Self-Guided

Explorer Tour

Teacher Booklet

Shangri La | Botanical Gardens® & Nature Center

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How to Use This Book

Welcome to Shangri La Botanical Gardens and Nature Center!
We are happy to welcome you and your students as our guests!

Use this book as a guide to lead you through the formal gardens, as well as the Nature Discovery Center at Shangri La Gardens. The map on page 3 will be your compass, serving as a guide to take you from place to place.

Each station is marked with an Explorer Tour Station stake marker. The station number and name of the station corresponds with the page titles in this book. This booklet contains background information for each station. Words that appear in **red** are defined in the Glossary on page 26**.**



You may not have time to see everything! Choose the places you think will be most interesting and start there!

While you are visiting with your students, we may be engaging other students or families with our onsite programming. Please do your best to not interrupt or be a distraction to these groups. Also, please be mindful that there may be school buses picking up and dropping off at the same time you are picking up or dropping off your students. Please do a head count of your students!

Should you have questions or concerns during your visit,
please phone our Education Department at (409) 670-0803.

<u>Garden Etiquette:</u>

- Please remind your students that while they are not in their classroom, the Gardens are still a place for learning, and we expect school-appropriate behavior.
- Please no running, climbing, or jumping.
- You may touch the plants, however please do not pick the flowers or leaves.
- You may carry water with you at all times, however please limit food and other drinks in the garden.
- Please walk on all designated paths and grass; do not walk into the garden beds.
- All of the animals at Shangri La Gardens are wild. Please do not feed or handle wildlife.
- Out of respect for others, please turn your cell phones to vibrate or silent.



Shangri La
Botanical Gardens
& Nature Center

Explorer Tour
Map of Botanical Gardens and Nature Center

Mentoring Children of all Ages to be Kind to Their World

- R GARDEN RESTROOM
- 1 MEDITATION PAVILION EXHIBIT HALL
- 2 COURTYARD
- 3 WETLAND DEMONSTRATION GARDEN
- 4 HERE WE GROW! CHILDREN'S GARDEN
- 5 DANCING SISTERS BOTTLE TREE SCULPTURE
- 6 EPIPHYTE GREENHOUSE
- 7 EXHIBITION GREENHOUSE
- 8 TREE RING PLAZA
- 9 PERENNIAL BORDER
- 10 TEXTURE GARDEN
- 11 SHAPE GARDEN
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- 14 BROWN DAYLILY COLLECTION
- 15 HERONRY BLIND
- 16 CONTRASTS GARDEN
- 17 COLOR GARDEN
- 18 POND OF THE BLUE MOON
- 19 RUBY LAKE RUNNELS
- 20 SPIRAL GARDEN
- 21 BRANCING GARDEN
- 22 CIRCLE GARDEN
- 23 STRIPE GARDEN
- 24 MAGNOLIA PLAZA
- 25 NATURE DISCOVERY CENTER
- 26 CYPRESS-TUPELO SWAMP

LEED'ing The Way

LEED stands for Leadership in Energy and Environmental Design. The U.S. Green Building Council developed the LEED rating system to encourage green building design, construction, operations, and maintenance. Green building design is a holistic concept that starts with the understanding that the built environment can have profound effects, both positive and negative, on the natural environment, as well as the people who inhabit buildings every day. Green building is an effort to amplify the positive and mitigate the negative of these effects throughout the entire life cycle of a building. LEED provides a framework for healthy, highly efficient, and cost-saving green buildings. LEED is a voluntary certification program that is a globally recognized symbol of sustainability achievement and leadership.

In 2009, Shangri La Gardens earned highest level of certification: Platinum LEED (NC). The LEED certification system measures water efficiency, energy sources, the use of salvaged materials, sustainably grown resources, storm water runoff, and much more.

Have you ever heard of your carbon footprint?

Your carbon footprint is the amount of carbon dioxide released into the air because of your own energy needs. You need transportation, electricity, food, clothing, and other goods. LEED helps Shangri La Gardens to have a lower carbon footprint. Throughout the garden you will find several examples of reduce, reuse, and recycle strategies. We use a geothermal system for heating and cooling, all bricks were salvaged from a warehouse in Arkansas that was being torn down, large windows on buildings allow for passive light and passive heating during the winter; and that's just the beginning!

