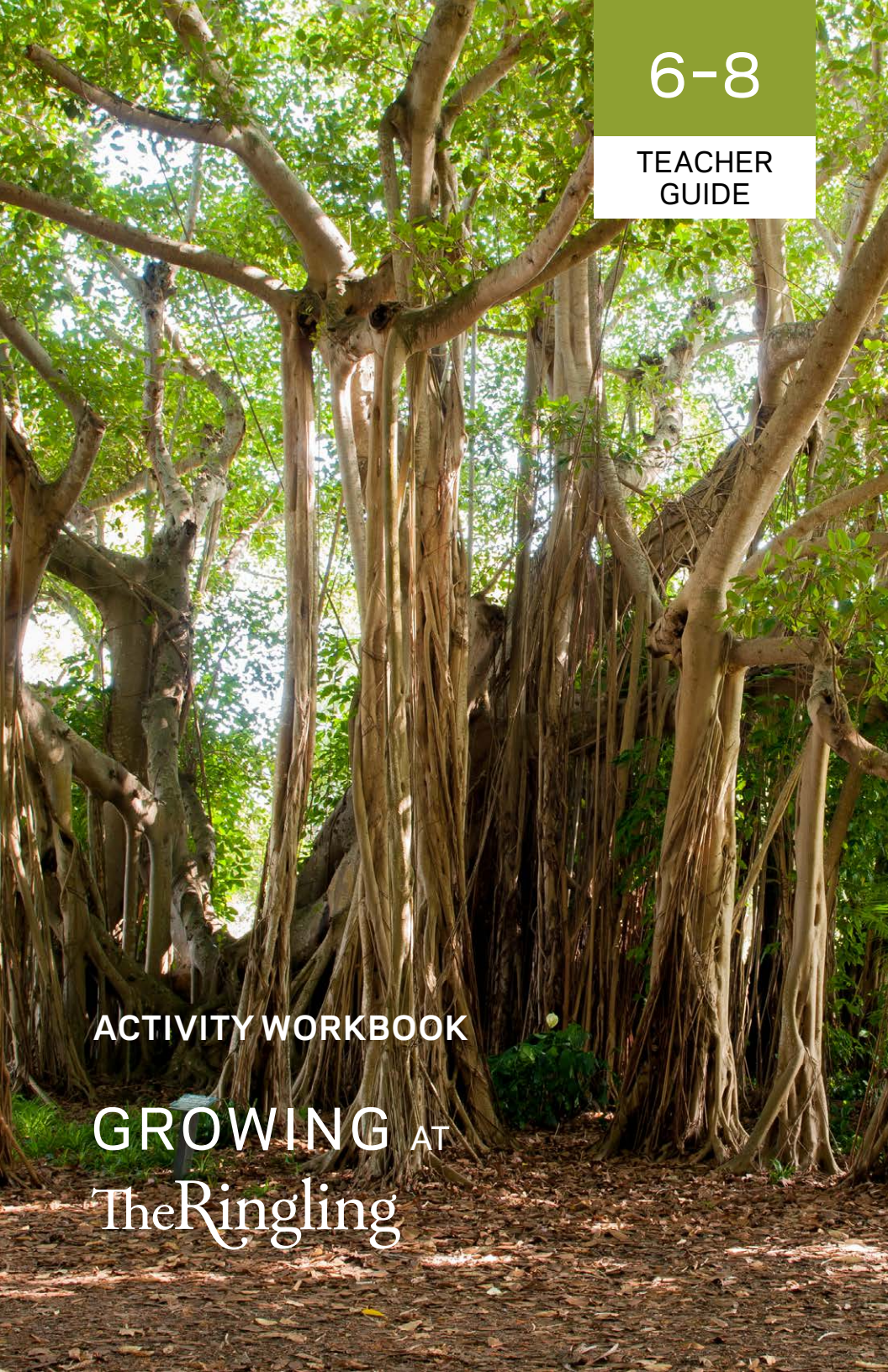

6-8

TEACHER GUIDE

ACTIVITY WORKBOOK

GROWING AT The Ringling

Welcome to the Bayfront Gardens!

The Ringling Museum is known for its art and circus collections, but did you know it is also home to 66 acres of grounds and gardens? During your visit today you will discover various ecosystems, genetic diversity, and beautiful landscapes. As our "living collections" these gardens provide a beautiful and scientific view of The Ringling. We hope you enjoy your garden adventure today!

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WORDS TO KNOW

Genotype: DNA sequence that determines physical characteristics

Phenotype: visible characteristics

Dominant Trait: genetic sequence that is visible if present

Recessive Trait: genetic sequence that is only visible if not dominant trait is present

This teacher's guide will help chaperones and teachers answer questions about the workbook, and provides lesson suggestions for learning extension in the classroom.

We hope you enjoy your tour today at the Bayfront Grounds and Gardens!

STANDARDS: SC.6.N.1.4, SC.6.P.11.1, SC.7.L.16.2, SC.7.L.17.1, SC.7.L.17.2, SC.9.L.18.2

Rosy Inheritance

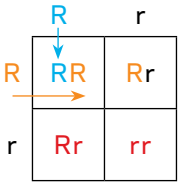
Go to the Rose Garden marked on your map.

