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Fall 2020: Girl Scout Gardener Badge Independent Study  
New Jersey Student Learning Standards used:

- 4th grade:
  - Steps 1, 3, 4, & 5: 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
  - Step 2 & 5: 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
  - All steps: 4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
  - Step 4 (Mathematics): 4.OA.A2, 4.OA.C5 (operations and algebraic thinking); 4.NF.A1, 4.NF.A2, 4.NF.B3 (numbers and operations- fractions); 4.MD.A1, 4.MD.A2, 4.MD.B4 (measurement and data)
- 5th grade:
  - Step 1, 2, 4, & 5: 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
  - Step 1, 4, & 5: 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.
  - Steps 1, 2, 4 & 5: 5-LS2-1. Develop a model to describe movement of matter among plants, animals, decomposers, and environment.
  - Steps 1, 2, 3, 4, & 5: 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
  - All steps: 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
  - Step 4 (Mathematics): 5.OA.A1, 5.OA.A2 (operations and algebraic thinking); 5.NF.B2 (numbers and operations- fractions)

*NOTE: Step 1 is an introduction to this gardener badge. While it does not specifically direct attention to a specific standard of NJSL, it does generalize specific standards that will become more clear as the Girl Scouts progress through the steps. In addition, step 5 allows the girls to pick one of the five options represented. This step also allows for flexibility for the girls to express what they have learned, as well as what they have personally taken from this experience. With that being said, all standards are equally relevant and can be found within the step 5 tasks.*

Hello fellow Girl Scout Leaders and thank you for choosing the Jersey-Friendly Yards compatible - five step gardener journey. Your Troop will be guided through multiple tasks in order to receive the foundational knowledge and learn appropriate gardening techniques using

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best practices, as provided by the Jersey-Friendly Yards website [www.JerseyYards.org](http://www.JerseyYards.org).

Specifically, Girl Scouts will learn the importance of native plants, the detriments of invasive plants, how to prevent water pollution through effective gardening, positive effects of gardening for wildlife, and concluding with their completion of the Junior Gardener Badge. These topics will be taught using the Jersey-Friendly Yards tools and resources, and bringing students attention to various articles, videos, and photos to support learning. Through each of the five steps, students will build on their previous knowledge of gardening in the state of New Jersey using New Jersey natives. The journey will begin at a more general level of gardening (step 1), leading towards specific garden design and why a design is important to our environment (step 2), followed by a narrowed approach to growing New Jersey native plants in healthy soil (step 3), continuing to a more inquiry-based learning approach through germinating seeds and observing the plant growth process (step 4), and finally, getting the word out and continuing gardening efforts in their New Jersey community (step 5).

Understanding that this five-step process can become complicated for young Girl Scout Troops, I have designed such steps to follow group activities that will be guided by the Troop Leader, as well as activities that will direct the leader to split their Troops into pairs/groups. It is important for the Girl Scouts to earn their badge through their own independent actions and understanding, however, the complicated components must be achieved with the assistance of the Troop Leader in order for the Girl Scout to continue successful garden learning.

Scouts will be guided through the five-step hands-on interactive learning process through instructions provided on the Ocean County Soil Conservation District's website: <https://soildistrict.org/girl-scout-gardener-badge/>. To see the original PPT format of the Girl Scouts' five-step guide, please reference this link: [Girl Scout Guide](#)

### **How I have created the Girl Scouts' version of the five-step Jersey-Friendly Yards Gardener Badge:**

Note: Some independent work requires a student to submit their work, including videos, posters, stories, etc. I have left it up to the Leader on instructing Scouts how to submit their work (online, email, in-person).

#### **Step 1: visit a garden**

The purpose of this step is to show Girl Scouts that (a) gardens are everywhere and (b) gardens are unique to the location they are in. The Girl Scouts will be asked to observe and think about the features of a garden and take into consideration what they observe independently. Understanding that some girls may not be able to get out and view a garden in person, I have provided multiple options for the Scout to view garden features. Options to complete step 1 are listed below (independent activity):

- a. Go to a garden!! If you can get out and go to a local garden, this would be the best option! Take pictures or videos of the garden and talk about what you love about this garden and what interested you the most about it. While you're there, think about how

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much sun is exposed to the plants, what the soil feels like and looks like, and what wildlife you see in the garden, and try to identify some of these plants and animals if you can.

