

Selby Gardens Education Department
Teacher Resources

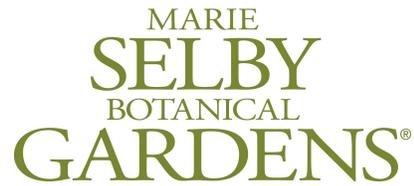
Native Florida Plants Curriculum

Third-Fifth Grades: Creating a Florida-Friendly Garden

Teacher-created Curriculum Resources Sponsored by:



(The following units have been designed & prepared by Barbara O'Brien, 2014)

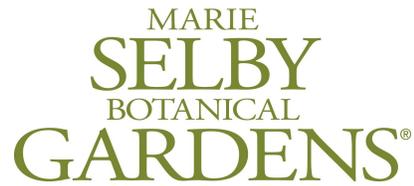


Curriculum Guide and Content Activities:

Reading/Writing, Math, Science, Art

Grade 3 Florida Standards

- SC.3.L.15.2 Classify flowering and nonflowering plants into major groups
- SC.3.N.1.6 Infer based on observation.
- SC.3.L.14.1 Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.
- SC.3.L.14.2 Investigate and describe how plants respond to stimuli (heat, light, gravity),
- SC.3.L.17.2 Recognize that plants use energy from the Sun, air, and water to make their own food
- SC.3.L.17.1 Describe how animals and plants respond to changing seasons.
- LAFS.3.L.3.6 Acquire and use accurately conversational, general academic, and domain specific words and phrases as found in grade appropriate texts, including those that signal spatial and temporal relationships (e.g., after dinner that night we went looking for them).
- LAFS.3.RI.1.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
- LAFS.3.RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
- MAFS.3.MD.2.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units' whole numbers, halves, or quarters



Grade 4 Florida Standards

- SC.4.L.16.1 Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.
- SC.4.E.6.6 Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).
- SC.4.E.6.5 Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things
- SC.4.L.17.1 Compare the seasonal changes in Florida plants and animals to those in other regions of the country.
- SC.4.L.16.4 Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.
- SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.
- LAFS.4.L.2.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening. Choose words and phrases to convey ideas precisely. Choose punctuation for effect. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion).
- LAFS.4SL.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 *topics and texts*, building on others' ideas and expressing their own clearly.
- MAFS.4.MD.1.1 Know relative sizes of measurement units within one system
- MAFS.4.MD.1.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Grade 5 Florida Standards

- SC.5.L.14.2 Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support -- some with internal skeletons others with exoskeletons -- while some plants have stems for support.
- SC.5.L.15.1 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.
- SC.5.L.17.1 Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.
- SC.5.N.1.1 Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics
- SC.5.N.1.2 Explain the difference between an experiment and other types of scientific investigation.
- SC.5.N.1.3 Recognize and explain the need for repeated experimental trials.
- SC.5.N.2.1 Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.
- LAFS.5.L.1.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. Demonstrate fluent and legible cursive writing skills
- LAFS.5.L.1.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. Use punctuation to separate items in a series. Use a comma to separate an introductory element from the rest of the sentence.
- LAFS.5.L.2.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style. Compare and contrast the varieties of English (e.g., dialects, registers) used in stories, dramas, or poems.
- LAFS.5.RI.1.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- MAFS.5.G.1.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates.
- MAFS.5.G.1.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Introduction

Native plants: Just what are they and why should we be planting them? Much of Florida was once ocean bottom, which means many plants, had to have originated somewhere else. Those we usually call “native” wandered in naturally long ago, brought by wind, sea, birds, animals, or other natural factors. They adapted to conditions here and grew in harmony with each other.

Exotics, on the other hand, are plants that have been introduced, either intentionally or accidentally. Florida botanists sometimes classify native plants as those that were growing here before the middle of the sixteenth century, when the Spanish colonists arrived.

Florida has a vast number of native plants, the third largest number of the 50 states, and while a good many plant communities still exist, development has taken a severe toll as housing, farming, logging, and ranching has destroyed huge areas of natural habits.