We also do things like refill our water bottles (instead of getting new ones), turn the lights of when we leave a room, and turn water off when we aren't actively using it.



All boardwalks are made of recycled plastic and wood fibers. There are over 1.1 million recycled milk jugs in our walkways.



Cisterns collect rainwater that is then used to water some of our plants.

Historic Shangri-La

The history of Shangri La Gardens began with **H.J. Lutcher Stark,** a prominent philanthropist who resided in Orange, Texas. Inspired by the mystical retreat represented in the 1933 novel, *Lost Horizon* by James Hilton, Stark sought to create his own haven of indescribable beauty where time would stand still. His vision became a reality in 1937 when he began creating Shangri-La within significant acreage he owned along Adams Bayou in his hometown of Orange, Texas.

Nine years of planning and construction followed, with Stark overseeing every detail. The gardens included a Cypress-Tupelo swamp, camellias, and breathtaking azaleas, Stark's personal favorite. There was also no shortage of wildlife, with swans, ducks, egrets, otters, rabbits, and more.





In 1946, H.J. Lutcher Stark opened his private oasis to the public. Word of its beauty spread throughout the country, and by 1950 thousands of visitors travelled to Orange to experience Shangri-La's wonder during the few weeks the azaleas were blooming each spring. The secluded utopia quickly became a popular destination for locals and tourists alike.

Unfortunately, in 1958, disaster struck Stark's glorious paradise. A major snowstorm invaded Southeast Texas and gripped its icy fingers around Shangri-La. The majority of the plants, among them Stark's beloved azaleas, were destroyed in the freeze. With a heavy heart, Stark closed Shangri-La to the public, and it would remain that way for nearly 50 years.



The Gardens finally re-opened as Shangri La Botanical Gardens and Nature Center in 2008. At this time, the Gardens became a non-profit under the Nelda C. and H.J. Lutcher Stark Foundation. The Stark Foundation's mission is to carry on the legacy of its founders by providing opportunities for study and enjoyment of the arts, history and nature.

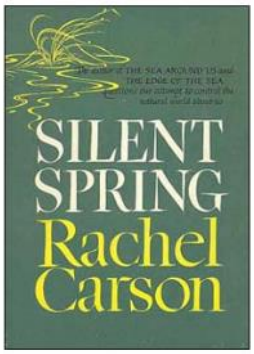
Shangri La Gardens seeks to provide excellence in environmental education, horticulture, environmentally responsible practices and conservation. Shangri La Gardens strives to ignite curiosity, instill a sense of wonder, nurture creativity, and expand knowledge in order to mentor children of all ages to be kind to their world.

Meditation Pavilion & Petrified Wood

Explorer Tour #1

The Meditation Pavilion is a space dedicated to the famous environmentalist, Rachel Carson. Rachel Carson's quote *"Drink in the beauty and wonder at the meaning of what you see"* is featured here in the Meditation Pavilion. Keep this quote in mind as you explore the Gardens.





Facts about Rachel Carson:

- Lived from 1907 - 1964
- She was a writer, scientist, and ecologist.
- She testified before Congress in 1963 promoting new policies to ensure the health and safety of humans and the environment.
- Time Magazine listed her as one of the 100 most influential people of the 20th century. In her famous book, Silent Spring, she shed light on **pollutants** and pesticides, and how they affect our wildlife and our environment.
- As a result of her work, the United States banned **DDT** (a pesticide) for agricultural use in 1972.

The fountain in the center of the pavilion is made from petrified wood. **Petrified wood** is a fossil that forms when plant material is buried by sediment and protected from decay. Groundwater rich in dissolved solids flow through the sediment, replacing the original plant material with silica, calcite, pyrite, or another inorganic material such as opal.

The result is a fossil of the original woody material that often exhibits preserved details of the bark, wood, and cellular structures.



Exhibit Hall

Explorer Tour #1



The Courtyard

Explorer Tour #2



The Courtyard is a historically classic feature of a western garden. Courtyard gardens are often found in cities or garden areas with limited space. A courtyard is typically an unroofed area enclosed by walls of nearby buildings.