- b. If you cannot visit a garden, you can view Rutgers' public gardens on their website: <https://rutgersgardens.rutgers.edu/gardens/>. Rutgers has various gardens to choose from with their own unique story. On the website, select from one of the many gardens that is featured on this page and click on the one that looks most pleasing to you. Observe the many pictures and talk about why you chose this garden from the selection, what you love about this garden, and what interested you the most. While viewing the pictures, observe the environment around the plants and see if you can identify the amount of sunlight the plants are getting. In addition, look for wildlife within the pictures or in the garden's description. Finally, make note of any plants you may have heard of before or look familiar to you. Since you cannot take pictures/video your own experience, copy and paste the pictures that were most interesting to you into a word document.
- c. Do you have your own garden at home? Great! Provide pictures/video of your garden, provide the names of the plants, provide clarification of how much sun the plants receive, what the soil feels like and looks like, what wildlife you see, and of course, tell what you love about your garden!

After providing these options, I have also asked the girls to reference a link:

<https://www.jerseyyards.org/create-a-jersey-friendly-yard/landscaping-design-examples/>

This link directs students' attention to various "Success Stories" in New Jersey of appropriate gardening. While not recommended to read by students, its purpose is to give the girls an idea of the many ways in which any ordinary New Jersey resident can make a change in their gardening practices and create a healthier environment. You may want to show your Troop this link as a group, as well as an introduction to this five-step process. This is an effective way for students to become engaged and confident that they can make a difference!

## **Step 2: explore garden design**

This step represents a jump to the specifics of gardening in New Jersey. In this step, it is important to understand that while we have interest and desires for what plants go in our garden, we must make sure it is not damaging to our New Jersey environment. In order to explain the "healthy" options, I have used the terms "native plant" and "in-between plant". The term "in-between plant" is a term I have personally generated to explain a plant that is not native, however, is not harmful to the New Jersey environment, which provides children with the understanding that these "in-between plants" are okay to grow! The Jersey-Friendly Yards website promotes both native and "in-between plants", collectively referred to as "Jersey-Friendly" plants. In addition, native plants are a "species that grow in a region without human introduction" (the definition can be found at this link: <https://www.jerseyyards.org/jersey-friendly-plants/native-plants/>). I have referenced this link for students to learn more about the term "native plant" in New Jersey. While I have defined the term for them, as a leader, you may want to review this link with them, as it is very educational to the importance of natives in New Jersey. Specifically, there is a section on this webpage titled, "Why grow native plants in your Jersey-Friendly yard?". This section is very informative to children in how they can create a better environment in their New Jersey home, as well as all the wonderful effects that come from our

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native plants! In contrast, it also provides some of the negative effects if we do not support the use of natives in our garden.

When providing a definition of “in-between plants” I have also included an example of a specific non-native plant. I used the Purple Coneflower, which is a non-native plant to New Jersey, however, is known to be a great species for New Jersey pollinators. For more information on this plant species, you can visit this link:

<https://www.highcountrygardens.com/perennial-plants/echinacea/echinacea-purpurea> . Because the term pollinator may be a tricky term for some young Girl Scouts, I have provided a definition of the term, as well as a link to an article and YouTube video that better explains the term. Both links also go into detail about the plant parts needed for pollination:

[https://www.fs.fed.us/wildflowers/pollinators/What\\_is\\_Pollination/](https://www.fs.fed.us/wildflowers/pollinators/What_is_Pollination/);

[https://www.youtube.com/watch?v=djPVgjp\\_bdU](https://www.youtube.com/watch?v=djPVgjp_bdU) .

After explaining the healthier options of plants when designing a garden, I have explained the dangerous plants. These plants are known as *invasive* plants and are known to be harmful to our environment, including wildlife, human life, and aquatic life. With this information, I have also referred the girls to visit this link in order to see the names of the many invasive species known to New Jersey: <https://www.jerseyyards.org/jersey-friendly-plants/invasive-plants/> .

Continuing with the invasive species, I wanted to emphasize the importance of the negative effects that these plants cause, as well as make children aware of the ways in which they are introduced into the environment. Specifically, I have explained how invasive plants can decrease the population of wildlife that is dependent on native plants, which can lead to a negative impact on human life (I have referenced this link for students to receive additional information on New Jersey wildlife: <https://www.jerseyyards.org/create-a-jersey-friendly-yard/pollinators/>). In addition, it is also essential for children to know how these invasive species can sneak their way into our gardens. Of course, it is because of us humans. It is impactful for the girls to understand that we are the cause of the unhealthy species to become a part of our environment, but we are also the solution! Girl Scouts must understand that it is important for everyone to be aware of invasive species.

