

Plant Explorer's Field Journal

**A Trek through the Wilds
of the U.S. Botanic Garden
Conservatory!**



Welcome! Time to embark on your very own exploring expedition in the U. S. Botanic Garden (USBG) Conservatory to discover the amazing world of plants! Use this field journal to record your experience.

Official Briefing for Your Expedition

From 1838 to 1842, the U.S. Congress funded the U.S. Exploring Expedition to the southern seas. Six ships, commanded by Lieutenant Charles Wilkes, traveled more than 87,000 miles (that's 1.5 million football fields!) exploring the world's oceans, continents and islands. Over the four years, expedition scientists collected living plants, pressed specimens and cultural artifacts. These items were among the founding collections of the Smithsonian, U.S. National Herbarium and U.S. Botanic Garden.

Three plants in the U.S. Botanic Garden Conservatory are descended from plants collected during the U.S. Exploring Expedition. Look for this symbol as you trek through the USBG to help you find these historic plants. (*A list can be found in the back of this Journal to see if you found them all.*)



Don't worry – your expedition won't take four years!

What is a field journal?

Botanists and other scientists keep field journals to record observations, thoughts, and questions about the life forms or habitats they study. Botanists' field journals typically contain:

- * The date and location of the observation
- * A sketch and description of the size and color of the plant (or its notable parts)
- * A description of the habitat of the plant
- * Questions raised by observations

"Ferocious blue cycad (Encephalartos horridus) - This small cycad is up to 31 inches tall and 11 inches across. The trunks of this plant branch freely, creating dense tangles of blue-green stems and leaves. The leaves are tough and have very sharp points. We found this cycad in open rocky areas."

- Lt. Charles Wilkes

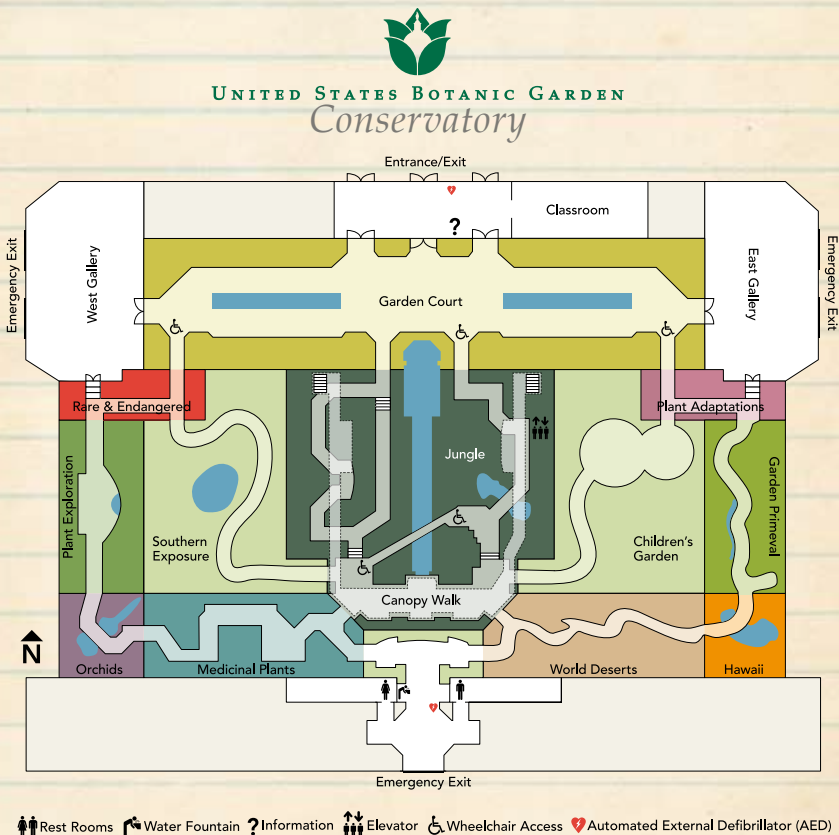
Begin your expedition!

Scientists on the U.S. Exploring Expedition found amazing plants. As you travel through the Conservatory, you will record your own observations, learn about the plants in our collection and complete activities. When you've explored each room, you'll be encouraged to select one plant you find amazing. At the end of your visit, look back and see the amazing collection of plants that you have documented!