The Courtyard at Shangri La Gardens is an iconic entrance feature which suggests several pathways for visitors to explore:

1) The pathway to the formal gardens
2) The pathway to the Children's Garden
3) The pathway to the Nature Discovery Center and natural areas

The Courtyard is an excellent welcoming garden that showcases a wide variety of plants which flower throughout the year. When exploring the Courtyard consider the many benefits of choosing plants which flower at different times throughout the year.

How does this benefit people? Animals? The plants themselves?

The Courtyard is also a fantastic place to explore. This garden is home to pollinators such as bees, butterflies, and hummingbirds, as well as animals seeking shelter like raccoons and rabbits. The Courtyard is an excellent human-landscaped habitat that has plenty of food, water, and shelter to make it a good home.

Spend some time in the Courtyard to discover its many interesting features.

Wetland Demonstration Garden

Explorer Tour #3

This **wetland** area was designed to help alleviate a pollution problem in Ruby Lake. During the course of a year, thousands of birds nest on Ruby Lake . These birds eat, then — yes, you guessed it — they defecate. The birds' waste products create a high concentration of **phosphates** and **nitrates** in the lake. Phosphates and nitrates act like a fertilizer for plants, unless their concentrations are too high. Then they act as pollutants.

The Wetland Demonstration Garden is made up of 4 cells, or 4 smaller ponds. Water travels from Ruby Lake into this garden. The water first flows through the 3 ponds that are full of plants. In these ponds, the water has a chance to slow down. As the water slowly moves through this beginning portion of the garden, the sediment settles out of the water.

The plants growing in these 3 cells take in the phosphates and nitrates from the lake water. In the 4th cell, the cell with no vegetation, the water is aerated to increase the amount of dissolved oxygen in the water. Then, the water is returned to Ruby Lake.

This process is called phytoremediation. **Phytoremediation** is the process of using plants to remove pollutants or other contaminants from soil or water. If Ruby Lake did not have this purification system, the water would become too toxic to support aquatic life.



Here We Grow! Children's Garden

Explorer Tour #4



The Here We Grow! Children's Garden offers a world of interactive opportunities for children of all ages to discover, learn, and use their senses while having fun in a series of garden spaces.

The Children's Garden is divided into four main sections: a sensory garden (where you can experience plants using all five of your senses), a butterfly and bird garden (look for evidence of the life cycle of a butterfly), and two sections for vegetables.



The **Vegetable Gardens** showcase a diverse range of seasonally changing themed raised bed plantings.





The **Sensory Garden** offers visitors a chance to engage their senses through interactive touch and smell opportunities while observing a wide variety of plants growing in raised beds.

The **Butterfly and Bird Garden** encourages visitors to learn about and promote the importance of food and habitat for wildlife. This garden contains plants that are host and food plants for butterflies and birds, as well as, beautiful garden plants for the backyard.



The Dancing Sisters Bottle Tree Sculpture

Explorer Tour #5



The Dancing Sisters Bottle Tree Sculpture is made from Cor-Ten® steel and contains nearly 400 cobalt blue bottles. It was designed and fabricated by Southern folklore metal artist, Stephanie Dwyer, during early spring of 2015.



Stephanie noted in her description of the Dancing Sisters that she named them because, "They are strong and carefree. They have an organic quality about them and a human sense of spirit; a threshold connection between us and nature and what better place to see this than in a Children's Garden?"

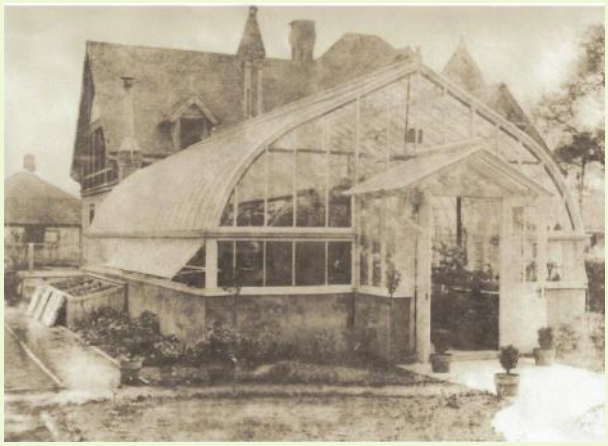
According to Felder Rushing, noted garden designer, self-proclaimed bottle tree historian, and author of *Bottle Trees and Other Whimsical Glass Art for the Garden*, the history of bottle trees dates back to the ancient Egyptian and Mesopotamian cultures. In ancient lore, roaming night spirits could be lured into and trapped by bottles placed around entryways, where morning light would destroy them.