In addition to humans putting invasive in our gardens (possibly due to being unaware of their dangers), humans also misuse fertilizers, leading to excess chemicals in our waterway, causing aquatic pollution known as eutrophication. The effects of fertilizers lead to polluted and sometimes harmful drinking water and decreased aquatic wildlife. With this information, I have referenced a link on fertilizers

([https://www.youtube.com/watch?v=6LAT1qLMPu4&feature=emb\\_logo](https://www.youtube.com/watch?v=6LAT1qLMPu4&feature=emb_logo)), as well as a link to fertilizer cause and effects in the Barnegat Bay (<https://www.jerseyyards.org/threats-to-bays-rivers/decline-of-barnegat-bay/>).

All of the information above (in step 2) is used as background knowledge in order for students to be able to effectively complete this step's task. In essence, the scouts must know the line between what is considered a healthy species and what is not, as well as how we can prevent these unhealthy occurrences. The process of these unhealthy occurrences becomes complicated, however, the solution is quite simple!

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Directions for step 2 (independent activity):

Plan before you plant! In order to complete this step, your scouts will be preparing to design their own garden. In order to do this, the girls will need a poster, crayons/colored pencils to draw their backyard. They will include any man-made features they see in their yard. After sketching these features, the girls will now use a checklist (view the highlighted checklist below) to get to know their backyard and examine all of the backyard's characteristics. These characteristics are important to create a healthy New Jersey garden. Using the checklist, the girls will draw symbols and take notes (on their posters) on important natural structures for planting (this task was generated using step 1 of the 8 step process: <https://www.jerseyyards.org/create-a-jersey-friendly-yard/8-steps/plan-before-you-plant/>).

**Checklist: Prepare before you plant:**

Do you already have plants in your yard? Draw a blue flower on your poster in the spot where you already have plants. Write the names of them next to your flower symbol

Are any of your plants invasive? Get rid of them! Draw a red colored flower in the areas that you have invasive plants and name them next to the symbol

draw your backyard trees! This will help you plant the species that need shade.

where do you feel the sun the most? Walk around your yard and draw an "X" on the spot that the sun feels the strongest!

Does your yard have any hills? If yes, draw a squiggle (~) to represent where the hill is. This could mean rain water will travel down the hill and get most water at the bottom.

if you said yes to having hills, jump on the ground at the bottom of the hill. Is the ground squishy and flooded with water? If it is, you must make sure not to plant in this spot! Write an exclamation mark (!) to remember that you can't plant here.

Where does your family and pets spend the most time in your backyard? Draw stick figures of your family members to represent where they spend the most time. We want to make sure our plants are in a safe space!

Where do you feel the summer breeze? Stand in your yard and close your eyes to feel the direction. On your poster, draw an arrow to where you feel the wind coming from.

Note: this step is just for the scouts to PREPARE to plant. They are only learning about what they must look for and the questions they must think about when planting. Actual planting becomes more complicated when taking into account New Jersey soils.

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**Step 3: find six plants to grow (recommended option for group activity!)**

This step is where plant growing becomes more complicated and it is recommended that the group leader is more involved! In this step, it is primarily important for students to not only understand New Jersey soils, but understand what soil is. As quoted by the Jersey-Friendly Yards website, Scouts must know that we can't "treat soil like dirt" (<https://www.jerseyyards.org/create-a-jersey-friendly-yard/8-steps/step-2-start-with-healthy-soil/>).

I began this step with a "KOL chart" to allow the girls to begin to think about what they already know about soil:



Things I Know	Things I Observe	Things I Wonder

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For a better understanding of what "soil" is, I have provided a YouTube video of a better explanation and introduction into soil and the importance of this step's task (YouTube video: <https://www.youtube.com/watch?v=if29mjcd5bc>). It is also projected to Scouts that understanding the soil in their yard will help them create lively and vibrant gardens! It is also important for the Scouts to understand that, while all soil may look the same, soils will vary from state to state, as well as from one house property to another. With this information, it is essential for the girls to understand that certain plants will live more successfully in certain soil types.