Robert G. Haehle Joan Brookwell, Native Florida Plants

Creating a Florida Friendly Garden

Objectives

Students will

- Identify the different parts of plants
- Create a seed traveler
- Understand and implement native plants to a designated area
- Design a Florida Friendly Garden
- Understand how a plant travels
- Be able to distinguish between species of plants

Vocabulary and Mini Activities to Build Understanding

Vocabulary : native, roots, stem, leaves, flowers, chlorophyll, photosynthesis, sugar, oxygen, carbon dioxide

- **Native** – Species that originated in a specific area.
- **Non-Native** – Species which did not originate in specific areas
- **Roots**- the part of a plant that grows underground, gets water from the ground, and holds the plant in place
- **Stem**- a plant part that supports another (as a leaf or fruit)
- **Leaves**- a growth from a plant stem that is typically a flattened expanded variably shaped greenish organ, constitutes a unit of the foliage, and functions primarily in food manufacture by photosynthesis
- **Flowers**- the part of a plant that is often brightly colored, that usually lasts a short time, and from which the seed or fruit develops
- **Chlorophyll**- the green substance in plants that makes it possible for them to make food from carbon dioxide and water
- **Photosynthesis**- the process by which a green plant turns water and carbon dioxide into food when the plant is exposed to light
- **Sugar**- any one of various substances that are found in plants and that your body uses or stores for energy
- **Oxygen**- a chemical that is found in the air that has no color, taste, or smell, and is necessary for life (plants give us oxygen)
- **Carbon dioxide**- a gas that is produced when people and animals breathe out or when certain fuels are burned and that is used by plants for energy (we breathe out carbon dioxide)

Activity

- Index cards to create vocabulary study cards on. Each student should write the word on the front and the definition on the back.
 - You can also have small pictures of each plant part on the card for visual recognition

Vocabulary: grabbers, floaters, wind drifters, and spinners

- **Grabbers** – seeds with little hooks or sticky substances which help them cling to animal fur and people’s clothes
- **Floaters** – seeds that float in water to a new location
- **Wind drifters** – seeds that glide easily in a breeze
- **Spinners** – seeds with wings that propel them with a spin to the ground

Activity

- Utilize the ***moving on activity*** to help students understand the process by which plants can transport.
 - **In school** –collect seeds outside on the playground, or look at purchased seeds
 - **Homework connection** - bring in seeds from home the whole family can get involved.
 - **Math** – Once seed travelers are made students can have a travel contest, measuring whose seed (paper clip) traveled the furthest.
 - **Creative writing** - “The Life of a Seed,” students can write stories about a single seed and how it traveled to Sarasota Florida. They can even have a seed on their desk for inspiration.
 - **Art** - create the students character from their book

Activity: Moving On

Materials:

- You can provide the supplies yourself, go outside and gather, or ask the students to bring in a variety of different seeds (milkweed, dandelion, cockleburs, pussy willows, sycamore seeds, maple seeds, acorns)
- Paper plates labeled grabber, floater, wind drifters, and spinners.
- Scraps of craft fur, wool sock or mitten, a stuffed animal, toys, straws, bowls or baking pans for water,
- Science journals

What to Do...

1. Assign students to groups of three.
2. Model how to do each test and how to sort the seeds on the labeled plates according to the test results.
 - Grabber test: Press a piece of fuzzy material or stuffed animal on top of the seed. If it sticks, place the seed on the grabber plate.
 - Floater test: Place the seed in water. If the seed floats, place it on the floater plate.
 - Wind Drifter Test: Blow on the seed gently with a straw. If the seed floats, place it on the drifter plate.
 - Spinner Test: Hold the seed above your head and drop it. If the seed spins as it falls, place it on the spinner plate.
3. As students complete the tests, have them write the results in their Science journal. Then instruct them to glue the seed to their plates.
4. Share and compare the results among the groups. Discuss any differences.

Critical thinking questions

Could any of the seeds fit into more than one group? Why would this help a seed?

What seeds would fit into any of the groups? (Acorns)

How else might a seed move to a good growing place? (Animals that eat a seed bearing fruit might expel the seeds in their waste; some plants have seeds that pop open to scatter their seeds)

Ask students what might happen if seeds fell in one place and tried to grow? (This is actually fun to do...I placed a variety of seeds in a shallow pan on wet paper towels and we created hypothesis about what would happen...Then we watched and took data on what we saw.)

Design a Seed Traveler

Use this activity as a creative extension of how seeds travel and as a way to incorporate critical thinking into the lesson.

Materials:

Balloons, plastic wrap, paper clips, foam peanuts, tinfoil, paper, tape, cotton, or anything the students can think of.