Over many generations, the belief that bottles gathered and destroyed evil spirits was carried from the Middle East, west into Eastern Europe, sub-Saharan Africa, and, ultimately, the Americas by African slaves. While the story has many interesting turns, in modern times bottle trees have become an iconic theme associated with Southern gardens. Their evolution and emerging general popularity as an art form is largely due to the gardening traditions that originated within the African-American community. Bottle trees have also been thought to bring rain, luck, and to make trees bloom.

Epiphyte Greenhouse

Explorer Tour #6

The Epiphyte Greenhouse was constructed in 1917 and originally stood on the grounds of the Victorian Era W.H. Stark House (located on Green Avenue in Orange, TX). This greenhouse was constructed by noted greenhouse manufacturers Lord and Burnham, who also designed the world-renowned Phipps Conservatory, New York Botanical Gardens, and the United States Botanic Garden. The greenhouse was moved to its current location during the 1940s.





Within the Epiphyte Greenhouse, there are many types of epiphytes. **Epiphytes** are frequently called "air plants." The word comes from the Greek roots, *epi-* (upon) and *phyton* (plant). These plants do not normally root in the soil, but rather situate themselves on other plants in order to access nutrients and water from the air and rain. They are not **parasitic** to the host plants. Many orchids and bromeliads are epiphytes. The Bromeliad family includes some plants that most people know, including pineapples and Spanish moss.





Exhibition Greenhouse

Explorer Tour #7

The Exhibition Greenhouse and the Classroom Greenhouse connect at the iconic glass archway that leads into the main garden loop. These greenhouses were original to H.J. Lutcher Stark's historic Shangri-La. Both were constructed in the 1940's-1950's.





In the past, these greenhouses have displayed a variety of plants. Within these greenhouses, Mr. Stark installed **cisterns** to collect rainwater. The rainwater was used to not only irrigate the plants inside but also maintain an environment of high humidity to support plant growth.





Today, the greenhouses serve a dual purpose: one is used to house rotating botanical exhibitions for visitors to enjoy; the other is used as a hands-on classroom for students to enjoy all aspects of plant growth and care. Explore the Exhibition Greenhouse to discover its many interesting plants. How does a greenhouse help plants grow?



Tree Ring Plaza

Explorer Tour #8

Tree Ring Plaza was designed to model the rings of a tree within the brickwork at the plaza. Tree rings can be found in a cross section of a tree trunk. Tree rings are formed during each year of growth. Thick rings are a sign of a long growing season, lots of rain, and good weather. Thin rings can be the result of little rainfall, poor weather, or a shortened growing season.

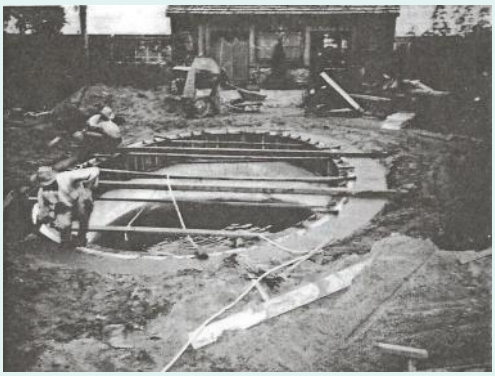
Tree rings can be studied by **dendrochronologists** (scientists studying tree-ring growth and change) to determine the age of a tree and the challenges the tree faced during a single growing period. Was there a lot of rain in the spring or a drought in the summer? Was the tree hit by lightning or did it suffer fire damage? All of these things can be determined by looking at the tree rings! Count the rings at Tree Ring Plaza, how old would it be if it were a tree?