Following, scouts will now learn about the specific soils that are plentiful and most important in the state of New Jersey. They will be introduced to ways in which we can navigate the type of soils within certain parts of New Jersey; by our ecoregions. The



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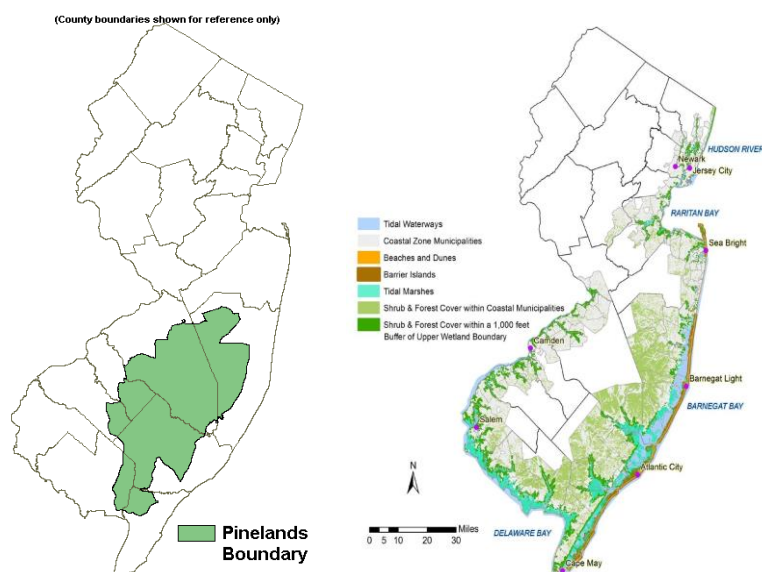
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term “ecoregion” is defined for the Girl Scouts and is a “Large area that includes generally similar ... environmental resources... [including] patterns of vegetation, animal life, geology, soils, water quality, climate, human land use, and other ecosystem components” (link to definition used: <https://www.jerseyyards.org/jersey-friendly-plants/plant-characteristics/>). Within this definition, I have brought to the girls’ attention that “soil” is one of the main contributors to an ecoregion’s characteristics.

After providing this general definition, I then lead the scouts into New Jersey’s well-known ecoregions. These ecoregions are known as the Pinelands (also known as Pine Barrens) and Barrier Island/ Coastal Habitat. Using the Jersey-Friendly Yards website, I have provided information on the type of soil that comes from each region, as well as the region’s visual features that make them diverse: The Pinelands are characterized by “sandy, acidic, well-drained, infertile soils, frequent fires, and extensive pine-oak woodlands” (<https://www.jerseyyards.org/jersey-friendly-plants/plant-characteristics/>). In contrast, the Barrier Island/ Coastal Habitat is characterized by “offshore deposits of sand ... separated from the mainland by a bay or other ...body of water. This ecoregion also includes mainland coastal areas along the bay or other tidal waterways” (<https://www.jerseyyards.org/jersey-friendly-plants/plant-characteristics/>).

In addition to this written information, I have also included two photos indicating where each region is located within New Jersey (shown below). Learning about ecoregions can become a complex attribute to this process, however, can serve to emphasize the purpose of appropriate gardening. The main information that is needed for this step is for the girls to understand what soil is and that soils vary from place to place. As a result, certain native plants and “in-between plants” will thrive more effectively, depending on the soil they are raised in.



If you would like to continue educating your Troop about ecoregions, I have referenced multiple articles, videos, and photos of the ecoregions. These references go

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into more detail about the soils, the regions' visual features, and what plants will grow more effectively within each environmental conditions:

For more information on how these ecoregions are different, visit the links below:

- Landscaping in the Pinelands (jersey yards resource): <https://www.jerseyyards.org/create-a-jersey-friendly-yard/landscaping-in-the-pinelands/>.
- Pineland Geology and Soils (page G2): <https://pinelandsalliance.org/wp-content/uploads/2018/04/up-close-natural-curriculum-geology.pdf>
- Plants of the Pine Barrens ecosystem: <https://pinelandsalliance.org/learn-about-the-pinelands/ecosystem/pinelands-plants-overview/plants-of-the-pine-barrens/>
- Barrier Islands habitat: <https://www.barnegatbaypartnership.org/learn/barnegat-bay-101/habitats-and-plants/barrier-islands-habitat/>
- Barnegat Bay Habitat and Plant Communities (a part of the Barrier Islands): <https://www.barnegatbaypartnership.org/learn/barnegat-bay-101/habitats-and-plants/>

You may also watch these videos/pictures to see what the two ecoregions look like:

- Pineland plants: <https://www.youtube.com/watch?v=TXZfGdFIOGw&t=118s>
- Barrier Islands (Island Beach State Park): <https://www.njspotlightnews.org/video/why-is-beachgrass-so-important-to-the-jersey-shore/>
- New Jersey Pinelands photo gallery: <https://pinelandsalliance.org/ppa-photo-contest-2/>

Note (1): These resources are embedded within the Troop's Guide. If you would like them to only look at specific ones (photos and videos may be more pleasing for independent view while the articles may be more beneficial for a group conversation led by the troop leader), please be sure to instruct your Scouts as needed.


