Children's Garden Volunteer Manual

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As a Children's Garden Volunteer you play an important role offering children and families creative ways to engage with nature, gardening, Longwood Gardens and the Indoor Children's Garden.

Thank you for participating in this volunteer program and for representing Longwood Gardens to the thousands of guests with whom you will interact.

Longwood Gardens Mission Statement

Longwood Gardens is the living legacy of Pierre S. du Pont, inspiring people through excellence in garden design, education, horticulture and the arts.

Longwood owes its creation to Pierre du Pont. Pierre du Pont purchased the initial 202 acres in 1906 to save a significant collection of beautiful old trees and to be used as a country home to entertain his family and friends. Starting with a simple Flower Garden Path, he began the spectacular Longwood Gardens we know and enjoy today.

We continue Pierre S. du Pont's passion for excellence through innovation, creativity, experimentation and professional development. We strive to connect our guests with this living legacy.

You, as volunteers, are an integral part of sharing his legacy and story with our guests.

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STAFF CONTACT

Nancy Bowley
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610-388-5263

VOLUNTEER POSITION DESCRIPTION

Volunteer within and near the Indoor Children's Garden, interacting with our youngest guests and their families. Engage them in simple, fun and creative activities to engage their curiosity and imaginations. Share information with them and answer questions.

Duties and Responsibilities:

- Interact actively and politely with children and parents in the Children's Garden and at the Curiosity Cart
- Engage children in interactive themed activities
- Be aware of and able to answer general questions from guests about Longwood Gardens, the daily events and displays.
- Effectively use communication skills to limit destructive behavior and encourage safe, fun creative activity
- Work with teammates to keep cart and supplies neat and organized

Requirements/Expectations:

- Volunteer a minimum of four hours per month February through December
- Attend regular team meetings as a Children's Garden volunteer including training on specific children's programs and interpretive training to increase your knowledge
- Bring an enthusiastic and positive attitude
- Enjoy interacting with children but also many different types and ages of people
- Have the ability to stand and walk for two hours
- Attend a general Longwood volunteer orientation
- Follow Longwood Garden's policies, procedures, and standards to create a great guest experience

Children's Garden Volunteer Policies and Procedures

VOLUNTEER SHIFTS

Shifts are from: 10:00 am–12:00pm or 12:00pm–2:30pm.
On Saturdays and Sundays there is an additional 2:30pm–4:30pm (or 5pm) shift
During the summer months you may volunteer evenings when the Gardens are open. Be sure to sign in. The sign in sheets are how all of your CG Volunteer hours are submitted.

Generally two volunteers are needed per shift; however, you may also work on your own. You are encouraged to sign up for a regularly scheduled time slot via the on-line calendar, but you may also select various slots or fill in any time you are available and there is an open slot.

Working a double shift - Some volunteers like to volunteer two shifts in one day. If you work a double shift and choose to take a short lunch break, please subtract those hours from the total hours worked.

SCHEDULING A VOLUNTEER SHIFT

You can see the current schedule online. Schedule yourself using this online calendar.
Online Calendar - http://our.calendars.net/lwg/lwgcgcalendar
You can also find this calendar on our website under the volunteer page:
http://longwoodgardens.org/volunteering/volunteer-calendar
Or you can bookmark it, or make it one of your favorites, on your personal home page.

To add your own name to our online calendar you will need to create a new entry for yourself.

To schedule yourself and add your name to the calendar –
1. Open the calendar. http://our.calendars.net/lwg/lwgcgcalendar
2. Click on the date.
3. Click on the "create" tab. Enter only your full first name and initial of last name.
4. Then enter start and end times of shift: 10:00am–12:00pm, 12:00pm–2:30pm
5. Click submit only once.
6. Click on the "view calendar" tab to view the calendar and check your entry.

Removing yourself from the online calendar

Logon to the calendar using the instructions listed above.
Click on the date (the actual date #).
Click on the EDIT button next to your name
Use this user name and password for editing privileges: 0418
Click on the DELETE button at the bottom of the box
Your name should be removed at that point.

Children's Garden Volunteer Policies and Procedures

CANCELLING A VOLUNTEER SHIFT

Your team members and our guests depend on you. Please do your best to avoid cancelling at the last minute. If you have to cancel your shift at the last minute, please email your staff coordinator to let her know, and take yourself off the online calendar.
Please contact Nancy Bowley at nbowley@longwoodgardens.org. or 610-388-5263 with any questions.

COMMUNICATION

Nearly all volunteer communication, updates and important information will occur via email. Please be sure to check your email regularly so you don't miss anything important. Your staff coordinator will send you regular emails regarding updates for this team and email you with additional important information or notices about Longwood.
The volunteer services manager will also send you important updates and information.

Please contact your staff coordinator to let her know if you will have to miss a shift, if you observe any supplies or materials are damaged or missing, or if you have any questions. The volunteer offices are located upstairs in the Pierce du Pont House so feel free to stop by.
If you need a new parking sticker, nametag or other administrative need please email volunteerservices@longwoodgardens.org and the central volunteer office will help you.

VOLUNTEER RULES AND POLICIES

Attire

You represent Longwood Gardens so please dress appropriately, neatly and cleanly. Always wear your nametag. Dress for the weather accordingly. Summer attire can include sandals and shorts but they should be neat, clean and conservative.

Volunteer Aprons – There are Children's Garden aprons for you to wear folded in the cart. You are not required to wear them but they can be part of your uniform and keep your clothing clean also. They are handy for carrying scavenger hunt cards or puppets as you move around the Children's Garden.

Cell Phone Use

Please refrain from using your cell phone to send or receive phone calls or texts during your shift as this is not a welcoming signal to guests. Please set your phone on vibrate if you bring it with you. If you do need to use your phone, please step out of the public eye to take your call. Remember you are an ambassador of Longwood and are "on stage" while volunteering.

Food or Meals

Volunteers should eat before or after their shifts. Anyone who wishes to take advantage of their volunteer benefit of a discounted meal at the Café should do so before or after their shift.

YOUR VOLUNTEER SHIFT

At the Start of your Shift –
Stop by the Conservatory Information Desk on your way in to check on the daily current events or changes you need to be aware of. You can pick up a daily lineup to use as a resource. GSA staff members will also stop by the Curiosity Cart to inform you of the day's activities.

Volunteer closet- You can leave your coat in the volunteer closet downstairs in the conservatory. It is located in the lower level across from the water bottle machine and labeled "employees only". A key for this door is hanging inside the cart door. There is also a key at the Conservatory Information Desk.
Although this closet is locked do not leave any valuables there.
CG aprons are stored here on the hooks as well as any extra supplies you may need.
This closet is shared with the docent and guest information volunteer teams.

The Sign In Book is located in the Curiosity Cart. Please sign in with your name and hours clearly written for our volunteer hours records.
There is also a notes section for you to make any notations about your shift.
This book also contains copies of all the volunteer documents and activity directions.

THE CURIOSITY CART

The Curiosity Cart is located in the back corner of the Children's Garden near the Bamboo Maze and "back door". Unlock the wheels under the cart using the lever on the wheels. Adjust the cart so that you can get behind it but also keep it out of the traffic zone. Relock the wheels by pushing done on the lever once the cart is situated. Make sure to lock the wheels in place once you have parked the cart. Push the knobs in to pop out the knob so you can open the drawers. Please don't lean on the drawers.

a. Inside the cart – each activity will have its own supplies and they will generally all be located in the cart. You may decide which activity you will do on a specific day. You do not have to work at the cart each shift. You may choose to roam instead with a puppet and scavenger hunt cards in hand. Volunteers working together can choose to alternate their activities.
b. When puppets or other supplies are out stay close by. Don't leave items of value unsupervised for a long stretch of time. If you want to focus on roaming around the CG, tuck everything in the cart first.

c. Some supplies, such as seek and find cards, can be left out at all times. At different times of the year, you will leave out other simple seasonal "props" for guests to see while the cart is unmanned. This will be specified for each activity.
d. Please replace all supplies back in the appropriate spot so the next volunteer can find what they need.
e. It is very important to notify your staff coordinator if anything is missing or broken so that it can be replaced or repaired promptly.
f. Aprons – there are green aprons you can wear while on duty. They are either folded in the cart or hanging in the closet downstairs.
g. At the end of your shift – please make sure to neaten the cart and put everything back in place. Store all supplies by category in the different storage boxes, puppets together and seasonal materials organized. Throw away any trash will may have collected in the trash can near the CG entrance. This makes it much simpler for the next volunteers to start their shifts.