Also located at Tree Ring Plaza are the Frog Ponds. The Frog Ponds were built in 1955 as a part of Mr. Stark's historic Shangri-La. The Stark Archives label the cobblestones "Dunkirk Stones" and were used to form the rings around each of the frog ponds. These cobblestones were purchased in Bordeaux, France; hence the story that St. Joan of Arc may have walked upon these very stones that were earlier streets in Bordeaux.

The Frog Ponds are a great example of a **biodiverse** habitat, this means many types of organisms live here. The ponds are home to water lilies, tad poles, snails, snakes, and more! Explore the ponds to discover who is living there today!







Perennial Border

Explorer Tour #9

As you travel along this winding path, you are sure to see something in bloom. The majority of the plants on this path are **perennials**. Perennials are plants that live for more than two years.



Perennial plants can include **herbaceous** plants, and woody plants like shrubs and trees. Most herbaceous plants will bloom during the spring or summer and then die back during the winter. The following spring they will sprout new growth from the existing root-stock and begin to bloom again.

The opposite of a perennial plant is an **annual.** Annuals will complete their entire life cycle within one year. Most annual plants will not come back the following year; however, some are able to reseed themselves.

As you are exploring the perennial border, look for the many pollinators such as bees, butterflies, and hummingbirds, that like to visit the perennial flowers each year.







Artist Concepts: Texture, Shape, Line

Explorer Tour #10, #11, and #12

Artists use the basic elements of art when composing each unique work of art. The elements include texture, shape, contrast, and color. Shangri La Gardens celebrates these basic elements of art by dedicating a garden room to each of these elements.

Texture Garden | Explorer Tour #10

Although we normally detect different textures through touch, our Texture Garden was created for you to visually observe a variety of different textures of leaves and flowers.



Examine the different sizes, shapes, and arrangements of the leaves and explore their different textures through your sense of sight and touch.



Explore this area to see how many different textures you can discover!

Shape Garden | Explorer Tour #11



Featured in the Shape Garden is the Dwarf Yaupon Holly plant. Each plant is trimmed by the Shangri La Gardens horticulture team to create a perfect sphere.

Though the Yaupon Holly is the obvious example of shape in this garden, there are many other shapes hiding in plain sight. Explore this area and see what other natural shapes you can discover.

How many different shapes can you spot?

Line Garden | Explorer Tour #12

The Line Garden is currently **Under Construction** making it the perfect blank slate for creativity! Imagine YOU are in charge. Your only requirement is to showcase "lines." What might your garden look like?

Hanging Garden & Historical Collection

Explorer Tour #13 and #14

The Hanging Garden is a part of Mr. Stark's original Shangri La Gardens. It is believed that this is where he historically planted exotic tropical plants. The Hanging Garden is designed to allow plants to cascade over the tiered edges, giving the impression that the plants are hanging over the side.

Mr. Stark's Hanging Garden is modeled after the Hanging Gardens of Babylon, one of the seven ancient wonders of the world. The Hanging Gardens of Babylon were tiered on walls and irrigated by means of an artificial canal system. These gardens were famous throughout the ancient world for their beauty and technical mastery.

Mr. Stark collected many historic items. Explore this area of Shangri La Gardens to discover pieces of Mr. Stark's interesting collection.



Sugar Kettles were used to make sugar. Sugar cane would be crushed to extract sugar cane juice. This would then be boiled down and ground.



Horse Troughs are still used today to provide water for horses.



Mill Stones can be found all throughout the gardens being re-used in different ways. Mill stones are used for grinding wheat or grains.



Brown Daylily Collection, Explorer Tour # 14, is a collection of plants! Find the collection and read the sign to learn more.

Heronry Blind

Explorer Tour #15

The Heronry Blind is a space that allows guests the opportunity to observe wildlife in their natural habitat. The slatted Cypress walls were designed for guests to gaze through without disturbing or distracting the animals.