This step is recommended to be used as a group activity with the whole Troop and led by the Girl Scout Leader. In the Girl Scout Guide, your girls are alerted that this is a group activity and to wait for their leader before continuing to read.

PART 1: The scouts will begin this step by becoming acquainted with their soil (the soil that the leader will provide). This soil will either be from the Barrier Islands or Pinelands. The leader will ask each of the troop members to grab a handful from the bag of soil. The leader will not tell the girls which ecoregion the soil is from! It is their job to figure out which one it is! The leader will now ask the girls to use their senses to guess what soil was in their hands. Directions are provided in the girl scout guide: "Now, use your senses! Use your EYES to question the color of the soil- is it a rich dark brown? Are there moving creepy crawlers such as worms and other insects? Now, use your HANDS to feel the texture- is it soft and crumbly or hard and compacted? Roll the soil between your fingers to find out! Now, use your NOSE to smell the soil- does it smell fresh or rotten?"

Referencing back to the "KOL chart", the girls are instructed to now fill out the "Things I Observe" column to talk about what they have experienced while using their senses and observing the soil they held.



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Things I Know	Things I Observe	Things I Wonder

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Next, the leader will conduct a soil test with their troop to find out which soil the scouts were holding. This test is also educational in assessing how to properly take care of the soil type. Watch the video below to see what the leader will be responsible for modeling to their girl scouts:

[https://www.youtube.com/watch?v=32KqO\\_4NWxo&feature=emb\\_logo](https://www.youtube.com/watch?v=32KqO_4NWxo&feature=emb_logo) (note: it may be helpful to watch this video with your Troop so they can help you along with the process as you model)

For more information on the process of soil testing, please visit the Rutgers website:

- How to have your soil tested: <https://njaes.rutgers.edu/soil-testing-lab/how-to.php>
- Need help interpreting results of the soil test: <https://njaes.rutgers.edu/soil-testing-lab/results-recommendations.php>

Note: This must not be completed as an independent activity. Sending in soil tests can become complicated and the purpose of this task may become confusing to individual scouts. Please do this as a group to help support student understanding of why we must test our soil.

Before the troop receives their results for the soil test, the Scouts are instructed (in their guide) to complete the third column of "Things I Wonder". The girls are instructed to predict what the results will come back as, as well as asking any other general questions that they don't understand about soil. This column may help the leader answer any questions and allow the girls to gain better understanding of this step.

Note: It is recommended that at least the third column is done as a group with the active troop leader, in order for all the girls to gain understanding.

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Things I Know	Things I Observe	Things I Wonder

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PART 2: After soil testing as a group activity, the girls will now advance to growing native plants. The leader will split their girls into pairs or groups (based on preference). With the information from your troop's soil test group activity, the groups/pairs will find six plants to grow in the troop's soil. They will be asked to view the Jersey-Friendly Yards Plant Database to find six New Jersey natives that interest them and will live "happy" within the soil's conditions. They are asked to use the soil test results, as well as your own soil observations to help you determine which plants will grow successfully with the help of the database indicated below.

Jersey-Friendly Plant database: <https://www.jerseyyards.org/plant/>

Note: The database may be difficult for the girls to navigate on their own. I recommend the troop leaders to watch the tutorial video (indicated below) for guidance on how to navigate the database. Before allowing the girls to search for their plants with their groups, you may want to highlight the important parts of what the girls should be looking for.

Plant Database Tutorial: <https://www.youtube.com/watch?v=hPkie33bdMI&feature=youtu.be>

Finally, the girls will create a story using My Story Book (<https://www.mystorybook.com>) with their group. This is a free website for children to be creative and create their own virtual book.

On the cover page, they will write about their soil- what they observed with their senses and the results from the soil test (this is based on what the leader wants them to include from the soil test-- the important parts). Then, on each page of their story book, they will explain one of the 6

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plants. They will be asked to provide a picture of the plant and soil characteristics. If they are unsure if their plant will be “happy” in their troop’s soil, they are also instructed to ask their troop leader for help, as well as help from their teammates!