Be sure to look in the USBG garden beds for this symbol while on your expedition – it will give you a clue for each room's *Find Me!* plant



Here's a map to get you on your way:



Destination: Garden Court

In the Garden Court you will find plants that people use – in many ways!

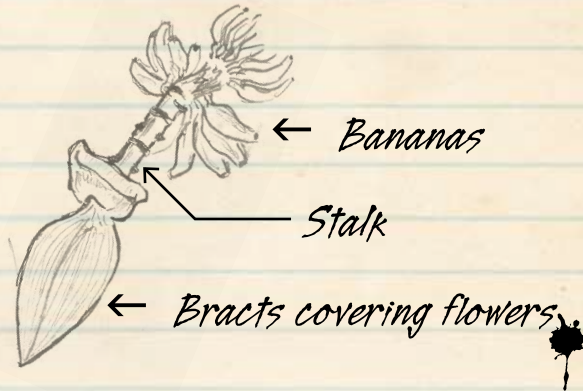
Fast Fact:

Plants help us meet our needs, by providing such things as food, building materials, fiber for our clothes, paper and fragrance. What are some ways that you use plants?



Find Me!

Banana (*Musa spp.*)



There is often a large, strange-looking, purplish structure hanging from one of our many banana plants. The structure is called an inflorescence. It is not one big flower, but actually hundreds of flowers! Each evening, a bract pulls up to reveal a double row of flowers. The rows of white, nectar-rich female flowers eventually become bananas.

There's a U.S. Exploring Expedition Plant in here — did you find it?

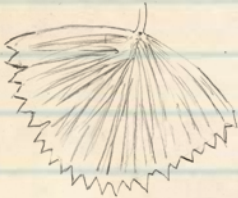


U.S. Exploring Expedition Plant

My Amazing Plant choice for the Garden Court is:

Your Quest!

Look at the images below. Can you match the plant to the product?



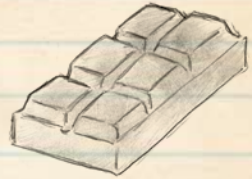
(A) Panama hat palm (*Carludovica palmata*)



___ Building Materials



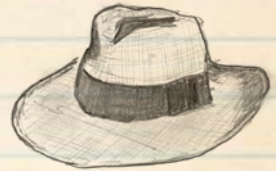
(B) Ylang-ylang (*Cananga odorata*)



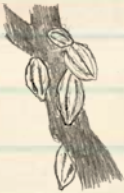
___ Chocolate bar



(C) Manila hemp (*Musa textilis*)



___ Panama hat



(D) Cacao tree (*Theobroma cacao*)



___ Rope



(E) Bamboo (*Bambusa vulgaris* 'Vittata')



___ Perfume

Destination: Rare and Endangered

Here you will see some plants that are otherwise hard to find because few exist in the wild.

Fast Fact:

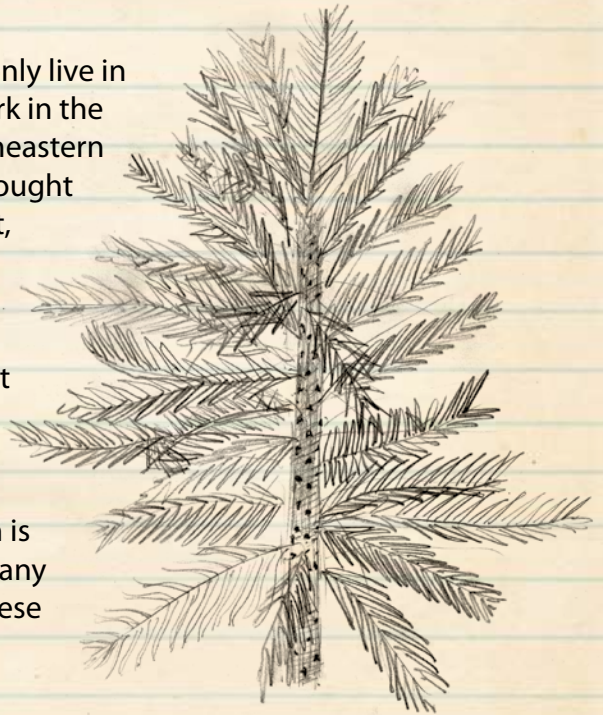
Plants are disappearing! It is believed that one out of every five plants is in danger of extinction. What does extinction mean?