STAFF SUPPORT - THE GUEST SERVICE ASSOCIATES (GSA'S) ROLE

There will always be a GSA staff member on duty in the Children's Garden.
Just the highlights of their responsibilities –

- Enforce and encourage good garden etiquette(see rules below)
- Supply towels for wet guests
- Your first contact in an emergency and have basic first aid supplies
- Operate Children's Garden elevator
- Welcome and inform guests
- Assist with way finding – helping guests to find garden locations and highlights

CHILDREN'S GARDEN ETIQUETTE

1. If you see guests running, damaging plants, or doing things that might cause harm to themselves or others gently try to redirect their behavior by distracting them with one of our activities or a positive comment. You are not responsible for discipline but sometimes a comment delivered positively can help turn a situation around. Redirect negative behavior in a polite, friendly, firm but non-aggressive manner – make your statements general, not personal, and avoid the use of negative words such as don't and "you". The Guest Services Associate (GSA) on duty can be contacted when you feel you need staff assistance
2. Guests are asked to leave strollers and Longwood scooters parked outside of the Children's Garden.
3. Wheelchairs and scooters of medical necessity are an exception, although guests should know that their wheelchairs and scooters may not fit in many spots and may get stuck.
4. The elevator is operated by GSA for those with special needs.

5. Children should be dressed and wearing shoes for their own protection – no bathing suits.
6. No one should climb into or on fountains.
7. All plants in the garden may be touched and handled gently.
8. Children should be changed in our spacious restroom and changing areas found at the Green Wall East Entry restrooms or the lower level restrooms.

SECURITY AND EMERGENCY INFORMATION

Security phone contact **610-388- 5222**
No matter how minor or major a situation may appear, the first thing to do is to notify a staff person. Staff will then take over. Do not administer first aid.
The volunteer role is to try to comfort or calm the guest(s) until appropriate staff arrives. Any information you can collect from the guest is helpful, but please don't discuss such things as why or how the incident occurred or the frequency of similar incidents.

GSA staff - Your first contact and they have basic first aid supplies. They can contact security staff for you.
If there is no GSA nearby and someone is hurt, lost or in need of emergency assistance please contact security using the phone number above, or the radio in the cart. Please remain calm and share the basic facts: your location, the emergent issue, and salient details. Stay calm and keep your message to the minimum.

Security staff is the next level of emergency assistance for you. They are trained EMTs and can help in more serious situations.

In a critical emergency such as a suspected heart attack or other serious issue please call 911 and then Security at 610-388-5222. Security will direct the emergency care to the correct location. Please save Security's number to your cell phone also. When you call Security first tell them your name, then tell them your location and what the problem is.

If you witness a minor incident (for example, a bumped head), politely offer to get assistance for the guest. If they refuse, discreetly observe them to see if further assistance is needed. GSA staff can offer a bandage or icepack in a minor injury. Anything beyond that Security must handle. *No volunteers should provide first aid services to a guest.*

In a more serious incident Security will respond immediately to the scene. Security staff is trained in basic first aid and will have a portable First Aid kit with all the essentials. If the injury requires more care, they will call an ambulance and have the guest taken to the nearest hospital or appropriate care facility. No matter what level of attention or care is provided, Security staff then complete a full report on the situation.

If a guest is struggling to walk, or appears weak: Help them to a seat if possible. Offer them the use of a wheelchair or scooter. The GSA team can bring you a wheelchair or (if available) a scooter for the individual. Note: there is a $25 fee for using a scooter and wheelchairs are free. Scooters, wheelchairs and strollers are free for members. Please ask the guest to return the wheelchair to Guest Services in the Visitor Center as they leave the Gardens.

Missing Persons

If you are told by Longwood staff (or hear over the radio) that a 'Code Adam' (which is a process to follow for lost person) is implemented, the Docent's role is to be the eyes of Longwood staff and look for the lost person within your area. If you find the missing guest, radio the Guest Services Associate (GSA) staff (radio channel GServ) or Security staff (radio Channel Sec) that they should come to your location.

If you are approached by a guest with a missing / lost persons situation
Stay with the guest. Remain calm and reassure the guest that all will be resolved shortly. Contact the GSA staff by radio or phone and notify them of the situation. Once staff arrives, introduce them to the missing guest and then step out of the situation, letting Longwood Staff take over.

Fire Alarm
If the Fire Alarm sounds leave the building. Stay calm and walk with the guests to the closest exit.

Guests may ask you "what is going on?", and "when can we go back in?" It is best to say you are not sure, but that hopefully everyone can go back into the Conservatory in just a few minutes. Remain outside with the guests until the Security Team or GSA Team gives the 'all-clear' signal.

RADIO USE

The radio is for emergency use only.
Keep your conversation calm, short and to the point. Do not use any guest names.
You can contact GSA staff on "GSERV" and Security staff on "SEC"

Using the radio:
1. Turn the radio on and adjust the volume by twisting the short knob on top of radio.
2. Twist the tall knob on top of radio to select your channel. The radio view window will show you which channel you are on. You should be on GSERV.
3. Press and hold the large flat button on the left side of the radio to speak.
4. Identify yourself, your location and identify who you are calling.
   Example "I am a volunteer at the Children's Garden (no names are needed).
   Lead GSA do you copy?"
5. Release the flat button to get a reply.
6. Press and hold again and explain briefly why you are calling. Example: "I have a guest who has fallen". "I have a child who has lost his mother".
7. Remember to release the button to hear a reply so you can provide more information.

CONSERVATORY - MISCELLANEOUS INFORMATION

Restrooms with large changing areas are located at the Green Wall near the East Entry Plaza and downstairs in the lower level of the Conservatory.

Emergency AA and AAA batteries for guests are available at the Guest Information desk

Smoking is not allowed in the Gardens.

Scooters rented from Longwood Gardens – Guests with Longwood scooters are welcome in all parts of the Conservatory except the Children's Garden and Ballroom. Guests may use a wheelchair nearby if needed to enter the ballroom.

Scooters owned by the Guest- Guests using their own personal scooters are welcome in all parts of the Conservatory, including the Music Room and the Ballroom.

Wheelchairs – Wheelchairs are available on loan for guests to use in the Conservatory. They are stored near the Green Wall. Guests can return them to the Visitor Center upon exiting the Gardens. Guests using wheelchairs are welcome in all parts of the Conservatory.

Monopod/ tripod/easel use by amateur photographers and artists is permitted in the Conservatory and the Peirce-du Pont House from 9:00 am–12:00 pm daily with a tripod permit.

Food and Drink - Picnicking or bringing in any outside food or beverages (except water) are discouraged. Guests may carry a drink or snacks for children or those with medical needs. Meals should be eaten in the Café. GSA staff can help in the situation when a guest is picnicking in the Gardens.

Drinking Fountains - The drinking fountains are located under the flags in the Exhibition Hall, by the Children's Garden and near the rest rooms in the lower level of the Conservatory. Bottled water is available in a vending machine just outside the Men's rest room in the lower level of the Conservatory.

Lost and Found - Lost items are held at the Guest Information Volunteer Desk until they can be turned over to the Guest Services Associates Team or to Security Personnel. Guests should be directed to check for lost items at the Information Desk in the Visitors Center.

YOUR RESOURCES AND ANSWERING GUEST QUESTIONS

Answer questions to the best of your knowledge and ability. It is important to familiarize yourself with all aspects of Longwood Gardens. If you do not know an answer to a question, it is OK to say so. "Hear-say" and "old stories" are not appropriate information to share with guests, since they cannot be substantiated and often times are not true! If guests have a question you cannot answer below are some resources you can use:

Resources –

- Your Manual
- Longwood Map
- Staff – GSA and garden staff are happy to help, but be respectful of their time
- Conservatory Information Desk – current events, plant information
- Heritage Exhibit in the Peirce–du Pont House
- Longwood Library – Located near the Potting Shed, you may take books out of the library or browse there.
- Website – www.longwoodgardens.org Our website is full of helpful information
- Blog - http://longwoodgardens.org/blog great source of interesting stories

Plant Questions

Although you are in the Children's Garden as a volunteer, you may get plant questions. We do have some plant information in the sign in book. There are Information Request Forms in your binders and at the Information Desk which a guest can fill out to get more information. Make sure the form is filled out with their name and street or email address, and phone number, along with a clear, concise write-up of their question.

Another great option is to let them know that on our website under "Contact" they can email any questions to questions@longwoodgardens.org

Elements of Interpretation

What is Interpretation?

Simply defined: Interpretation connects minds and hearts to a place

A more in-depth explanation is that interpretation helps guests make emotional and intellectual (hearts and minds) connections to a resource – or in our case, Longwood Gardens. Interpretation is more than just you talking, answering questions, or exchanging facts. It is an interactive sharing of experience and knowledge between the interpreter and the audience.

The goal of interpretation is to create a learning environment that changes or enhances a visitor's knowledge, attitude, and perception. This is accomplished by blending a strong, accurate understanding of the topics, a love for the resource, and a concern for the audience.