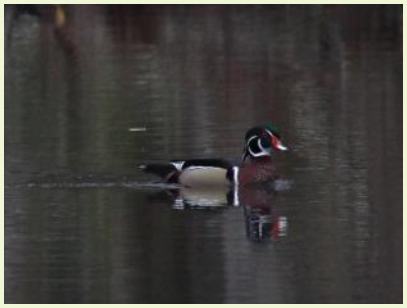


Ruby Lake is a special place within Shangri La Gardens as it provides a resting and nesting space for a wide variety of birds that migrate through Southeast Texas. Bird diversity and numbers fluctuate within depending on the season.

Throughout the year, at least 17 species call Ruby Lake their home. Some species include Wood Ducks, Great Egrets, Cormorants, and American White Ibises.

Check out the informational panels within the Heronry Blind to learn more about the variety of birds that frequent Ruby Lake!





Wood Duck



Cormorant



Egret

Helpful Hint

If the Texas heat is not your friend today, the ceiling fan switches are located to the left of the Heronry Blind entrance. Simply press the switch to turn the fans on.

Artist Concepts: Contrasts, Color

Explorer Tour #16 and #17

Contrasts Garden | Explorer Tour #16

Contrast is an attractive artistic concept used in a wide range of art and design applications. The Contrasts Garden uses plants to highlight contrasting colors. Contrasting colors are opposite on the color wheel.

At any given time of the year in this garden, you may find combinations of red and green, blue and orange, or yellow and purple. Artists use the element of contrast to emphasize color. Often if two contrasting colors are placed next to each other, the individual colors will "pop" to ones eye. What colors do you see today?





Color Garden | Explorer Tour #17

The Color Garden demonstrates different shades of the same color. Color is especially important for a flower. Flowers use different colors and patterns to attract pollinating insects, birds, and bats. Some flowers even utilize colors on the **ultraviolet light** spectrum. The patterns made on these flowers are detected by **pollinators** but can not be seen by humans without the help of an ultraviolet light. What colors do you see in the garden today?





Pond of the Blue Moon

Explorer Tour #18

In James Hilton's novel, *Lost Horizon*, the mystical Shangri-La was located in the valley of the Blue Moon. Within our Shangri La Gardens, the Pond of the Blue Moon honors the book that inspired it's name.

Pond of the Blue Moon—1950's



When Mr. Stark originally built Shangri-La, he planted many azaleas around Ruby Lake. He dreamed of using the reflective properties of the water to multiply the floral images.

Beginning in early Spring, you can watch the colorful azalea blooms dance in the reflection of the Pond of the Blue Moon, just as Mr. Stark had once envisioned for his colorful oasis.

As you stroll through Shangri La Gardens, you will find Mr. Stark's passion for azaleas has been sprinkled throughout the gardens. There are 40 different varieties of azaleas planted within Shangri La Gardens. Mr. Stark chose his favorite variety to surround the Pond of the Blue Moon, the Afton Villa Red azalea, later renamed Southern Charm.

Modern Pond of the Blue Moon



Spring is not the only season worth visiting the Pond of the Blue Moon. This man-made body of water features many unique plants such as weeping cypress trees and irises. A wide variety of aquatic animal species also call this home. Catfish, blue gill and bass are just a few species of fish that inhabit this body of water.

Shangri La Gardens' Wildlife Curator frequently stocks this pond with aquatic wildlife to ensure students have the opportunity to catch a fish when participating in school programming.

Ruby Lake Runnels

Explorer Tour #19

As you walk along the Great Lawn, you will see that it is separated into 4 sections. The Great Lawn is separated by a series of ditches, also called runnels. These runnels collect and transport water. The Ruby Lake Runnels are connected to Ruby Lake, and eventually the Wetland Demonstration Garden.

Take a close look at the runnels. What do you see?

The Ruby Lake Runnels are an excellent example of **biodiversity**. Here, there are many different kinds of plants. If you're lucky you may even see a snake, turtle, frog, or crawfish.



Runnel with few plants



Runnel with high biodiversity

The plants play an especially important role in the runnel system. Plants prevent erosion during a hard rainfall. Plants can also absorb nutrients such as **phosphates** and **nitrates**, that become harmful in high concentrations.

Areas similar to these runnels are very important in our everyday life to form ecological buffer zones. A **buffer zone** helps to minimize the impacts of adjacent areas and keep natural areas functioning.