Find Me!

Wollemi pine (*Wollemia nobilis*)

In the wild, these trees only live in the Wollemi National Park in the Blue Mountains of Southeastern Australia. It was once thought that this tree was extinct, existing only in fossils. However in 1994 a park ranger discovered a grove of these plants; it wasn't extinct! Since there are so few Wollemi pines in the wild, their exact location is kept a secret to prevent any harm from coming to these special trees.



Your Quest!

Scientists from the International Union for Conservation of Nature (IUCN) study plant and animal species and make a list of those most at risk for extinction. They examine several factors including population, rate of decline, threats to survival and geographic range.

IUCN scientists assign the species to a risk category, which include:

Least Concern – Lowest risk

Near Threatened – Likely to become endangered in the near future

Vulnerable – High risk of endangerment in the wild

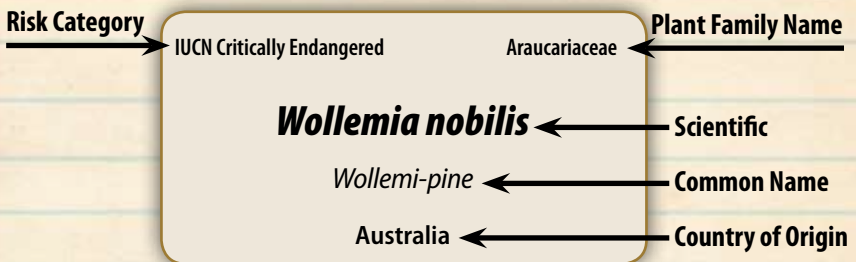
Endangered – High risk of extinction in the wild

Critically Endangered – Extremely high risk of extinction in the wild

Extinct in the Wild – Known only to survive in cultivation

Extinct – No known individuals survive

These categories can be found on the plant's IUCN label.



Look at the IUCN labels in this room. Count how many plants fall into each category by using hash marks.

IUCN Designation	Number of Species ()
Least Concern	
Near Threatened	
Vulnerable	
Endangered	
Critically Endangered	
Extinct in the Wild	

Keep your eyes peeled for more IUCN labels throughout the Conservatory!

My Amazing Plant choice for Rare and Endangered is:

Destination: Plant Exploration

From historic explorations to the search for new species, humans are continually exploring the world of plants.

Fast Fact:

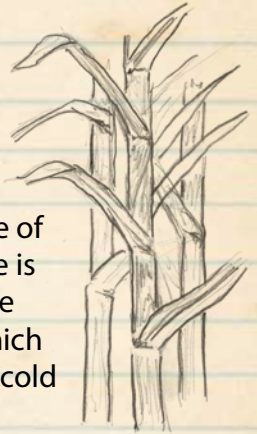
Each day, new plant species are being discovered, grown or studied in every corner of the planet. In your life, what have you discovered, grown or studied?



Find Me!

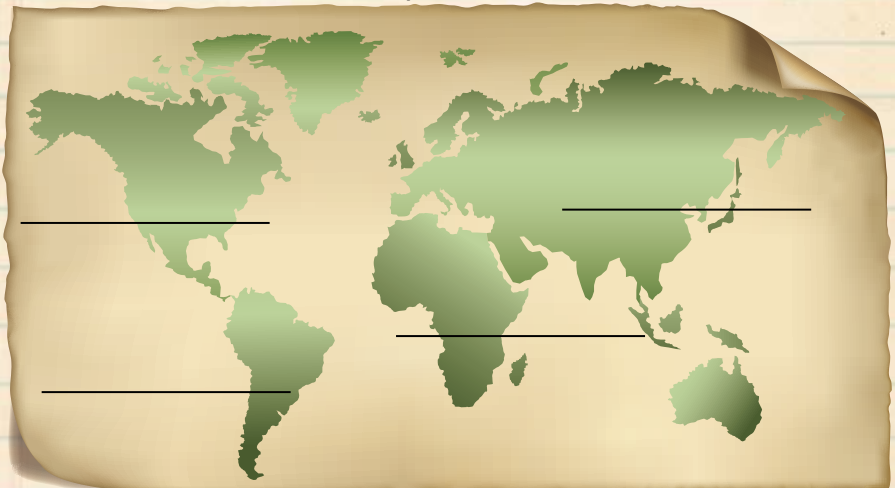
Sugar cane (*Saccharum officinarum*)