The three main elements of interpretation can be summarized as **ART**:

1. Knowledge of the **Audience**
2. Knowledge of the **Resource**
3. Interpretive **Techniques**

Each of these elements is discussed in the sections that follow.

1**. Knowledge of the Audience**

One of the key elements of successful interpretation is assessing and adapting to the audience. Guests vary greatly in age, geographic origin, knowledge level, perceptions, and expectations. They also vary in their desire for interactions with human interpreters. Some guests want to be left alone, preferring to quietly listen to your discussion or walk through the area. Others may have just a few questions, while others may have numerous questions and enjoy the interaction.

Let guests dictate the degree to which you interact with them. Make them feel welcome, but do not overwhelm them. If guests seem to welcome interactions, you can try to assess their interest, capabilities, and knowledge level by asking a few questions about themselves and their interests. Do not overestimate the guests' knowledge nor underestimate their intelligence.

Who are our guests? Why do they visit us?

Our audience in the Children's Garden ranges from the very young to the very old. Guests come from all over the world and speak many languages.

Our audience can also be classified in several different ways. One way to look at the guests who come in our doors is to determine why they visit us.

These are **five distinct categories of guests** and their primary motivation for choosing to visit:

Elements of Interpretation

"**Experience Seekers**" primarily derive satisfaction from the fact of visiting this important site. They may have the least advance knowledge and the lowest expectations for their visit. They may want a picture memory and may not spend a lot of time visiting but head on to the next experience.

> Example: A tourist-type that wants to briefly see, set foot in, and photo document that they were at Longwood Gardens so they can share their travel experiences. They are looking for the simplest of experiences and will excitedly share their discovery of "treasures" at Longwood with others. You should offer to take their photo!

"**Explorers**" are curiosity-driven and seek to learn more about whatever they might encounter at the institution. They are looking for a deeper connection and come with a good base of knowledge.

> Example: These are guests that want to understand how Longwood works, its history, and the "hidden" or behind-the-scenes side of the operation. They will readily attend a talk or tour and will want to actively ask you questions.

"**Facilitators**" are focused primarily on the experience and learning of others in their accompanying social group.

> Example: Grandparents with grandchildren or parents with children are a fine example. The Grandparents or parents will most likely have a wonderful past experience or memory of Longwood Gardens and want to facilitate a similar experience in the children. You should talk with the adults, ask them questions and provide helpful suggestions on where or how they might forge these emotional connections.

"**Professional/Hobbyists**" seek a close tie between the institution's content and their professional or hobbyist passions.

> Example: The guest who grows an orchid at home, or has a waterlily garden, or breeds daylilies. In other words, these are guests that identify and directly connect with some part of Longwood Gardens. They want to understand how Longwood cares for the particular resource and compare this to their own care at home, in the hopes of becoming more proficient with the resource.

"**Solace Seekers**" are primarily seeking a contemplative and/or restorative experience. These guests are not likely to be found within the Children's Garden as they may wish to be left alone to experience Longwood in their own way.

> Example: This is the guest who may sit on a bench and be transfixed by the beauty around them, or very slowly stroll through the Conservatory gently brushing plants and deeply inhaling the wonderful scents. They are in their own emotional world. Eye contact and a smile is all you need to provide, letting this guest know you are available for conversation if they so wish.

What type of guest are you?

Elements of Interpretation

Special Groups of Guests - families, tour groups and foreign language speakers

Some special groups of guests are families, teenagers, tour groups and foreign speaking adults. Families can be broken down into two groups: families with children under five, and families with school-age children. Here are some tips for interacting with these types of guests.

- **Families with children under five –** in general, they spend less time in any one place due to the short attention spans of their young children. Keep this in mind when engaging and interpreting with them. Quick observations of any plant or garden element are very interesting to this group. Point out colors or unique smells, and ask the family what they think might be going on. Young children will also welcome an opportunity to touch and examine objects. They are experiential learners and touching an object intrigues this group.

- **Families with school-age children –** should be encouraged to work together and discuss possible answers amongst themselves. Try to find ways for the family to work together and share their awe and discoveries. Remember that children often like to be challenged, to brainstorm ideas, and make discoveries. They rarely like to be quizzed!

- **Teenagers –** in general, like to travel in peer groups. If you are not used to being around or working with teenagers, you may feel a bit uncomfortable interacting with them. The only way to get to know this group better is to just start talking to them. They like to be treated as adults, not kids, so ask higher-level questions that will force them to think. This age group is fascinated with bizarre and unusual facts, but try to lead the conversation back to points about gardening techniques, display, or heritage. Though certainly an interpretive challenge, working with teenagers can be a very rewarding experience.

- **Groups** –Visits by school groups are frequent on weekdays during the school year. These and other groups vary widely in age, purpose, and expectations. Many groups are well behaved, but others may race about. Engaging them with a seek- and-find is the best way to help them experience the Children's Garden in a deeper way. Use the teacher, or chaperone as your aide if the group is largely composed of children. Adults can encourage proper group behavior and can repeat and emphasize important information to younger children.

- **Foreign language speakers** – don't assume that everyone who looks foreign only speaks a foreign language. Take cues from the language they are speaking and how they interact with your first greeting. Often if they truly don't speak much English they will tell you or nod their head no. See if there is a leader of the group who is acting as translator. Slow your conversation and simplify it to fit their comprehension. Even those who speak no English

may appreciate an offer to take their picture or touch an object. Just mime clicking a camera and ask photo? And they may say yes. Or, hold out the object for them to take and feel.

2. Knowledge of Resources

Building your knowledge of Longwood Gardens will help you to better help our guests. Knowledge of Longwood Gardens is based on specialized training, personal experience, and taking advantage of the many free talks and tours you can attend.

Interpreters should develop a professional attitude about their volunteer work and have a respect for accuracy. Learn the information and facts and don't be afraid to say, "I don't know," to a question beyond your knowledge. Guests will appreciate an honest, “I don’t know,” over a guess. Make sure to try to find out the answer that will allow you to provide the information the next time you are asked.

3. Interpretive Techniques

Interpretive techniques are the different ways we share our knowledge with our guests. Conversation is the primary interpretive technique used by volunteers and allows personalized interaction with guests. Interpreters should utilize several interpretive approaches, such as asking guests questions, encouraging close observation of the garden elements, and sharing hands-on objects.

Techniques

Roving interpretation
Interpretive Conversation
Use of Objects and Props

Roving Interpretation

As members of the volunteer interpretive team, you engage in informal interpretation. Your opportunities for interaction with guests are spontaneous and can occur anywhere in the space you are working in.

Roving interpreters move throughout the area they volunteer in talking to guests, highlighting interesting parts of our displays, and sharing behind the scenes information. Their role is to spark the visitor’s curiosity and help them to interpret what they see. It is a give and take flow of communication which is a positive learning experience for both guests and volunteers. When done well, this personal interaction between guest and volunteer leads to deeper connections between the guest and Longwood.

A volunteer at a desk or cart has interested guests come to them. But, many guests are hesitant to take that first step and may never walk up to a cart. A roving volunteer can connect with many

more guests on a more casual level. They can engage the guest in an impromptu manner and interpret what the guest is looking at, or they can highlight something nearby that is worth sharing. A larger part of our displays can then serve as interpretive discussion points.

For the volunteer, this means interpreting “on the fly” and engaging the guest with what they are looking at. Just as a guest may be hesitant to come to you, some volunteers hesitate walking up to a guest to start talking.

Let’s break it down into simple steps to make this less challenging.

1. **Identifying a likely guest** to engage is the first step.
2. Use **positive body language** and a warm initial opening comment to connect with them and determine their interest level.
3. **Fit your conversation to the guest’s interest level**.

Each of these elements is discussed in the sections that follow.

1. Identifying a Likely guest

When walking through an area, be aware of all the guests. If you see a guest who looks quite interested in something, lingers over a display or plant, looks wonderingly around them, or you overhear a “How do they do that?” or “Wow! Look at that!”, then you have the potential to increase their enjoyment of that moment. Engage them with eye contact, a warm smile, and a simple greeting. Use a puppet or Seek-and-Find card to connect with them.

Ask them if they have any questions. Introduce yourself. Our guests are generally happy to be here and pleased to be greeted with a warm smile. When you walk up to the side of an interested group, for example in the Central Cove, take a moment for them to realize you are there. Then engage them in a similar manner. Never interrupt a conversation, just wait for a break before speaking up.

2. Determining the Interest Level of a guest

Every visitor responds differently to a roving volunteer. Some love the interaction and enjoy learning something new. They may even desire an extended interaction. Others prefer to enjoy the displays on their own.

Volunteers can learn a few simple skills to quickly assess the interest level of the guest and adapt their interaction for each guest.

Use your eyes to assess visual clues such as body language and eye contact.