#### **Step 4: experiment with seeds**

This step is a continuation from the last step and is broken into two parts; part one is a whole troop activity (with leader guidance) and part two is the continuation of step 3, asking for the girls to work within their step 3 groups. The ending activity of this step will ask the girls to revisit their groups and pick one of the six native plants that they would like to grow. They will use the soil that was tested in step 3 in order to properly develop their native plant.

However, before the girls can properly grow seeds, they must understand the process of seed-to-plant development, as well as become introduced to important science terms. This will allow them to adequately understand the purpose of proper care in the life of a plant. The essential goal from this step is for the girls to observe the plant growth process and duration of the process, as well as gain insight on growth terms and plant part distinction.

To begin this step, I have introduced the girls to a video that provides students with the basics of how a plant grows from a seed: <https://www.youtube.com/watch?v=tkFPyue5X3Q>. Following, I have narrowed this topic to the process of germination, which is the “emergence of a new plant from a seed” (<https://www.accessscience.com/content/seed-germination/900110>). I have also informed the girls that this term is very important and will need to be known when they plant their own seeds (in part 2). I have provided an additional video for them to watch, which focuses on the process of germination: <https://www.youtube.com/watch?v=TE6xptigNR0&t=207s>.

After providing these educational video lessons, I have asked the girls to watch time-lapse videos of a plant’s growth, beginning at germination. This allows them to prepare for what they will see during this step, as well as become introduced to the observational process of a plant’s growth.

Time lapse videos:

- Sunflower Seeds Germination and Growth Time Lapse: <https://www.youtube.com/watch?v=eKo5F87A8a0>
- Time lapse of a sunflower from seed to flower: <https://www.youtube.com/watch?v=Z-iPp6yn0hw>
- Bean Time-Lapse: <https://www.youtube.com/watch?v=w77zPAatVTul>
- Time-Lapse- growth and blossoming of marigold: <https://www.youtube.com/watch?v=4iMVaYSMbal>

While viewing the development of the plant’s growth, the girls may start to question the names of the parts of the plant (or the plant’s anatomy). I have provided an additional video that references the main parts, however, this video is only a reference and will not be used for later activities.

What’s growing in these time-lapse videos? Watch the video below to learn more about plant parts:

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<https://www.youtube.com/watch?v=TD60-3rqPXg>;  
<https://www.youtube.com/watch?v=MP5jnuvMqxQ>

NOTE: the leader may want to use the “plant parts” video and test their scouts during the process of the plant's growth. This can more specifically be used in the sunflower growth in Part 1 (see below).

PART 1: This part will be a whole troop activity. The troop leader will model planting two types of plants; the sunflower and the partridge pea. While planting each of the plant seeds in separate pots, please use the procedures from the video provided to adequately model planting. The girls will have to follow these same procedures during the part 2 activity.

Planting steps: <https://www.youtube.com/watch?v=Ym7ABf-tRNI>

To better understand the purpose of planting these 2 types of seeds, the sunflower is not native to New Jersey, however, it is Jersey-Friendly (or an “in-between” plant). In contrast, the partridge pea is a native plant to the New Jersey environment. Using these diverse plants will allow the girls to visualize two types of plants, which were considerably brought up as an important component of New Jersey gardening in the past sections (native plants and “in-between” plants). In addition, using these diverse plants allows the girls to observe plant growth at varying durations. As specified in the girl scout guide, sunflowers take 80 to 120 days to grow (<https://www.hgtv.com/outdoors/flowers-and-plants/flowers/growing-sunflowers-when-to-plant-and-how-to-grow-sunflowers>) and the partridge pea takes 7 to 25 days to germinate ([https://plants.usda.gov/plantguide/pdf/pg\\_chfa2.pdf](https://plants.usda.gov/plantguide/pdf/pg_chfa2.pdf)).

During this modeling activity, it is important for the girls to gain understanding that, while these 2 plants will grow at varying durations, they will also notice this to happen when planting their own native plants. It is essential for the girls to be patient, as their group's plants may take months to germinate while other groups' will take weeks. In addition to this information, the troop leader should also speak about important characteristics of each of the plants. This includes their blooming season, as well as what wildlife the plants will attract. This information can be retrieved from the database. The girl's guide provides the information as follows: “As shown in the Jersey-Friendly Yards database, the sunflower blooms in the summer and attracts pollinators such as bees, as well as butterflies (<https://www.jerseyyards.org/plant/helianthus-annuus/>). On the other hand, the native partridge pea blooms during the late summer to early fall and attracts pollinators, butterflies, and birds (<https://www.jerseyyards.org/plant/chamaecrista-fasciculata/>)”. Providing this information will allow the scouts to begin to think about what wildlife they may want to attract with their native plant (in part 2).