Buffer Zone– an area of vegetation near a waterway that is designed to minimize the impact of runoff from an adjacent land use

Sculpture Rooms

Explorer Tour #20, #21, #22, and #23

These four garden rooms have different sculptures highlighted in each of them. These sculptures were designed and created by Linda Covit, a Canadian sculptor. Each garden demonstrates how nature is reflected in art and how art is reflected in nature.

Spend some time in the sculpture rooms to look for connections between the sculptures and the plants growing nearby.

Spiral Garden | Explorer Tour #20 **Branching Garden | Explorer Tour #21**



Spiral Garden:

Many plants and animals grow in spiral shapes, like snails or the tendrils on vines. Practice drawing a spiral, does it remind you of anything?

Branching Garden:

All trees have branches. Branches make up the canopy, or top layer of a tree.



Circle Garden | Explorer Tour #22 **Stripe Garden | Explorer Tour #23**



Circle Garden:

Circles are found in the living (**biotic**), and nonliving (**abiotic**) parts of nature. Can you find examples of both biotic and abiotic circles?

Stripe Garden:

Many plants and animals have stripes, like the stripes on a bee or the veins on a leaf. Stripes are a great



Magnolia Plaza

Explorer Tour #24



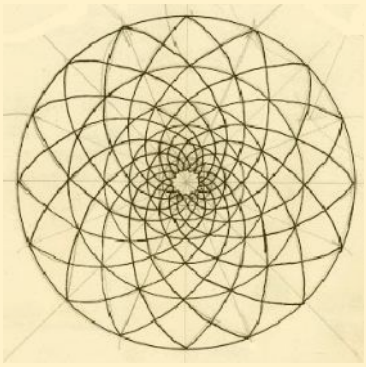
The round area in the middle of this plaza contains a magnolia tree. Magnolia trees have thick, waxy leaves that are dark green on top with a soft brown underside. They produce brilliant white flowers, and red seed pods.







Follow the pattern on the walkway at magnolia plaza. This pattern mimics the pattern found on magnolia seed pods. Read about the **Fibonacci sequence** and how it relates to nature on the metal sign at Magnolia Plaza.





Nature Discovery Center

Explorer Tour #25



Cypress-Tupelo Swamp

Explorer Tour #26

Walk to the back deck of the Nature Discovery Center. Here, you can glimpse the cypress-tupelo **swamp** sandwiched between Ruby Lake and Adams Bayou. Cypress swamps are a common ecosystem in southeast Texas. These swamps play an important role in providing habitat for numerous species of animals, and in holding excess water to prevent flooding.





Bald Cypress



Tupelo

The two dominant tree species in the swamp are Bald Cypress and Tupelo. Other vegetation commonly found in these swamps include Red Maple, Black Willow, Wax Myrtle, Pickerel Weed, and lilies. Cypress-Tupelo swamps are flooded year round, and dry out only during the most severe droughts.

Wetlands, like this swamp, support a variety of wildlife. Crawfish, gambusia, catfish, and other fish are commonly seen in these waters. The swamp is also home to alligators, turtles, owls, herons, egrets, nutria, and otters. Raccoons, bobcats, and coyotes frequently visit swamps in search of food.

Glossary

Abiotic - non-living factors in an environment. These include sun, water, temperature, air, wind, etc.

Annual - a plant that completes its entire life cycle in one growing season. If the plant comes back it will be from seeds that the parent plant dropped, not from the roots.

Biodiversity (n.)/biodiverse (adj.) - a variety of different life forms in a habitat

Biotic - living factors in an environment. These include plants, animals, bacteria, etc. and anything dead that was once living.

Buffer Zone - an area of vegetation near a waterway that is designed to minimize the impact of runoff from an adjacent land use.

Cistern - a tank for storing water

DDT - dichloro**d**iphenyl**t**richloroethane is one of the most well-known synthetic pesticides. Before being banned, this pesticide was poisoning our wildlife and environment causing a huge decline in the bird
population.

Dendrochronologist - a scientist that studies tree-ring growth and change

Epiphytes - a plant that grows on another plant but is not parasitic. Epiphytes absorb water and nutrients from the air. Examples—orchids, Spanish moss, some ferns.