A short reply to your warm welcome or greeting may indicate that they aren’t interested. If a guest is glancing at their watch, it’s a tip that they won’t have time for an interaction. Their eye contact or lack of it is one signal that they would prefer to be left alone. Then, simply continue your walk or wish them a great visit, and leave them to enjoy on their own.

Elements of Interpretation

On the other hand, they may not have a question, but sometimes a good question on your part can lead to good questions from the guest as you spark their interest. Questions are a great way to connect with guests. They can be used to assess a guest's interest or past experiences with Longwood Gardens or gardening. You never know if a guest is a casual visitor, musician, a garden pass holder or the director of the New York Botanical Garden. Your interaction with guests will be based on what experiences they bring to Longwood.

3. Fitting the conversation to the guests' needs

Be mindful that many guests have limited time to spend in any one space. Most of the time, your connection will be short, engaging and over! Wish them a wonderful visit, or help them find another highlight of Longwood before thanking them for visiting.

Some guests will really engage with you and you will have a longer interaction with them. Just take your cue from the guests. Remember to also be aware of other guests around you. They may be following your conversation and want to join in. Do you remember the old idiom 'Eyes In the back of your head"? It usually applied to your mother, a teacher or someone else who always knew what was going on behind them. That's a good skill for a volunteer to develop!

Interpretive Conversation

Great personal communication is made up of three important elements: **words, voice, and body signals.**

Research indicates that only seven percent of our verbal message is communicated through words; 23 percent of our message is communicated through voice; and amazingly, body signals account for 70 percent of our message!

- **Words** - Effective communication involves choosing appropriate words. Words can make a person feel great or terrible and can make a huge difference in shaping the attitudes of your audience. Choose words carefully. Consider the difference between telling someone they are "wrong" versus saying "Actually, a lot of people think that but …," or the difference between describing a gardening task like weeding as, "grunt work," versus, "An effort that results in a beautiful display…"

- **Voice** - This is a vital tool in spoken personal communication. A lower pitched voice is generally more effective in interpretation. However, the volume of your voice should be loud enough for guests to hear you clearly. Speak with enthusiasm and vary the tone of your voice and avoid speaking too slowly or too quickly. Speak clearly without slurring or mumbling.

Elements of Interpretation

- **Body signals** - these are important nonverbal cues that are part of the communication repertoire. They include:

  facial expressions - for example, lowered eyebrows convey anger whereas a smile and raised eyebrows express enthusiasm

  gestures - too many can be distracting but a few for emphasis are effective

  posture - it reveals what you think of yourself and of your listener. For example, slouching conveys indifference to the world, crossed arms places a barrier between you and the guests. Try for the happy medium of poised and comfortably relaxed.

  eye contact - thought by some to be the **most important body signal.** Eye contact shows your audiences that you are interested in them and helps you gauge their interest level. Maintain eye contact throughout the group without focusing on just one person.

Much of volunteer interpretation is conducted through conversation. This lets the visitor lead the way but allows the personal style of the interpreter to shine. It is an informal exchange of ideas between two or more people. Even an informal conversation should have a beginning, middle, and end, or, in other words, introduction, content, and conclusion. This section discusses these elements.

<u>The Introduction/Conversation starters</u>

It is often up to the interpreter to initiate the conversation:

- Simply greet the guests. A warm, “Hi! Welcome to Longwood Gardens!” may open the way to conversations and interactions. A non-spoken nod or smile may have the same effect. Once guests realize they can talk with you, they usually will.

- Open with a question. This is perhaps the best conversation starter of all; for example, “Can you figure out how gardeners water all the plants in the Conservatory?” Questions are excellent tools for initiating conversations because they ask the other person to respond.

- Share an interpretive object or prop. This is very helpful in the Children’s Garden where there are many props. Most people are interested in taking a closer look at an object like a seed pod, flower or hanging basket display. This experience can easily lead into a conversation. Objects also provide physical information to guests. They can smell the wonderful scent of a flower, or see how a hanging basket is made.

- Try a self-disclosing statement such as, "I love to just sit in the Gardens. It’s so relaxing." This is a way to equal out roles. Someone who is viewed as an “expert” may intimidate guests.

Elements of Interpretation

- Listen for a visitor's comment that might provide you an entry into a conversation. If you approach them in an unassuming, unobtrusive manner, most guests will welcome an answer to the questions asked amongst themselves. “Excuse me, but I overheard you wondering how old the fountains are ...” guests who are having difficulty with a display, appear confused, or perhaps are just having trouble locating something on the map, will definitely welcome your input!

The Body of the conversation

This is your time to share information. Try to incorporate various interpretive techniques to keep the information exciting for yourself and your audience. **Don’t reveal all the answers right away**. Get your audience to examine objects, make observations, and ask questions themselves. Having guests discover information for themselves will greatly enhance the impact of your interactions.

The middle of a conversation involves two activities, **talking AND listening.** You and the guests should share these activities equally, or the conversation may end quickly. For example, if one person does all the talking, the other person may feel he/she is being lectured to; or if one person only listens and doesn't join in, the other participant may believe there is a lack of interest. **Try not to do all the talking, and ask questions to keep your audience involved**.

Remember to use the all-important **pause** in your conversation. It can signal the end of a thought, give an idea time to sink in, and also provide impact to a statement.

Tap their emotions. Explore the emotions and opinions of the audience. “Do you find the Conservatory beautiful or elegant?” Emotions and attitudes shape our perceptions, and by helping guests understand this, we can positively influence them.

The conclusion/ Ending the engagement

Endings provide closure to an interpretive encounter. The best endings encourage guests to see another display, like the Italian Water Gardens, or areas that build on the topic or interest of the visitor. Another simple method to ending a conversation might be, "I, hope you enjoy the rest of your day at the Longwood Gardens” or “Please come back again for a future display”. Let people know that you enjoyed conversing with them and leave them hoping for more interpretive encounters along the way.

Using Objects or Props

Often you will have a lot of “tools” or props to help you tell your stories. Objects can have a power greater than words. They can make the story more concrete. Guests can touch and feel what you are talking about. They can also help engage guests in interesting dialog.

Elements of Interpretation

When a cart is part of your interpretative location, use the objects on the cart to engage our guests. They can passively look at and touch them if you happen to be away from the cart, but it is much more meaningful if you explain and create connections for them between the object, Longwood, and them. Don't hesitate to carry some props with you when roving.

Here are some tips for object use:

- **Stimulate different senses with objects**. Most of the objects used are intended for guests to touch or smell or scrutinize closely. Encourage them to use different senses while examining these objects, "Can you see the column on this orchid?" The visitor who handles objects will have a better understanding of textures or structures that help the plant or display. Remember to take a break from speaking when giving your audience a chance to observe and handle objects.

- **Use objects to elaborate on a theme**. Use any of the objects as the basis for a discussion or conversation. There are multiple directions this conversation can take – gardening techniques, heritage, or display. Objects should support a cohesive theme or idea, rather than act merely as eye-catchers.

A Variety of Interpretive Approaches

Learning is a complex process, and people learn in many different ways. Because of this, interpreters need to be creative and incorporate a variety of approaches into the body of the conversation. Listed below are examples of different approaches that you can use in your interpretive repertoire.

- **Tap the five senses**. Encourage guests to experience textures and smells as well as things they can see. "Can you smell the light fragrance in the Acacia Passage?" Or, point out the push-cart tracks imbedded in the pathways of the West Conservatory, helping guests understand the heritage and history of Longwood Gardens and its horticulture practices. Guests may gain an appreciation for what they at first thought was just an old track.

- **Share an anecdote or story**. Kept short, a personal, positive, and relevant story can be an entertaining and effective way to convey information. As you volunteer, you will have many unique experiences that can be used as interpretive anecdotes.

- **Encourage your audience to work together**. See if they can work together to answer a question about why the whispering bench actually works for example. If they're having trouble, give them hints.

- **Discovery** guests find information meaningful if they discover it themselves. Ask guests if they can see any difference between a palm and a cycad in the Palm House. Ask them to point out the various features that allow air circulation or trap heat and humidity.

Elements of Interpretation

- **Use gestures** Interpretation should involve movement other than the mouth (talking)! Use gestures to make your point. For example, use your hands to demonstrate proper pruning techniques and tool use.

How to be a Great Volunteer

1. Be enthusiastic- your passion for Longwood can inspire your guests.

2. Know your stuff – study your notes before you come in. The more you know about the topic, the more your confidence will grow.

3. Know when to say I don't know. Do your best to find an answer but remember, unanswered questions can be a positive way to lead guests toward further inquiry and research.

4. Know your audience – tailor your comments to the guest's interest and background.

5. Know the art of asking good questions…..and waiting for an answer!

6. Be a good listener.

7. Use your props.

8. Be confident– smile and make eye contact.

9. Take pride in what you do and the important role you play.

10. Send guests on their way with smiles – on your face and theirs and encourage guests to enjoy other parts of Longwood.

