.org](http://monarchwatch.org))  
The Nature Conservancy ([nature.org](http://nature.org))  
Gardening calendars from Margaret Roach's "A Way to Garden," ([awaytogarden.com/regional-gardening-calendars/](http://awaytogarden.com/regional-gardening-calendars/))



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***Our mission is to promote the appreciation, protection and study of New Jersey's native flora***

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- National Wildlife Federation ([nwf.org](http://nwf.org))
- NC Extension Gardener ([plants.ces.ncsu.edu](http://plants.ces.ncsu.edu))
- USDA-NRCS Plants Database ([plants.usda.gov](http://plants.usda.gov))
- U.S. Fish & Wildlife Service ([fws.gov](http://fws.gov))