Sugar comes from a bag you buy at the store, right? Actually, the sugar we buy comes from one of two plants: sugar cane or sugar beets. Sugar cane is a tropical grass that can grow 10-20 feet high! The stems are crushed to produce raw sugar from which we get molasses and table sugar. In climates too cold for sugar cane, sugar beets are grown instead.



Your Quest!

Do some exploring of your own. Try to find plants from the continents of North America, South America, Asia and Africa. Write their names on the map below.



My Amazing Plant choice for Plant Exploration is:

Destination: Orchids

Plants have families, too! With more than 25,000 species, orchids are one of the largest plant families. The diversity, or differences, among orchids makes these plants fascinating.

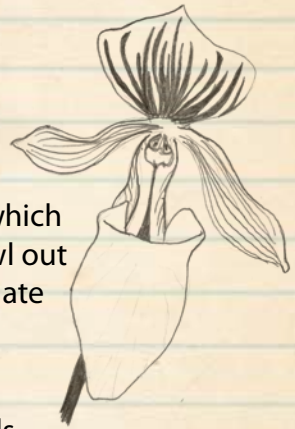
Fast Fact:

Orchids are found on every continent except Antarctica. Is your family found on more than one continent?



Find Me!

Paphiopedilum



These orchids live on the ground and are considered terrestrial orchids. The colorful and fragrant toe, or pouch, attracts insects, which become trapped in the pouch and must crawl out through a specific route, whereby they pollinate the flower and help the orchid reproduce!

Your Quest!

There are two additional categories of orchids that don't grow in the soil and get their nourishment from the atmosphere. Lithophytes grow on rocks. Epiphytes use other plants for support.

Look around at the orchids and see if you can find a terrestrial orchid and an epiphytic orchid:

Category	Name of Orchid	Plant Description
A terrestrial orchid		
An epiphytic orchid		

My Amazing Plant choice for Orchids is:

Destination: Medicinal Plants

Throughout the ages and still today, people have relied on plants for their health and wellness.

Fast Fact:

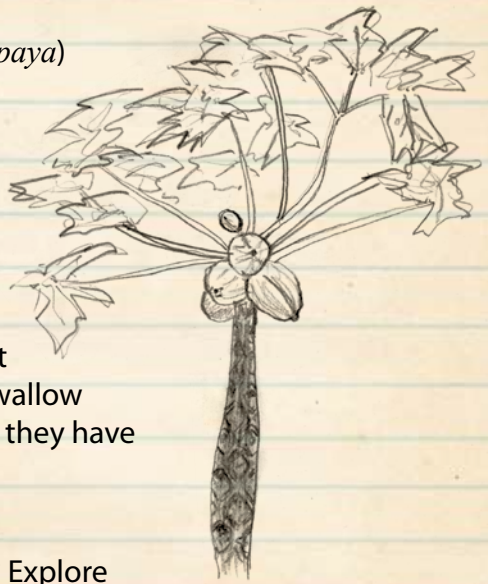
From the common cold to cancer, plants are used in the treatment of many illnesses throughout the world. Did you know that people have always used plants for healing? In fact, many of our medicines come from plants. Do any of your medicines come from plants? Look when you get home.



Find Me!

Papaya (*Carica papaya*)

Papaya is grown for its edible fruit, which is rich in Vitamins A and C. Papain that comes from papaya is used in the treatment of mild stomach problems and jellyfish stings. Doctors use it in the treatment of back pain. Even monkeys swallow the seeds of the papaya when they have intestinal worms!



Your Quest!