What to Do:

1. Show the class a paperclip. (I gave each group a different color.) Tell students to imagine that the paper clip is a seed. Ask students: *How might the paperclip seed travel to a new place so it can grow?*
2. After generating a few ideas, have students work in small groups. Explain to the students that they will be constructing a seed traveler with any of the materials provided. Discuss with the students how a parachute falls or a paper airplane glides. You can take about how a boat floats. What type of materials stick to things?
3. Have students work together to create a man-made seed traveler. They will need to be able to classify their traveler as a grabber, floater, drifter, or spinner. They should also be able to demonstrate how their paper-clip seed has become a better traveler.
4. Give all students an opportunity to comment on a group's traveler. *I liked how you...What if you...*
5. Have the students write up this activity in their Science Journals.

Vocabulary: Invasive, nutrients, photosynthesis, vascular, non-vascular, phloem, xylem, stoma, chlorophyll, and angiosperms.

- **Invasive** – plants, animals, or microbes that are introduced either intentionally (e.g. ornamental plants, food) or unintentionally (hitchhikers in plant shipments, in water, boats, animals.)
- **Nutrients** - a substance that plants, animals, and people need to live and grow
- **Photosynthesis** - the process by which a green plant turns water and carbon dioxide into food when the plant is exposed to light
- **Vascular** - relating to a channel for the conveyance of a body fluid (as blood of an animal or sap of a plant) or to a system of such channels
- **Non-vascular** - Non-vascular plants are plants without a vascular system (xylem and phloem). Although non-vascular plants lack these particular tissues, many possess simpler tissues that are specialized for internal transport of water.
- **Phloem** - a tissue of plants that contains tubes to carry dissolved food materials and that lies mostly outside the cambium
- **Xylem** - a tissue of higher plants that carries water and dissolved materials upward, functions also in support and storage, lies deeper inside the plant than the phloem, and usually makes up the woody parts
- **Stoma** - a small opening which is surrounded by two guard cells and through which moisture and gases pass in and out of the epidermis of a leaf
- **Chlorophyll** - the green coloring matter of plants that is found in chloroplasts and is necessary for photosynthesis
- **Angiosperms** – Flowering Plant

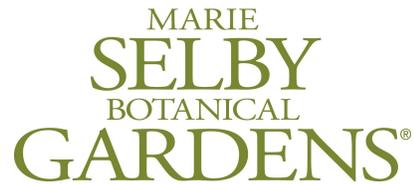
Activity

- Have the students create a vocabulary foldable.
- Students will need a large piece of white or light colored paper
- Colored pencils

Activity (This can be used for any of the vocabulary list)

	Definition	Definition	
Cut along lines...Stop			Cut along lines...Stop
<i><u>This side will fold in</u></i>	Definition	Definition	<i><u>This side will fold in</u></i>
Cut along lines...Stop			Cut along lines...Stop
Write vocabulary word on the outside along with a picture	Definition	Definition	Write vocabulary word on the outside along with a picture
Cut along lines...Stop			Cut along lines...Stop
	Definition	Definition	

NOTE: This can also be used as a study tool for students to take home and prepare for a vocabulary test.



PROJECT – Creating a garden with native plants

Pre-Visit Activity: Creating a Florida Garden

This project can be adapted to fit your location, availability to materials, and budget. You can create an actual garden on the school grounds, or tie your project to a community service organization. Another option is to create a virtual garden using technology. You may even want to create models of a garden utilizing many different mediums of art. The choice is yours.

Materials:

- Clip boards
- measuring tape
- Pencils
- Erasers
- Yarn
- Four large Popsicle sticks

Procedure:

www.fnps.com ...Florida Native Plant Society is a great resource for generating a list of native plants in your area.

At the top of the web page find native plants by region

follow the steps to create a list of plants that will help your students plan their garden.

NOTE: For third and fourth graders I would generate the list prior to planning the garden. You may also want to limit the list. For fifth grade I would have the students take an active part in the research

1. Split the students into groups of 4 to 6 depending on your class size.
2. The students will survey the school campus and decide the area they think would be best suited for a native Florida garden. If the area they choose is already occupied by plants, use the Schoolyard Plant Survey format.

MARIE
SELBY
BOTANICAL
GARDENS®

3. Have four different students hold Popsicle sticks to create the four corners of the garden area. Once the group decides on the size of the area the students can place the Popsicle sticks in the ground.
4. Use the string to tie the area off.
5. Measure the strings for length and width. This is where the students can make adjustments to the Popsicle sticks. They will want each length to be the same, and each width to be the same. (Older students will calculate the area.)
6. Next have the students photograph, or draw the area they wish to garden.
7. Once the students have their area planned out they can create layers, or different scenarios for how they want their garden to be structured.