Fibonacci sequence - in mathematics, a series of numbers where the next number is found by adding up the two numbers before it. This sequence is a naturally occurring pattern found throughout nature.

Herbaceous - having little or no woody tissue and persisting usually for a single growing season.

Nitrates - inorganic chemical that plants use. However, high levels of nitrates can often cause death of fish and other aquatic animals. High levels are often due to surface runoff from agricultural or landscaped areas that have excess fertilizer and also after the breakdown and decomposition of animal or human waste.

Glossary

Parasitic - an organism living in, with or on another organism that is dependent on the host for existence without making a useful or adequate return.

Perennial - a plant that completes its life cycle over several years.

Phosphates - inorganic chemical that is a highly sought after resource for many plants. It is often the limiting nutrient in environments. However, if there is an addition of high levels of phosphate to an environment, it often causes blooms in certain plant populations.

Phytoremediation - the use of plants to reduce concentrations of toxic effects in the environment.

Pollinators - animals that aid in the process by which pollen is transferred in plants,. Pollen transfer enables fertilization and sexual reproduction for the plant.

Pollutants - a waste material that pollutes either the air, water or soil. Three factors determine the severity of a pollutant: its chemical nature, the concentration and the persistence.

Swamp - a wetland dominated by woody vegetation that is often partially or intermittently covered with water (a flooded forest).

Ultraviolet Light (UV) - having a wavelength shorter than wavelengths of visible light but longer than those of X-rays. Found in sunlight and causes many substances to glow or fluoresce (like a black light).

Wetlands - land that is covered, often intermittently, with shallow water or has saturated soil.

Notes

Shangri La®
Botanical Gardens
& Nature Center

October 2021

BY RESERVING THIS FIELD TRIP, THE SCHOOL AND/OR HOMESCHOOL PARENT ASSUMES ALL RISK INCIDENT TO THE FIELD TRIP INCLUDING BUT NOT LIMITED TO PROPERTY DAMAGE AND PERSONAL INJURY, AND BY RESERVING THIS FIELD TRIP NOW AGREE TO RELEASE SHANGRI LA BOTANICAL GARDENS AND NATURE CENTER AND THE STARK FOUNDATION, OUR AGENTS, AND RELATED ENTITIES FROM ALL LIABILITY FOR ANY LOSS, INJURY, OR DAMAGE THAT YOU MAY SUSTAIN, EVEN IF THE LOSS, INJURY, OR DAMAGE IS CAUSED BY OUR SOLE NEGLIGENCE OR FAULT.

ALL SCHOOLS AND OR HOMESCHOOL PARENTS SHOULD KNOW THAT COVID-19 HAS BEEN DECLARED A WORLDWIDE PANDEMIC BY THE WORLD HEALTH ORGANIZATION. COVID-19 IS HIGHLY CONTAGIOUS AND IS BELIEVED TO SPREAD MAINLY FROM PERSON-TO-PERSON CONTACT. AS A RESULT, FEDERAL, STATE, AND LOCAL GOVERNMENTS AND FEDERAL AND STATE HEALTH AGENCIES RECOMMEND SOCIAL DISTANCING, THE WEARING OF CLOTH FACE COVERINGS, AND HAVE, IN MANY LOCATIONS, PROHIBITED THE CONGREGATION OF GROUPS OF PEOPLE. SHANGRI LA BOTANICAL GARDENS AND NATURE CENTER AND THE STARK FOUNDATION CANNOT GUARANTEE THAT FIELD TRIP ATTENDEES WILL NOT BE EXPOSED TO COVID-19 WHILE PRESENT AT THE SITE. SOME FIELD TRIP ATTENDEES MAY BE MORE VULNERABLE TO COVID-19 DUE TO OTHER HEALTH CONDITIONS THAN OTHERS. SCHOOL AND /OR HOMESCHOOL PARENT AGREES TO INFORM ITS FIELD TRIP ATTENDEES THAT THEY SHOULD SATISFY FOR THEMSELVES THAT IT IS SAFE FOR THEM TO BE PRESENT TO ATTEND THE FIELD TRIP ON SITE DESPITE ANY SPECIAL VULNERABILITY THEY MAY HAVE.