Scientists and gardeners create new rose species by selecting plants to reproduce based on their appearance or genetic performance. During reproduction, scientists are looking for specific genotypes. Genotypes are DNA sequences that determine what phenotype, or visible characteristics, a new plant will have.

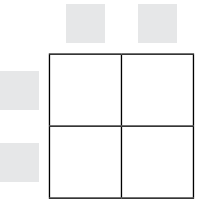
Hybrid tea roses are common because of their beautiful flowers and sturdy plant structure. Flower color can be predicted by using a Punnett Square. Together, let's create a simple Punnett square to predict flower color. Fill in the remaining squares.

R – Red flower, dominant trait

r – White flower, recessive trait



Now try predicting the flower color on your own hybrid tea rose by reproducing a red dominant flowering plant **(Rr)** with a white flowering plant **(rr)**.



How many variations are possible? 2

What phenotype would you like best? _____

What will you name your hybrid tea rose? _____

There are hybrid tea roses throughout this garden. Find three and list them in chronological order by date they were created below.

_____

_____

_____

Fueling an Ecosystem

Head over to the Millennium Tree Trail marked on your map.

Walk the trail and find a tree.
Sketch the following aspects of your tree in the boxes below.

How does your tree's leaf structure help photosynthesis?
Large leaves capture more sunlight and carbon dioxide.
Veiny leaves transport more water.

Does your tree contain a lot of chlorophyll? How do you know?
The greener the leaves, the more chlorophyll!

Why are trees important in the carbon cycle?
Trees produce oxygen, and help to decompose the soil.

Observe the ecosystem around your tree and write down some things you notice. Based on observing the tree's environment and information you gathered from the label **answer** the following questions.

What type of environment might your tree like best?

_____

How do you know that?

_____

Ecosystems are made of:

Producers who create energy	**Consumers** who eat producers to gain energy	**Decomposers** who break down organic materials

List 3 producers, consumers, and decomposers you might find in this ecosystem.

Producer	Consumer	Decomposer
_____	_____	_____
_____	_____	_____
_____	_____	_____

What role does your tree perform? _____

CLASSROOM CONNECTIONS

Back in the classroom, instruct students to use their life cycle lists to create visual food web using markers or colored pencils. Then students can create their ideal ecosystem using producers, consumers and decomposers to create their own interconnected world.

Gardens Rock!

Head over to the Japanese rock garden located on your map.

Zen rock gardens are an ancient art practiced in Japan. Rock gardens are sacred so at this garden we will look and observe, but not touch.

TURN and TALK: In groups of two or three, discuss the cultural significance of rock gardens, and what symbolism you can find here.

Using an aerial view (looking down from above)
sketch the garden and its ripple effect.

Calculate the potential energy of one rock in this garden if the rock weighs 0.001 kg, the speed of the Earth is 9.8 m/sec, and the rock is 1 m above the ground. (PE=mgh).
PE = (0.001)(9.8)(1) PE = 0.0098 Jules

If there are 10,000 rocks in this garden, what is the potential energy of the entire garden? 98 Jules

Explain how the potential energy of this garden changes when the gardener is raking.
When set in motion, potential energy will change to kinetic energy.

Located next to the rock garden is a small grove of Timor black bamboo. The stalks of this rare and unusual bamboo turn black after 2-3 years. Which plants are the oldest? How can you tell?
The black and wide bamboo stalks are the oldest plants.

CLASSROOM CONNECTIONS

Identify Japan on map and find the latitude and longitude, capital city, number of islands and other geographical information. Discuss the role Japan plays in world history. Then in small groups, research images of famous rock gardens in Japan and around the world. Construct a small desk rock garden using sand or pebbles, toothpicks, miniature trees or plants, and other decorative elements.

It's Complicated – Ecological Relationships

Head over to the Dwarf Garden marked on your map.

Below are the five major types of ecological relationships. **Walk** around this garden and find an example (or make one up!) of each relationship.

Mutualism – both organisms benefit
bees pollinating, fungi decomposing leaves

Commensalism – one organism benefits while the other is unharmed
Ants under the roots, lichen on trunks, vines on trees

Competition – two or more organisms compete for resources
Banyan and bamboo need soil and water, squirrels and birds want seeds

Predation – one organism eats another
Birds eat beetles

Parasitism – one organism benefits while the other is harmed
Banyan attaches to host tree, animals eating other animals

Did you know banyan trees are commonly called strangler figs? This tree attaches itself to a host and sends down large hanging roots. Those things that look like trunks are actually the roots from a single tree!

These dwarves are from Italy and are a common feature in Italian Renaissance gardens. Which one is your favorite?

CLASSROOM CONNECTIONS

Lead a class discussion on the ecosystems you visited today. Ask students what would happen if humans moved in to those ecosystems. How would they change? Which organisms would be at risk? What resources would humans use?

1 Mable's Rose Garden
2 Millennium Tree Trail
3 Japanese Rock Garden
4 Dwarf Garden
★ Entrance
Restrooms

HOURS
All Venues Open Daily 10:00 AM – 5:00 PM
Museum of Art & Circus Museum
Open Thursdays until 8:00 PM

5401 Bay Shore Road, Sarasota, FL 34243
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The Ringling
THE JOHN & MABLE RINGLING MUSEUM OF ART
STATE ART MUSEUM OF FLORIDA | FLORIDA STATE UNIVERSITY