Children's Garden Facts

CHILDREN'S GARDEN INTRODUCTION

This imaginative and child-sized space is filled with hands-on water features, handcrafted sculptures, secret stairways, and engaging plant displays. Pierre S. du Pont delighted in his many nieces and nephews, so the addition of an Indoor Children's Garden in 1987 was very appropriate. The current Children's Garden was completed in 2007, tripling the original size.

INTENT AND DESIGN

- This garden was designed to create a magical and stimulating experience to spark children's imaginations and encourage exploration.
- Like all of Longwood, it is full of beauty, both botanically and sculpturally, and is designed for all ages to appreciate.
- As the garden matures, it is meant to look aged – you will see algae, staining and a patina of age forming on stonework and sculptures.
- Plants with trailing roots and foliage create intimate spaces
- It is a child-sized garden with "adult" areas more to the periphery.

See the following article, "Longwood Garden's Indoor Children's Garden," for more information on the creation of this garden.

INTERPRETATION ACTVITIES

Creative self-discovery activities integrated into the garden

- **Paintbrushes** – There are paintbrushes for water painting the walls of the Drooling Dragon's Tower.
- **Touch and Smell Plants** – All the plants in the Children's Garden can be touched. We have herbs down Herb Run, which are especially fun to share with guests. You can break off a leaf for them to smell all the different scents. Guests can also touch roots hanging down from plants without damaging the plants.
- **Story Tiles** – In the square maze are tiles which guests can be guided to when you are in the area. They change by the season.
- **Water Bugs and Nets** – Simple as these are, the youngest children love to fill and empty them. They are located in the Spitting Salamander Fountain just near the entrance.

Curiosity Cart and Volunteer Activities

See the detailed activity directions in the back of this manual and information under policy and procedures.

You may choose which activities you want to use when you volunteer. You can roam throughout the Children's Garden or work near the cart. You can roam with puppets in apron pockets or scavenger hunt cards in hand, choose to do a cart based activity, or take out musical instruments and base yourself in the stained glass window music alcove. If there are two volunteers, alternate or split activities. If working alone, select what you would like to focus on.

Children's Garden Facts

SUPPLIES

All your supplies should be inside the cart. Make sure to keep everything sorted and orderly for the next volunteer.
Surplus supplies can be found stored in the volunteer closet downstairs near the men's room in the conservatory. The key to that door is either hanging inside the cart door and/or at the Conservatory Information Desk.

CART

Your cart is located near the bamboo maze. Make sure there is space for a wheel chair in front of your cart when setting up.
There are several activities to choose from:

a.) Puppets – Talk to children and adults via your puppet friends. Let the children and adults play with the puppets.
c.) Seasonal activity – changes every month or two
d.) Scavenger hunts can be offered to guests and kids at the same time as any other activity.

HORTICULTURE FACTS

Staff

This garden is supported by a team of part time garden volunteers and students and supervised by one full-time gardener. GSA staff supervise the Children's Garden on a daily basis.

Plants

- This is the only garden at Longwood where guests can touch the plants.
- Plants are selected for texture, color and variety.
- A Photo ID Guide of some of the plants can be found in the Children's Garden Volunteer sign in book.
- Herb Run along the ramp is full of interesting herbs like scented geranium, mint, thyme and rosemary.

Watering

- Fertilization and water - Both are accessed from connectors hidden in beds. Fertilizer comes up from a large tank in the tunnels underneath. We fertilize more frequently in the summer during the growing season and less frequently in the more dormant winter season (only when a plant is suffering).
- The water is heated to 65°F.
- Irrigation in the upper beds located overhead is automatically controlled by an irrigation clock. All upper beds have irrigation drip tubes built in for watering.

Children's Garden Facts

IPM or Integrated Pest Management

- We do have insects and disease. Throughout the Gardens we use a balanced approach to manage pest issues and apply treatments only if the problem gets out of control.
- Methods of pest control include watering to remove insects, use of beneficial insects and application of pesticides as a last resort; those applications are very limited and specific.
- Methods of disease control include removal of an entire plant or diseased plant parts.
- Treatments are done after hours when guests are not affected.

Heat and Cold - Environmental Controls

- The temperature is what is best for the plants – not people. When a window or door is opened by a gardener, do not close it, and if a door is closed, do not open it. Contact the gardener or CG volunteer team coordinator if you have any questions or concerns.
- *Volunteers should be prepared and dress in layers for the weather. In the summer it can be lovely but can become very warm. Working in the central cove area can be much cooler than at the cart. On a sunny winter day it is lovely but can be quite chilly on a rainy or snowy day.*
- The garden is kept between 45 - 55°F in the winter. Vents and windows may open automatically in the winter to keep the temperature cool for the plants. Steam heat through the floor grates provides heat. During the summer, shade paint is painted onto the glass surfaces in different areas to keep temperatures down.
- The garden has root zone heating in the soil. The soil is kept at a minimum temperature of 65°F via computer-controlled steam tubes running under the soil. There are thermostats in each planting bed.

PLUMBING and FOUNTAINS

The fountains and water features are all controlled by a complex computer system, which was designed and engineered by Longwood staff.

Water – The water is treated with chlorine and tested regularly, but it is not recommended that children drink the water. It's similar to swimming pool water. The fountains are drained each night but some fountains, which hold standing water, contain the same water all day long. It is not recommended that children drink the water, especially standing water, as we do not know what they might have on their hands, etc. But, if they attempt to drink the water it shouldn't be an issue as we do our best to keep it clean and healthy.

Fountains – The fountains utilize 2,000 gallon reservoir tanks for the water supply. The water is NOT re-circulated.

How does all this water activity happen? The whole system is controlled by an intricate computer program, which the plumbers and electricians can utilize to observe everything, make changes, troubleshoot problems and repair the system. Below the garden in the tunnel system are solenoid valves, sensors, and timers, which control the actions of the water.

Laminar Flow Fountains – These fountains are found in the central cove. A small light is inside the fountain nozzle. The light is carried on the water stream for about 13 feet.

Children's Garden Facts

What are the metal strips in front of the fountains?
There are drains and retaining pools located under the floors near the fountains to capture water on the floor. You can see the metal edges of the drains in the floor.

What makes the water pop up, jump and do all those tricks? The spitting or bubbling fountains (central Cove, Ibis, glowworms) have solenoid valves and timers which cause the water to jump or leap at specific times. The valves and timers are coordinated by the computer system.

What makes the fog in the Grotto Cave? The grotto cave fountain contains a fog generator which operates in a similar manner to an ultrasonic humidifier in your home. Six small vibrating discs under water create water atomization (fog) through ultrasonic vibration.

Why does the Ibis fountain smoke? The nearby ibis fountain is often "smoking," and guests wonder why. The drain for the grotto cave runs under the Ibis fountain. The smoke is actually fog coming through the floor where the drain is located.

Where does the water go in the Triumphal Arch (the bell ringer!)?
The water never actually touches the bell. The water shoots up but never hits the bell. The bell is timed by computer to go off at the right moment so it seems the water has hit it. The water doesn't come back down because a water vacuum pulls the water out to pipes built into the side of the arch and down into a retaining drain.

SCULPTURE AND ART

The fountain sculptures and most of the bronze railings and grills were all made out of house. Initial sketches were created by Tres Fromme, designer of this garden and turned into bronze sculptures by Claro Art Studio in California.

The tile work, wood elements and ceiling of the Grotto Cave work was all done by Longwood craftsmen.

The Stained glass window was created by Mezalick Design Studio, LLC as shown in this link: http://www.flickr.com/photos/rockymtns99/6378337087/

Longwood Gardens Indoor Children's Garden

– reprinted from Longwood Gardens Chimes issue 268

On the Cover...

Let the word go forth, the children are delighted. Longwood opened its new Indoor Children's Garden on October 27, 2007, and the squeals of delight have not subsided. As adults wander through the Garden offering every opinion imaginable, children move wide-eyed through the Garden, which is sized just for them. What began back in 1985 as a Graduate Student's idea and Longwood's commitment for a garden built for children, has evolved into an $18 million Children's Garden which follows perfectly Pierre du Pont's dream of welcoming children into a stimulating realm of plants and water features. While many guests are taking their time getting used to it, the children are having a ball.

Longwood began planning the new Children's Garden in 1997 by forming an in-house design team consisting of staff from across the organization. The team was chaired by Maintenance Department Head Robert Underwood and Horticulture Department Head Sharon Loving. Tres Fromme, Longwood's Planning and Design Leader at that time, was the lead designer.

After completing initial research, the team began brainstorming how to create an innovative approach to design within the historic context of the classical gardens, which inspired our founder, Pierre S. du Pont.