Questions that may be posed to students...(have students generate their own questions)

- Where will your tallest plants be placed?
- What type (if any) of ground cover will you use?
- How tall will your tallest plant be?
- Do you want to attract butterflies?

NOTE: the first seven steps can be used no matter what format you are choosing to do as a final project

Visit Activity: Creating a Garden

Materials

- Garden plan
- Pencil
- Blank paper or science journal
- Camera, I-Pad or phone

At Selby Gardens students will be introduced to a variety of native plants that may make up the majority of their garden. The students can take their generated lists and compare it to the plants they see in Selby Gardens. As the students tour the gardens they will be able to decide which plants they may want to keep and others that they may want to use in their garden.

- Students should photograph the plants
- Make notes as to the conditions the plants will grow under.
- Make notes on whether the plants will flower, and when they will flower
- The availability of the plants to their area.

MARIE
SELBY
BOTANICAL
GARDENS®

- They students should also pick more plants than they need in order to compensate for any changes they may have to make to their original plan.

NOTE: If time allows and the students have a good understanding of the plants they may want to use this time to discuss their plan with a member of the Selby staff to get their input.

This step can be an opportunity to have students practice verbal communication and, note taking skills.

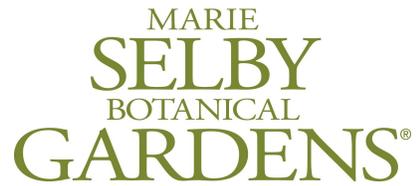
Post-Visit Activity: Creating a Garden

Now that students have their area planned out they can create layers, or different scenarios for how they want their garden to be structured.

- Have students look over their original plans to see if any changes need to be made.
- Have Students use the photographs they took to create a model of what their garden will look like. This may take several tries for students to be satisfied with the look of their garden.
- Third and fourth graders will work with their teachers to find out where to obtain their plants and all other materials needed to complete their garden.
- If using technology the students will need to find a way to create a 3D garden.
- Once students have all the materials needed they can begin to prepare the designated area. Once the soil is tilled have the students lay out their garden with the plants still potted.
- Once the students get the arrangement they desire then they can plant.
- Once all the plants are in and the students are satisfied with the look you can evaluate their understanding of the importance of native plants to our area.

Evaluation Ideas:

- The evaluation part of this activity can be done through an essay about the process from beginning to end, making sure that each student hits upon each important step that was taken to achieve their garden project.
- You can also have the students create an educational video about native plants to assess their understanding.



Plant Survey

Generate a list of plants that occupy the site that you have chosen for your garden. If you are unfamiliar with the plant then you can photograph it, look it up, ask an expert, or bring the photo with you to Selby for help identifying it.

- Pre-visit – the students will list the plants they see, the location and if they think they are native or non-native
- Visit – Students will bring their list with them to verify if the plants were in fact native or non-native.
- Post visit – Students can use the list to help them decide what types of plants they will have in their garden.

Schoolyard Plant Survey

Picture	Plant Name	Location	Native/Non-Native?	Invasive

MARIE
SELBY
BOTANICAL
GARDENS®

--	--	--	--	--

Resources:

Suggested Story Books:

From Seed to Plant, by Gail Gibbons

The Reason for a Flower, by Ruth Heller

The Magic School Bus - Plants Seeds, Scholastic

The Tiny Seed, by Eric Carle

The Reason for a Flower, by Ruth Heller

Teachers References:

Exploring the World, of Plants by Penny Raife Duran

Native Florida Plants, Robert G. Haechle and Joan Brookwell

Videos

Magic school bus goes to seed ...full copy on YouTube

Supporting Web Site

<http://floridayards.org/fyplants/>

<http://www.wordcentral.com/>

<http://www.fnps.org>

Activities: Moving On

Adapted from Scholastic Teaching Resources: Exploring plants Rebecca Olien

Resources

Florida Agriculture in the Classroom www.flagintheclassroom.com

Florida Aquatic Invasive Species www.floridaaquaticinvasivespecies.com

Florida Department of Agriculture and Consumer Services www.doacs.state.fl.us (click on kid's corner)

Florida Native Plant Society www.fnps.org

MARIE
SELBY
BOTANICAL
GARDENS®

Tampa Bay Estuary Program kid's page "Invaders" www.baysoundings.com

Games

Nab the Invader game www.sgnis.org/kids/