PART 2: Now, the troop leader will instruct their girls to return to their groups from step 3. The girls will now revisit their storybook creation and decide with their groups on which of the six native plants their group will grow. In the girls' guide, they are informed that they will be using the tested soil from step 3, as well as the databases to reference for what wildlife their plant attracts, amongst additional characteristics they would like to see in their desired plant and future garden.

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Once the groups have decided on their plant, they are instructed (in the Girl Scout guide) to tell the troop leader. The troop leader will then buy the group seeds. A potential site to buy the native seeds from is referenced below.

For more information on where to purchase your natives, visit this website provided by Jersey-Friendly Yards: <https://www.jerseyyards.org/jersey-friendly-plants/where-to-buy-native-plants/>

Once every group has received their seeds, they can begin growing their natives! The troop leader must supply the each group with the proper supplies:

1. The tested soil from step 3
2. The group's selected seeds
3. water/ watering can
4. 1 planting pot
5. 1 stick (to make seed holes)
6. 1 spoon

In the girls' guide, I have provided the link to the video for planting procedures, in case they needed a refresher from the troop leader model (in part 1).

After scouts have successfully planted their plant, they will now become Plant Detectives! Before beginning this final portion of step 4, I have asked the girls to consider their plant's growth rate from the databases. These include: 'fast', 'medium-fast', 'medium', 'slow-medium', and 'slow'. While needed to know their own plant's growth rate, the girls should be aware of how often they must check on their plant for growth. I have provided an additional source for the girls to determine the timing of "fast growers", "medium growers", and "slow growers": <https://www.thesill.com/blogs/care-miscellaneous/how-do-plants-grow>.

After providing this information, the girls will begin the final task of step 4, which focuses on growth rate. Becoming a Plant Detective, the groups will begin an inquiry-based task in which they will observe and record information over the extended period of time in which their native plant will germinate and grow. Because this final task can take up to months for some groups to complete, it is recommended that the troop leader asks their troop to begin their detective work now, but have troops continue onto step 5 and come back to this step 4 task when growth progress is made. The troop leader must remind the groups to go back to step 4 in order for them to receive accurate answers for their detective work.

The girls are provided with these questions (in the girl scout guide) to complete step 4:

Detective questions:

1. What date did you plant your seeds with your group?
2. What date did your plant germinate?
3. Is your plant a "slow grower", "medium grower", or "fast grower" based on the Jersey-friendly yards database and <https://www.thesill.com/blogs/care-miscellaneous/how-do-plants-grow>.
4. Now, predict your growth rate! You will go through the steps to get your answer!
  - Watch the videos and read the steps with your group to get the best answer:

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- Read “method 1: measuring plant height”: <https://www.wikihow.com/Measure-Growth-Rate-of-Plants>
- How to measure growth rate of plants YouTube video: [https://www.youtube.com/watch?v=QbpemJi9EHo&feature=emb\\_logo](https://www.youtube.com/watch?v=QbpemJi9EHo&feature=emb_logo)
- a. Take your height measurement (with a ruler) at the date of your plant's germination. What is the measurement of your plant (in inches)? This number is your “size 1” (S1) number
- b. Take another measurement after 2 weeks (for fast growers), one month (for medium growers), and three months (for slow growers). What is your second measurement number? This number is your “size 2” (S2) number
- c. Now, subtract the second number from the first number. What number did you get?
- d. Now, divide the number from 4c by the number of days that you waited in-between your measurements. If your plant was a fast grower, this number would be 14 days, if you had a medium grower, this number would be 30 days (or one month), and if you had a slow grower, this number would be 90 days (or three months). This would be your “time” (T). What is your “size” number divided by the “time” number? This number is the amount of inches your plant will grow per day.
- e. You cracked the code! You figured out your predicted growth rate, Miss Plant Detective! Write your number to complete step 4!

This final part should be completed within the girls' groups. This portion brings in skills of subtraction and division, using a formula, as well as measurement skills. For number four, predicting plant growth rate can become tricky for fourth and fifth graders. If the troop leader believes their girls will need additional assistance, the troop leader can also model this with their troop, using the partridge pea model or the sunflower model. If the troop leader decides to model this task for their troop, please use the resources as specified in the girl scout guide:

- Read “method 1: measuring plant height”: <https://www.wikihow.com/Measure-Growth-Rate-of-Plants>
- How to measure growth rate of plants YouTube video: [https://www.youtube.com/watch?v=QbpemJi9EHo&feature=emb\\_logo](https://www.youtube.com/watch?v=QbpemJi9EHo&feature=emb_logo)

NOTE: The YouTube video asks to observe the plants after 2-3 days. This will not occur for your troops. They must go by <https://www.thesill.com/blogs/care-miscellaneous/how-do-plants-grow> for the amount of days in which they should wait before recording size differences. This is specified for the girls in '4d'.