As the team visited other children's gardens, they noticed something missing; they did not see the elements that distinguish the great gardens of the world. As Tres stated early on, "One should simply design a well-conceived, detailed and well-constructed garden at a child's scale."

Instead of a Children's Garden where a child moves from one designated activity area to another, Longwood envisioned a choreographed journey through an exciting series of spaces where children learn the joy and pertinence of plants and horticulture through fully being in a garden. Educational and interpretive goals would be secondary. In short, Longwood sought to create a world-class garden based upon Longwood's unique identity and drawing upon the history of gardens in general.

As Tres explained, "The design team decided merely employing the trappings and symbols of a recollected idea of childhood was not the answer for Longwood. Illustrating storybooks in topiary was a bit facile. Decorating exhibits on photosynthesis with plantings wanted for charisma. Replicating tried and true cookie-cutter elements monotonously appearing in most children's gardens lacked conviction.

"We felt the design should create a world-class garden experience. Interpretation and blatant educational messages should be secondary to aesthetic concerns. The spaces, plants, and physical and mental delight of being in a garden environment should be the message. Instead of a museum exhibit surrounded with plants, Longwood should create a true garden containing teachable moments as an integral part of its scheme."

While they continuously revised concepts as their collective thinking and the physical design evolved, the design team's challenge became how to create something appealing yet pioneering new directions. This goal is simply stated, but is actually quite a complex reality to achieve.

During the design process and research, the team articulated several principles to guide the new garden in all its parts.

One principle was to offer aesthetics instead of academia. The goal was to create a world-class experience to delight and excite kids about visiting and being in gardens, particularly public gardens. Children should discover the ever-changing horticultural, social, aesthetic, and imaginative offerings within a well-designed garden. Engaging youngsters in the beginning of a lifelong relationship with gardens is critical for public gardens' futures. Children are every horticultural institution's future supporters and visitors.

Another principle was to emphasize the sensuous experience in order to get kids excited about being in the space.

Tres noted, "The goal was to create spaces before decorations. The design should primarily offer compelling, sensuous, horticulturally exuberant, experientially rich spaces. An exciting choreographed series of spaces should be the garden's foundation.

"We were interested in the types of spaces, not just garden spaces, children enjoyed, and what children did in these spaces, aside from just gardening activities. We wanted to know what they liked so we could create linkages, sequences, and quality to the spaces to engage kids physically and mentally. I purposely wanted the aesthetics or how things look, though important, to be almost a decorative overlay over the rooms, tunnels, caves, groves, etc. After all, kids are quite content to play in cardboard boxes if the boxes engage them."

Another principle was to emphasize the choreographed journey, which would leave the story untold. The goal was to let the child's imagination "fill in the blanks" rather than scripting a story. The team felt children should not encounter obvious pre-existing stories or themes (e.g. Mother Goose, Peter Rabbit). Such themes might limit the garden's appeal and legibility because not everyone might know, or have cultural access, to these stories. The team designed the garden so children can engage their imagination by making up their own stories based on the possibilities contained within, and suggested by, the spaces.

With these guidelines in mind, and inspired by his visits to gardens in Italy, Tres began conceptual design of the garden by creating drawings of whimsical and exciting pieces that could be a part of the garden. Anyone who worked with Tres, had lunch with Tres, sat in a meeting with Tres, or happened to walk by where Tres was sitting could not help but be enthralled by the imagination that poured through Tres' fingers and onto the sketch pad or napkin or whatever was handy. And if the imagination was stunning, the number of drawings Tres created was staggering. He produced hundreds and hundreds of sketches and hundreds of finished drawings over the three years of planning and design.

As the team developed the conceptual design for the garden, they handed off the drawings to architects, engineers, artisans, and water consultants who, under Longwood's guidance, took these drawings from conceptual design to construction documents. Tres' drawings, and the many handcrafted pieces now cast in bronze and stone, which adorn the garden, are truly works of art!

As Sharon explains, managing the creation of the artisan pieces became a job in itself. "We quickly realized the complexity of the features, so we retained an artisan management firm, Claro Creative Studios in California, to oversee this work. Tres and I went to California and interviewed the artisans to ensure they followed the drawings to sculpt each piece. We did not want them to stray from Tres' initial design. After artisans were selected, Claro staff managed each piece to ensure that the design intent met our expectations. We communicated with the Claro staff weekly for two years straight!"

Sharon also pointed out that the Longwood Plumbers and Electricians are totally responsible for all the finished water features.

"We first worked with a number of consultants to develop the water features but we never got what we really wanted. Operations Division Foreman Dave Jones and the staff of our Plumbing and Electrical Shops took over the responsibility for the design and engineering of these complex systems. They literally invented the system which operates the water feature in the Triumphal Arch."

Other talented members of Longwood's staff created other pieces for the garden.

Longwood's Design Specialist Lauren Goldstein painted the large mural which adorns the west end of the garden.

Planning & Design Intern JR Meyers created the drawing for the snake railing.

Longwood's Masons worked on bended knees for many days creating the ceiling mosaics in the Grotto Tunnel.

Mary Allinson, who helped design and select colors for the mosaics in the new garden, has played a much larger, overall role. Mary represents Longwood's most consistent presence throughout the entire Children's Garden development process. She was a member of the original Children's Landscape Project Committee, which first met in 1985. She assisted in the design of Longwood's very first Children's Garden, was instrumental in the design for the second version in 1989, and coordinated the maintenance for both gardens. She then worked closely with Tres in developing concepts for the new garden, acting as a valuable link to evaluate and add features from the first two gardens.

And none other than our master craftsman himself, Longwood's Carpenter Ken Stapleford created the magnificent, handcrafted teak pieces.

Ramon Velazco from Pasadena, California, sculpted the big animals and the bird fountains in the Bamboo Maze. Valerie Edwards from Glendale, California, sculpted most of the salamanders, floral nozzles, and the bell in the Triumphal Arch.

As the artisan pieces were being created, Longwood initiated a complete restoration of the entire #25 greenhouse in December 2006. Workers installed a new basement to house the elaborate mechanical and electrical systems which support the garden. Overall, 31 firms contributed to the construction, which included installation of all the cast stone, concrete, brick, and stonework.

"This is by far the most complex garden Longwood has ever achieved," Sharon noted.

The opening of the new garden was celebrated on two occasions.

On October 25, Longwood held a press opening of the garden. Over 75 members of the regional press attended, along with Longwood staff, and special young guests from the Greenwood and Mary D. Lang Elementary Schools.

Director Paul Redman welcomed many distinguished guests who were present to celebrate the completion of a project nearly a decade in the making. He also informed everyone that he could not take credit for this project and asked the crowd to give Former Longwood Director Fred Roberts a round of applause to acknowledge Fred, who was not present.

"Longwood has created a truly extraordinary Children's Garden where we hope young and old alike will be inspired, intrigued, and entertained, and most importantly, discover the joy of being in a garden," Paul said.

"The Children's Garden was a project I inherited, and my only role was to be a part of the team to get it built. Fred deserves total credit for having the vision to recognize the importance of this garden to the future of Longwood. Fred clearly understood the importance of building future generations of horticulturists, and it was his leadership and vision that facilitated the creation of this new, magnificent garden."

Paul also acknowledged Children's Garden designer Tres Fromme.

"This is as much your garden, Tres, as it is anyone else's. This garden is an extraordinary example of your creativity and vision for garden design."

Paul went on to acknowledge the many other talented and creative Longwood team members who brought this garden to life.

Board President Nathan Hayward also welcomed the guests, paying particular attention to the children in attendance. Hayward noted that the new Children's Garden was "perfectly in line with what Pierre du Pont had in mind when he created Longwood. I know this because I spent time in these gardens when I was your age, and I can tell you how much fun I had and how much fun you're going to have in this new garden. Pierre du Pont would be absolutely delighted with this new garden, and he would be absolutely delighted to have you here today to be the first children to enjoy it."

Sharon then presented an overview on the development of the garden, bringing the guests up to date on the the chronology of events which led to the opening.

At the beginning of Sharon's presentation, a remarkable life-sized, lizard-like character, a member of Annie Hickman's Rain Forest characters, appeared from a side door, and led the school children out of the Ballroom and over to the Children's Garden, and the laughter and squealing officially began.

On Friday evening, October 26, Longwood hosted over 500 guests for the official opening party for the Children's Garden. The mostly adult audience dined on kid's themed hors d'oeuvres, helpings of macaroni and cheese, and bite-sized hamburgers, while marveling at the new garden as well as a Conservatory filled with mind-boggling chrysanthemums.

The grownup kids enjoyed the garden that evening as much as the genuine kids had the day before. Tres was in attendance at the opening, and upon seeing his creation fully open and operational for the first time his imagination was stirred by being in the garden, which led him to comment, "It's as if I designed a garden for an eight-year old Medici Cardinal."

