

# Botanical Engineering

## PROGRAM OVERVIEW

### NGSS Alignment

**LS4.C:** Adaptation  
**LS4.D:** Biodiversity and Humans  
**LS1.C:** Organization for Matter and Energy Flow in Organisms  
**ESS2.D:** Weather and Climate  
**ESS3.C:** Human Impacts on Earth Systems  
**LS1.B:** Growth and Development of Organisms  
**LS4.B:** Natural Selection



## About the Program

Designed for students in 3<sup>rd</sup> through 8<sup>th</sup> grades, the *Botanical Engineering* class looks at survival from two perspectives: first: what do plants need to do to adapt to their environments, and second: what do we as human curators of living collections have to do to create a space that will allow highly adapted species to survive here in Missouri? During this program, students will:

- Discuss the relationship between adaptations and fitness, as they relate to a given plant's ability to thrive in a given ecosystem.
- Compare adaptations of plants from different biomes around the world, noting the structural adaptations each has developed to equip it to survive the challenges posed by those biomes.
- Visit the Climatron, Kemper Center and Linnean House to investigate how greenhouses have developed over history and what we do today to simulate rainforest, desert and aquatic environments for our plants. A visit to the Margaret Grigg Nanjing Chinese Garden will show how a "built" environment can house many plants that have the same adaptations native to our Missouri climate.
- Receive a sample of duckweed to take home or to the classroom for which students can construct an appropriate environment.

### *Why Duckweed?*

*While duckweed (Lemna minor) is often the source of aggravation for aquarium enthusiasts, its ecological and potential economic value has made it a subject of study in recent years. This tiny floater is among the world's smallest flowering plants, and is native to nearly every continent. It prefers calm water and will reproduce quickly under suitable conditions to form a mat over the surface, controlling algae growth. Duckweed also removes impurities from the water, and serves as a high-protein food source for wildlife. In fact, its protein content is so high that dehydrated duckweed is considered a good additive for livestock feed and may even become an important food source for humans in the future.*

*Your students will receive a small sample of duckweed and will be challenged to create an environment for their tiny plants that enables them to grow, reproduce and thrive.*



Pre- and Post-visit resources include suggestions for integrating **Science and Engineering practices** and **Crosscutting Concepts** into activities that align with this experience.

For more information to book this program please visit: [www.mobot.org/schoolprograms](http://www.mobot.org/schoolprograms) or call the School Programs office and 314-577-5185.



# This Program Features:

## The Linnean House, Climatron®, Chinese Garden, Butterfly Garden/Glade area and Kemper Center

During these outdoor explorations, your students will explore our onsite conservatories, each of which was designed in a different era to enable exotic plants to survive in Missouri's climate. The Linnean House, constructed in the late 1800's, was created to be a Victorian "orangery where citrus and other tropical plants could be housed over winter. The Climatron®, constructed in 1959, used newly-available aluminum, Plexiglas and climate controls to simulate a rainforest environment. The Margaret Grigg Nanjing Friendship Garden, established in 1996, is an outdoor garden that has many of the same plant adaptations native to our Missouri climate and showcases attempts to reconcile gardening with the surrounding "built" environment.

Finally, the William T. Kemper Center for Home Gardening showcases strategies humans have used to breed plants that suit our purposes, such as producing food for us, creating more abundant and varied blooms, or to just survive in Missouri for a given period of time.



## Other Places to Explore...

- ❖ The Victorian District - Enjoy a walk around the ornate Victorian gardens. Henry Shaw's country home and the Kaiser Maze are also located in the Victorian District, however, both are closed during this time.
- ❖ The English Woodland Garden - Stroll through a temperate forest and observe the "floor". Look for evidence of decomposition in action, and see what plant/animal interactions you can find.
- ❖ Seiwa-en - Our 14 acre Japanese strolling garden where students have an opportunity to experience a garden designed around Japanese culture. Feed the koi, walk the zig-zag Yatsushashi bridges, interpret the dry garden landscapes and see how many different stone lanterns you can find!

## Logistics for Teachers

- ☀ Each Botanical Engineering program is approximately **90 minutes** on Garden grounds and 30-45 minutes for pre and post activities (prior to and after visiting the Garden). This program serves a maximum of 60 students.
- ☀ Program fees include admission for up to six adults per 30 students. (Additional adults will be charged normal admission rates.) Please try to bring at least **one adult for every five students**.
- ☀ Groups booking this program may eat lunch at Tower Grove Park, if they wish. (Please note that picnicking on the Garden's grounds is prohibited.)
- ☀ Program availability is limited! **Book early!**