Is there a doctor in the house? Explore Medicinal Plants and read the signs to find a plant that could be used in the treatment of the following:

Cold: _____

Malaria: _____

Burns: _____

Cancer: _____

My Amazing Plant choice for Medicinal Plants is:

Destination: Jungle

From the forest floor to the treetops, you'll find plants that are adapted to live in each layer of the Jungle.

Fast Fact:

There are four main layers in the jungle: forest floor, understory, canopy and emergent layer.



Water, light and nutrient conditions differ in each layer, resulting in different plant adaptations depending on where the plants live in the Jungle. Do you act or dress differently when you travel to different climates?



Find Me!

Swiss cheese plant (*Monstera deliciosa*)

In the jungle, the leaves of some plants have holes or slits in them or colors that look like holes or slits. Scientists think this may fool insects into thinking that the plant has "already been chewed" so they will go somewhere else for a fresh meal or to lay their eggs.

Your Quest!

After exploring the plants of the understory, go upstairs to view the canopy and emergent layers of our Jungle from the walkway. After exploring the different layers of the Jungle, write/describe your observations in the following table. Don't forget the palms!

	<i>Forest Floor and Understory</i>	<i>Canopy and Emergent Layer</i>
<i>Leaf Size</i>		
<i>Shape</i>		

Why do you think there are differences in both leaf size and shape in jungle plants?

My Amazing Plant choice for the Jungle is:

Destination: World Deserts

In deserts around the world, plants have adaptations for survival in arid, or dry, environments.

Fast Fact:

Deserts are home to plants that can survive in harsh conditions. Some desert plants have spines or small hairs that shade their surface and protect them from herbivores. Others have seeds that lie dormant until conditions are just right. Still others store rain water for use during dry times. How would you survive a stay in the desert? Are there certain items you would bring?



Find Me!

Texas prickly pear (*Opuntia engelmannii*)

Cactus for dinner, anyone? Both the fruit and the pads of this plant are popular in the cuisines of Mexico and the American Southwest. The fruit is eaten raw or can be made into jelly or candy. The pads, *nopales* in Spanish, can be grilled, boiled or sautéed. Just be sure to remove the spines first!



Your Quest!

Choose a plant you find interesting and draw it below. Think about how this plant is adapted for desert conditions.

There's a U.S. Exploring Expedition Plant in here — did you find it?



U.S. Exploring Expedition Plant

My Amazing Plant choice for World Deserts is:

Destination: Hawaii

Plants on islands often exist there and no place else in the world. They are especially vulnerable when other plants and animals are brought to the islands.

Fast Fact:

Hawaii is made up of both large and small islands. Some plants are endemic to Hawaii, meaning they exist only on one or a few of its islands and no place else in the world. More plants and animals are threatened or extinct in Hawaii than in any other place in the United States. What's unique or special about where you live? How would you feel if it went away?



Find Me!

Cabbage on a stick, Alulu or Olulu
(*Brighamia insignis*)

Gone from the wild due to overgrazing, human development, invasive weeds and the loss of its native pollinator, this plant no longer survives in its native habitat. Today it is pollinated by hand and grows in gardens and greenhouses.

Your Quest!

Because many of the plants in this room are so rare, scientists have to look carefully to find them in the wild. How many of the following plants can you count in this room?



Olulu _____
(*Brighamia insignis*)



Kauai delissea _____
(*Delissea rhytidosperma*)

My Amazing Plant choice for Hawaii is:

Destination: Garden Primeval

This room shows what a forest may have looked like during the Jurassic Period – back when the dinosaurs roamed!

Fast Fact:

Until about 150 million years ago, forests were lush with conifers, ferns and cycads. Now our planet is dominated by flowering plants. But look around – what is missing from Garden Primeval? If the plants in this forest were so successful, why do you think the flowering plants took over?



Find Me!

Scouringrush horsetail (*Equisetum hyemale*)

Gently turn the stem around in your fingers. What does it feel like? Early settlers used it to clean their pots and pans. It was also used for polishing wood and filing fingernails.

Your Quest!