NOTE: This is an option for troop leaders to take in order to speed up step 4 completion! The Partridge pea has a “fast” growth rate. You can give students the option of using the partridge pea troop model for their detective work, if their plant is taking too long to grow. You can also ask the groups (that have native plants of ‘medium’ or ‘slow’ growth rate) if they would like to plant their own partridge pea IN ADDITION to their selected group plant, just in case their plant takes too long and they cannot receive their badge in time.

**Step 5: help with community garden**



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As you will notice, steps 1 through 4 are the most activity-based that are geared towards new learning in gardening. Step 5 acts as a “test” for the girls to prove that they are capable of making these changes in gardening within their community, as well as proving that they have earned the Gardener Badge. The Scouts are provided with multiple options in which they are only instructed to pick one:

1. In step one, you may have picked the option to research about one of the community gardens known to our state. Put your work out there on social media to get more people interested and aware of the importance of native plants.
2. **Group activity/ whole troop option guided by the troop leader:** Do you know if your soil matches the soil type of one of these public gardens (as completed in step 3)? Email or call the locations of these community gardens and help them grow more native plants. Ask for the information of their soil test and review the databases with your troop to contribute new plants to their community gardens. Ask for permission to add new natives. Use your knowledge of your native plant's growth and backyard soil to compare to the community garden's soil in developing a plan for plants that would work well with this community garden.
3. Are there gardens in your community that need developing? Use your chore money to buy native plants that can be planted in the community garden setting, helping the garden flourish with health and beauty!
4. EXTRA, EXTRA, READ ALL ABOUT IT! Help get the word out about New Jersey gardening by handing out your own created flyers! Talk about what you have learned during your girl scout gardening experience about the importance of native plants and becoming a caring gardener of New Jersey wildlife, oceans, and soils. Hand out these flyers to family members, friends, classmates, and neighbors' mailboxes!
5. You are the teacher! Make an EdPuzzle video to test your friends on the importance of native plants! Put this on social media and collect many results from friends and family, asking them to enhance their knowledge about the importance of growing New Jersey natives! At the end, ask them to visit a community garden (with this link: <https://www.jerseyyards.org/jersey-friendly-plants/native-plants-public-gardens/>) and ask them to reflect on how the quiz and their community garden experience has helped them! Ask them to post their reflection on social media with the link to your EdPuzzle, asking more people to contribute to your EdPuzzle experience! Don't have a social media account? Ask mom, dad, or your troop leader to put your work on their social media accounts!
  - a. <https://edpuzzle.com>
  - b. How to make an edpuzzle: <https://www.youtube.com/watch?v=QWar47cMmUI>

Note: You may have noticed that option 2 is a group project. This activity asks the troops to reference soil testing once again. Because soil testing should not be done independently by the young scouts (as recommended in step 3), it is best that the troop leader takes the lead for this activity (references for soil testing instructions and result interpretations are provided again below). This activity requires contacting community gardens in order to retain soil information, as well as asking for permission for their troop to grow more native plants in the community garden. Troop leaders may want to reference the database as a whole troop in order to find appropriate plants or, troop leaders can instruct the girls to go back to their groups or pairs (from step 3) and search the databases. This is an excellent way for troop leaders to observe that *all* of their scouts deserve the gardener badge!

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For more information on the process of soil testing, please visit the Rutgers website:

- How to have your soil tested: <https://njaes.rutgers.edu/soil-testing-lab/how-to.php>
- Need help interpreting results of the soil test?: <https://njaes.rutgers.edu/soil-testing-lab/results-recommendations.php>

For more information on where to purchase your natives, visit this website provided by Jersey-Friendly Yards: <https://www.jerseyyards.org/jersey-friendly-plants/where-to-buy-native-plants/>

After students have completed the five steps using the tools and resources of the Jersey-Friendly Yards website [www.JerseyYards.org](http://www.JerseyYards.org), proving their effective new knowledge of gardening in the state of New Jersey, they will now be cleared to receive the Gardener badge, as well as a certificate of completion.