And indeed, if one stumbled upon this garden in a secluded location in Italy, one would immediately be writing postcards to friends describing having just found the most enchanting garden ever. The children in this area seem to like this new garden just where it is.

Longwood Trustee and Advisory Committee Chairperson Peg Stabler summed up the feeling about this garden in a note she sent to staff congratulating them on the tremendous team effort it took to produce the garden. In her note Peg said,

"WOW! The Children's Garden is a triumph! Ten years in the making and it is spectacular. Each of you had a part in it's creation and should be very proud of the result. We at Longwood are blessed with so many talented, dedicated people and your work will stand for generations. Please know that the Advisory Committee is very pleased with this wonderful addition to Longwood and thank each and every one of you."

If you have not visited Longwood's new Children's Garden as yet, please do so. Bring your imagination, bend at the knees, and enjoy the fun.

How It all Started - Longwood's First Children's Garden

When Longwood installed its first Children's Garden in 1987, it was the first of a new concept in gardens intended for children. Since that time, many public gardens have installed various forms of children's gardens, so many that the idea seems less than novel at this point. But in 1985, it was Longwood Graduate Program Fellow Catherine Eberbach who started it all. With a keen idea, which became her graduate thesis, Catherine began a process which led to the first Children's Garden at Longwood Gardens. And that garden, the first of its kind, led to many other gardens at many other institutions over the next 20 years.

As Catherine recalls, "The idea emerged after observing children and families over several months, and followed a conversation with Bill Thomas about possible plans for a discovery room. What seemed more important was to create a more family-friendly experience in the garden with plants and other garden elements, rather than create a separate discovery room."

Catherine also credits the encouragement and assistance she received from many Longwood staff, particularly Longwood's Director, Fred Roberts, as the reason the project reached fruition.

As Catherine researched her thesis, Fred assembled a Children's Landscape Project Committee comprised of Ted Acorn, Pat Christopher, Mary Allinson, Landon Scarlett, Bill Thomas, Jan Vogelsberg, and Eberbach. The Committee first met October 9, 1985, and completed the garden's design in March, 1986. Installation began in October, 1986, and the garden opened on May 1, 1987.

The group outlined goals, which appear in chapter four of Catherine's thesis entitled *Garden Design for Children*. (1) Create a special plant display which interests children. (2) Present plants on a cognitive level and physical scale to which children can relate. (3) Present a self-explanatory, cohesive, and attractive display that possesses practical maintenance applications. (4) Provide children with an extensive adventure with plants that stimulates their senses. (5) Provoke curiosity and enjoyment in plants.

Catherine's overview of children's gardens found they originated in the Nature Study Movement in the United States in the 1890s. This movement peaked at the close of World War I. Brooklyn Botanic Garden established a teaching garden cultivated by children, and other public and private gardens had similar plot-plan-type gardens with the usual purpose to teach children what adults want them to learn.

A Fantasy Garden in Chicago, Illinois, in 1986, first incorporated ideas contributed by children. As Catherine noted, this is an important distinction which "separates children's gardens designed and influenced by adults from those designed by adults, but influenced by children."

Catherine opened her chapter on the design of the Longwood garden by quoting Gertrude Jekyll, who observed "the best way to help children love and value a garden is to give them a pretty one ready made." Catherine noted, "This thought reflects the philosophic ideals of the Children's Garden; to build a display garden for children, in much the same way that Longwood is a display garden for adults. Longwood's Children's Garden design is based upon findings from playground, phenomenal landscapes, and garden research."

Longwood selected Greenhouse 25C, a former fruit growing house then known as the Container House. Eberbach noted that location, "surrounded by other conservatory displays possesses qualities of a perfect hideaway."

The original garden was targeted for youngsters ages six through nine, but it functioned well for kids of all ages. The water features were a very popular element, as was the maze, which finished with a tunnel where crawling was the only way to get through it. Director Fred Roberts confidence in the concept was well placed. His work with staff to develop the concept to the point where Longwood's Advisory Committee saw the potential, led to the Committee's permission for the garden's installation on a temporary basis.

Longwood held an official opening for the first Children's Garden on April 30, 1987. Guests dined on small cakes and kid's-sized tea sandwiches. And once the kids got into the garden, the rest was history. Longwood intended the garden to be temporary, but response by visitors demanded it become a permanent feature. After a redesign in 1989, the Children's Garden remained in service from April 1990 until January 2003. Further planning, in many ways linked directly to Catherine's initial idea, led to the opening of our new Children's Garden this past October.

Family Favorites at Longwood Gardens

1. **Indoor Children's Garden**
   Discover the hidden secrets of the Children's Garden with a **scavenger hunt**. Stop by the Children's Curiosity Cart located in the Bamboo Maze to pick up a Seek and Find hunt card—each one geared to different ages and abilities.

2. **In the Conservatory**

   a. Children are especially interested in the **Banana House** with its tall plants which often have hanging bananas on them.
   b. The **Waterlily Pools** during the months of June through September are a big favorite and the volunteer docent team can help guests explore the plants and pools out there.
   c. The **Fern Passage** with its carnivorous plants is very popular with kids.
   d. The **Organ and Pipes Gallery** is full of interesting hands on activities.

3. In the **Peirce du Pont House** try a Seek and Find, search for the miniature doll house room full of tiny items and explore the history of Longwood Gardens.

4. Climb the **Birdhouse Treehouse** located between the Terrace Cafe and Peirce-du Pont House. Explore the forest and local birds from this high viewpoint. Search for birds and bird houses with binoculars, discover bird nests, read bird books and more.

5. **Lookout Loft** is a wheelchair-accessible, rustic Adirondack-style treehouse located in the shady **Forest Walk** where families can take a short hike (½ mile or less.)

6. **Canopy Cathedral** Climb the stairs of Canopy Cathedral and gaze out over the Lake. Say hello to the sentinel dragons that guard the entrance to this beautiful treehouse.

7. **Whispering Bench** This curved bench is located at the end of the Flower Garden Walk. If you sit on one end of the bench with a friend at the other end you can share a secret. Cup your hand, whisper towards the center of the bench, and notice how your voice travels around the curve!

8. **Watch a Fountain Show;** check the daily schedule for these free shows.

Family Favorites at Longwood Gardens

9. **Topiary Garden** Wander through the towering green growing sculptures created by our gardeners. Take a picture in front of your favorite topiary. *Guests should not go into the topiaries as they are quite old and easily damaged.*

10. **The Outdoor Children's Corner** is located outdoors in Longwood's Idea Garden. Buzz around our bee maze. Sit in the Sunflower house in the Vegetable Garden and have an imaginary picnic. Visit Pumpkin Playground during the month of October.

11. Families can explore the **Garden Railway** from September through December.

12. Our **Meadow Garden is full of natural spots to explore.** Favorite spots include exploring the birds, fish and amphibians near Hourglass Lake Bridge, or Beech Boardwalk, or hiking to any of the interpretive learning pavilions.

13. **The Eye of Water** Kids love to peer down at this curious fountain which looks like an "eye". It is located near the Carillon Tower.

14. **Carillon Tower** Climbing the steps of this bell tower which looks like a small castle is fun for all. The beautiful bells sound on the hour and every quarter hour as well.

Conservatory Quick Facts

This document is a basic introduction to Longwood, the Conservatory and many of the topics in this manual.

General Longwood Garden Facts

Longwood Gardens is one of the great gardens of the world. We strive for innovation in horticulture and display. We present the arts in an unparalleled setting to bring pleasure and inspire the imagination of our guests. We contribute to society through excellent and diverse education programs, horticulture research, environmental stewardship, and cultural and community engagement.

Longwood Gardens encompasses 1077 acres; over 350 acres are open to the public. Pierre du Pont's original purchase from the Peirce family in 1906 included 202 acres. Other properties were added later.

Employees (at time of printing)

Longwood has approximately 200 full-time employees, and 250 part time employees. About 100 employees, 75 fulltime and 35 part time are directly involved with horticulture. These employees are not just gardeners but include the design team, researchers, section heads, nursery personnel, plant records specialists, purchasers, arborists, ground specialists, IPM team members, etc.

There are about 700 volunteers; about half of the volunteers are in guest engagement and the other half support horticulture.

Early History

Many generations helped create Longwood Gardens, but one individual—Pierre S. du Pont (1870-1954), industrialist, conservationist, farmer, designer, impresario, and philanthropist—made the most enduring contribution.

Pierre du Pont was the great-grandson of Eleuthère Irénée du Pont (1771-1834), who arrived from France in 1800 and founded the E. I. du Pont de Nemours and Company gunpowder works. Pierre turned the family business into a corporate empire in the early 20th century and used his resulting fortune to develop the Longwood property.