Instead of producing seeds from flowers, many plants such as mosses, ferns and clubmosses produce tiny, single-cell spores for reproduction. Check the undersides of fern fronds (leaves) for brown spots or lines. These are concentrated areas of spores known as sori. Draw what the sori look like on the frond at right.



There's a U.S. Exploring Expedition Plant in here — did you find it?

U.S. Exploring Expedition Plant



My Amazing Plant choice for the Garden Primeval is:

Destination: Plant Adaptations

All plants are adapted to where they live, but some have amazing abilities and relationships that are not often obvious to us.

Fast Fact:

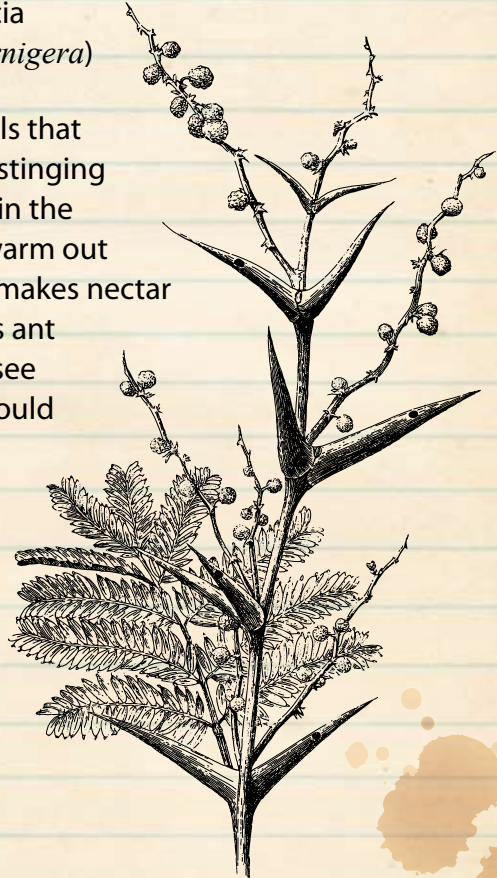
Plants adapt to their environment in many ways! Some plants live together with other organisms and help each other survive. This is called a “symbiotic relationship,” which means one or both benefit from the relationship. When both benefit, it’s called “mutualism.” Who or what in your life helps you? Do you help them too?



Find Me!

Bullhorn acacia
(*Vachellia cornigera*)

Insects and other animals that try to eat this tree get a stinging surprise—ants that live in the plant’s hollow thorns swarm out to defend it! The acacia makes nectar and protein (food) for its ant inhabitants. In order to see these in the wild, you would need to visit Mexico or Central America.



Your Quest!

Plants face many challenges in nature. They develop unique adaptations to help them with needs like communication and protection. Some even have special adaptations for nutrition when they can't get what they need from sunlight alone! Can you find a plant in this room that gets extra nutrition in the following ways: mutualistic relationship (ant plant), root nodules, insect eater (carnivorous plant)?

<i>Nutritional Adaptation</i>	<i>Plant</i>
<i>Mutualistic Relationship</i>	
<i>Root Nodules</i>	
<i>Insect Eater</i>	

My Amazing Plant choice for Plant Adaptations is:

U.S. Exploring Expedition Plants



Remember those three original plants from the U.S. Exploring Expedition that are here at the USBG? Did you find them all?

- * Cycad (*Cycas circinalis*)
Garden Court (Southeast Asia)
- * Vessel fern (*Angiopteris evecta*)
Garden Primeval (Tropical Pacific)
- * Ferocious blue cycad (*Encephalartos horridus*)
World Deserts (South Africa)

Take a moment to explore if you missed one.

Congratulations!

Your expedition through the USBG Conservatory is complete! While your expedition may be complete, your adventure can continue at home. Take a look back at the plants you chose for your "Amazing Plant" collection. After you leave the Garden, you can do research to learn more about them, find photos of them and maybe even grow one of your own. There is a blank page included at the end of this Field Journal so that you can keep writing down interesting plant encounters, no matter where you find them.

Remember to be like a botanist—keep your eyes peeled and be on the lookout, because there are fascinating plants wherever you go!

Notes



This journal belongs to:



**U.S. BOTANIC GARDEN
245 FIRST ST., SW
WASHINGTON, DC 20024**

