

Garden Ecosystems: Plants and their Pollinators

Sigourney Cheek Literary Garden & Wills Perennial Garden (60 minutes) - Grades 2-4

About

This field trip explores pollinators that call Cheekwood home while diving into plant reproduction and photosynthesis. Students will create their own pollinator, look at parts of the plant reproduction system under a microscope, and complete an activity about photosynthesis.

Objectives

1. Students will leave knowing that pollinators prefer specific flower colors and choose flowers they pollinate based on color and size.
2. Students will leave knowing the different parts of the plant, and the parts of a flower.
3. Students will leave knowing the concept of photosynthesis and the resources a plant needs to complete photosynthesis.

Background on the Gardens

Sigourney Cheek Literary Garden

The use of iconic antique imagery was meaningful to Sigourney Cheek. In the literary garden, visitors will find a fifteenth-century French tub, which features a nineteenth-century beer tap. An owl, carved from solid stone by Charlie Hunt of Hunt Memorials of Nashville, was moved from Sigourney's home garden. Two patinaed, repurposed nineteenth-century planters were originally the capitals on columns at an old courthouse in Mississippi.

Cheekwood continues to evolve the horticulture of this site to respond to the warm microclimate generated by the western exposure of the limestone retaining wall. Espalier plants and vines will flourish here, softening the limestone perimeter. Hardy dry land plants, subtly evocative of a Mediterranean climate, will thrive within this nook set above the surrounding terrain and reach back to Sigourney Cheek's love for the country of Spain.

Wills Perennial Garden

there's something for everyone to experience and love at Cheekwood.

In the summer of 1977, an iris collection was donated to Cheekwood by Mrs. Ellen Wills. She dedicated it to her late husband, Jesse Ely Wills, the famed iris hybridizer, former president of the American Iris Society and winner of the Dykes Medal Award. The donated iris collection planted the seed for something bigger, a memorial garden for the beloved Jesse E. Wills, philanthropist and pillar of the business community, iris breeder, poet, and wildlife lover.

The design for the memorial garden was a collaborative effort between Duncan Callicott, Cheekwood's executive director of horticulture at the time, and a local landscape architecture firm, Kevin Turner & Associates. Together the team created a space that would capture Jesse Wills' essence: a garden fit for the cultivation of irises, a home for pollinators and other wildlife, an auditory experience, and a spectacular open view of the sky. The Wills Perennial garden officially opened and dedicated in April of 1981.



Vocabulary

Anther – The part of a flower that produces and contains pollen.

Fertilization – Fertilization is when pollen lands on the stigma of a flower to begin the process of reproducing.

Filament – The filament of a flower holds up the anther (which produces pollen).

Leaf – The leaf is the part of a plant attached to the stem or branch resembling a flat structure, typically green. Leaves collect sunlight and turn it into food through a process called photosynthesis.

Microscope – A microscope is a tool to help view very small objects or organisms. It enlarges what is being viewed.

Ovary – The ovary is the part of the flower that will mature into a fruit.

Ovule – The ovule is the part of a flower located inside the ovary that forms the seeds.

Petals – Petals are the bright colorful part of a flower. They are different colors depending on the type of flower; the colors of the petals attract insects and other creatures that help with pollination.

Photosynthesis – Photosynthesis is the process in which green plants use sunlight to help create food for the plant from carbon dioxide and water. Photosynthesis is necessary for life on Earth.

Pistil – The pistil is the female reproductive part of the flower containing an ovule, ovary, style, and stigma.

Plant Reproductive System – Plant reproduction is the creation of new plants by one or more parent plants. In flowering plants, pollination occurs to pass the pollen on to another flower, where fertilization occurs in the pistil.

Pollen – Pollen is a fine powder produced by certain plants when they reproduce. Pollen is transported by wind, insects, and other animals. When it lands on the female plant, it leads to the creation of fruits, seeds and in turn new plants.

Pollinator – A pollinator is an animal or insect that moves pollen from one part of a flower of a plant to another part. This pollen then fertilizes the plant, and it begins to produce fruit and seeds.

Pollination – Pollination is the process of pollen moving from flower to flower allowing plants to reproduce through fruit and seed production.

Receptacle – A receptacle is the part of a flower stalk where all the parts of the flower are attached.

Sepal – The sepal are the tiny, green leaf-like parts at the base of the flower; they help to protect the developing flower bud.

Stamen – The stamen is the male part of the flower made up of the anther which contains the pollen and filament which holds the anther up. The stamen typically surrounds the stigma which is located in the center of the flower.

Stem – The stem is the main part of a plant that grows up from the ground and supports the branches, leaves, flowers, and fruits that may grow from the plant. This part of the plant helps bring water and other nutrients from the soil up to the top of the plant.

Stigma – The stigma is the part of a flower that receives pollen during pollination and is located at the center of the flower.

Style – The style is the long, tubelike structure inside of the flower in which the stigma sits on top of. The style leads down to the ovary that contains the female egg.

Standards Covered

2.LS1: FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

1. Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.

2.LS2: ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

1. Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.
2. Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation).

3.LS1: FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

1. Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction.

3.LS4: BIOLOGICAL CHANGE: UNITY AND DIVERSITY

1. Explain the cause and effect relationship between a naturally changing environment and an organism's ability to survive

4.LS2: ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

1. Support an argument with evidence that plants get the materials they need for growth and reproduction chiefly through a process in which they use carbon dioxide from the air, water, and energy from the sun to produce sugars, plant materials, and waste (oxygen); and that this process is called photosynthesis.

Pre-Visit

For the pre-visit portion of the field trip, there will be a virtual meeting between a Cheekwood staff member and the class. A PowerPoint presentation will be shared about Cheekwood's history and will also include a brief introduction on what students will be learning during their Cheekwood visit. This introduction will include briefly going over the parts of a plant, specifically the reproductive parts, and then an overview of the photosynthesis process.

Overview of the Day

1. Students will start off at the Frist Learning Center. Students will be greeted by an educator, and they will be given an overview of the guidelines and the materials covered during their pre-visit.
2. Students will be preassigned to 3 different groups. One educator or docent will be placed with each group and remain with that group the entire time.
3. Field Trip Activities
 - a. Create Your Own Pollinator (15 minute)
 - i. At this station, students will explore pollinators and learn that they prefer flowers based on color, size, shape, fragrance before designing their own pollinator.
 - b. Parts of a Flower (15 minutes)
 1. At this station, students will learn about the parts of a flower, focusing on the reproductive parts. Students use microscopes to identify the parts of the flower and observe them up close.
 - c. Photosynthesis (15 minutes)
 - i. Students will learn all about the process of photosynthesis. They will review the inputs and outputs of photosynthesis. Then, students will play a game in which they are plants going through the process of photosynthesis. Students must collect chips that represent water, sunlight, and carbon dioxide to survive.

Post Visit

As a post visit activity, students can go back to the classroom and further explore the parts of a flower through a flower dissection activity. A lily is recommended for this activity since it is easy to see identify each part.

Post-Visit Book Suggestions

[What If There Were No Bees?: A Book About the Grassland Ecosystem \(Food Chain Reactions\)](#) by Suzanne Buckingham Slade, Carol Schwartz

[Flower Talk: How Plants Use Color to Communicate](#) by Sara Levine and Masha D'yans