More than 200 years earlier, the land had been inhabited by the native Lenni Lenape tribe who hunted, fished, and farmed the productive wilderness. In 1700, a Quaker family named Peirce purchased the property from William Penn and soon established a working farm. Joshua and Samuel Peirce began planting an arboretum on the farm in 1798. By 1850, the site was known as one of the finest collections of trees in the nation. Eventually the farm fell into disrepair.

In 1906, at the age of 36 Pierre du Pont purchased the farm in order to save the trees. Pierre inherited a strong sense of entrepreneurship, love of horticulture and the drive to leave a personal legacy; traits that reflected his family's philosophies. Soon, Pierre was dedicating great amounts of his personal fortune to transform his property and took great pride in delighting guests with its' growing beauty.

He followed no grand plan; rather, he built the gardens piecemeal, beginning with the 600-foot-long Flower Garden Walk in 1907. Although his later gardens would draw heavily on Italian and French forms, this early effort reflected what he termed an "old-fashioned" influence, with

Conservatory Quick Facts

nostalgic cottage-garden flowers, exuberant shrubs, rose-laden trellises, and even a shiny gazing ball. The scale was grand, the accessories quaint.

Five years later was the debut of the new Open Air Theatre. His inspiration was an outdoor theatre at the Villa Gori, near Siena, Italy, although his version was much larger. Within a year, he equipped it with secret fountains that shot out of the stage floor to drench visiting nieces and nephews.

Pierre enhanced the domestic comforts of Longwood by enlarging the original Peirce farm house, notably in 1914 when he doubled its size. The attached conservatory was Longwood's first "winter garden" and Pierre's first experience with the aesthetics of greenhouse gardening.

The massive Conservatory opened in 1921. It would be hard to imagine a more theatrical setting for the indoor display of plants.

With the Conservatory a reality, Pierre turned his attention to another great love—fountains. He based his Italian Water Garden on the Villa Gamberaia near Florence, but he added 600 jets of recirculating water. At the Open Air Theatre, he replaced the old waterworks with 750 illuminated jets. His hydraulic masterpiece was the Main Fountain Garden in front of the Conservatory: 10,000 gallons a minute shot as high as 130 feet and illuminated in every imaginable color.

As early as 1914, with the formation of Longwood, Inc., Pierre was thinking about the eventual fate of the property after his death. In 1937 the Longwood Foundation was created to handle his charitable giving. When Pierre died in 1954 at the age of 84, he left Longwood with a well-established horticultural tradition, experienced businessmen (his nephews) as trustees, and a sizeable endowment.

After his death in 1954 Longwood's first director was hired. Since that time Longwood Gardens has matured into a magnificent horticultural showplace filled with countless opportunities for enjoyment and learning.

The Longwood Foundation and Funding

In 1937 Pierre du Pont created the Longwood Foundation to manage his charitable giving and to later include “the maintenance of Longwood as a public garden”.

The foundation was split in two in 1970, becoming two foundations – Longwood Gardens, Inc and the Longwood Foundation. Longwood Gardens, Inc is the foundation which operates Longwood Gardens. The annual budget is about 43 million. About half of the money required to run Longwood Gardens comes from onsite revenue - ticket sales, special events, the restaurant, GardenShop, classes and memberships. The other half comes from Longwood Gardens, Inc. endowment.

The second foundation, the Longwood Foundation, offers grants to nonprofit organizations. It has made grants of over 2 billion dollars to non-profit organizations since 1937. Historically, investments and grants have been made primarily in education, health care, environmental, housing, arts, social services, and civic sectors. Funds are also provided to Longwood Gardens, Inc for specific large capital projects.

Conservatory Quick Facts

Plant Production

About 65% of the Conservatory seasonal plants are grown on site, in the production greenhouses and the growing fields. The rest are purchased from a variety of growers. Nearly all seasonal plant material is composted and all soil is recycled. The restaurant also contributes to the “green” effort by composting food waste and decomposable dishes, cups and flatware.

Conservatory Spaces

Acacia Passage Original Conservatory construction – 1919-1921

The scent in the Acacia passage comes from the foliage of the *Acacia*. Mr. du Pont planted the original *Acacia*.

The hanging baskets are many plants planted together to create one huge basket.

Banana House – original Conservatory construction in 1919 to 1921, made smaller in 1983.

It only takes about one year from a new banana plant shoot to a flowering plant and another six months until fruit is ready to eat.

The bananas are allowed to ripen and then harvested, unlike commercially grown Bananas, which are picked when green so they can be transported.

Bananas are herbaceous, not woody, so they are not true trees but are closely related to grasses.

Ballroom constructed between 1929 and 1930 to highlight the Organ and for entertaining, renovated 2005

Above is the original etched pink glass ceiling, below the black walnut floor was originally made from surplus World War One gunstock and was replaced in 2005.
Organ sound comes through the pink acoustic fabric on back wall of ballroom

The Pipes Gallery behind Ballroom showcases the Aeolian organ with 10,010 pipes viewable from large glass windows

Bonsai Display located in the North Passage

While the plants of Bonsai are minimized, the flowers and fruit remain full sized.

Bonsai artists choose plants with smaller flowers that look good on a Bonsai.

Bonsai (Tree in a Container) are full sized plants, not dwarfs. They are minimized by the grower using branch and root pruning techniques and by the size of the container. Root pruning is usually done in the spring.

If you hide the pot and any other size reference, a well styled Bonsai should look like a regular, full sized tree. A tapered trunk, exposed root system and drooping lower branches and full branching structure help to create this illusion.

Conservatory Quick Facts

Cascade Garden added in 1958 as a cactus house**,** redesigned in 1993

Features 16 waterfalls and 4 pools

The exotic stonework in the Cascade Garden was carved out of Pennsylvania mica.

Camellia House original construction – 1919-1921, redesigned 2007

Camellias blossom from November through April with peak flowering in January and February.

East Conservatory Plaza Entrance new construction – 2010

Innovative land sculpture, formal turf terraces and design connects one of the world's greatest Conservatories to ancient trees which are the backbone of Longwood Gardens.

Largest green wall in North America (47,000 plants) creates jungle effect outside of state of the art restroom facilities.

East Conservatory Original construction –1928 Azalea House, redesigned several times

State of the art redesign in 2005 on footprint of original 1928 space
Designed to have the feel of an outdoor garden with hidden spaces

Plant highlights - Bamboo, camellias, potted hybrid grapefruit and wood's cycad

Encephalartos woodii Wood's Cycad
A feature plant in the old East Conservatory, this plant is extinct in nature and there is no known female specimen on Earth.

Estate Fruit House original construction 1919 to 1921, redesigned in 2002

The Estate Fruit House is an example of fruit growing as it was grown in the conservatories during Pierre du Pont's lifetime. Gardeners raise Mr. du Pont's favorite and most successful types of fruit to demonstrate this history.

The Estate Fruit House is composed of three separate spaces - the Nectarine House, the Grapery, and the Melon House

Espalier is a French word that is pronounced "es-pal-yeah," or "es-pal-yer" in English. It is defined today as any flattened tree, shrub, or vine trained in any pattern.

Exhibition Hall Original construction – 1919-1921, renovated 1995

The sunken floor is drained once weekly and for special events.

Plant highlights – tropical tree ferns (their stems are watered!) and Bougainvillea vines above. Mr. du Pont first ordered tree ferns for the Exhibition Hall in 1921.

The small fountain in the north end of the sunken floor was originally an orchestra pit.

Conservatory Quick Facts

Fern Passage original construction project 1919 to 1921, adapted later

Venus Fly Traps and pitcher plants are a big attention grabber here in the two alcoves. Insect-eating plants attract insects with sweet secretions and brightly colored foliage. Insects are trapped by sticky hairs, waxy plates or hair triggered leaves.

Ferns grow all over the Earth. They reproduce by spores rather than seeds.
Look for the different patterns of sori (spore filled cases) on each fern.

Garden Path Original construction – 1919-1921, redesigned 2005

Original hanging lights from 1920 hang over path which highlights a large millstone.

Its cottage garden design mixes permanent and temporary plantings.

Indoor Children's Garden Original construction – 1919-1921, redesigned 2007

This garden is designed to create a magical & stimulating experience to spark Children's imaginations & encourage exploration.

All the water is potable – treated and inspected daily.

It is a child-sized garden with "adult" areas on the periphery.

The Children's garden volunteer team is based here.

Orangery Original construction – 1919-1921, renovated 1995

Why is it called the Orangery? Citrus trees originally grew on the lawns but didn't do well and were replaced with lawns and beds.

Most of the seasonal plantings are rotated out every two weeks.

Plant highlights - *Bougainvillea* (Brazil), bird-of-paradise (South Africa), Cherokee roses and creeping fig climbing up the columns. The creeping fig and *Bougainvilleas* were installed in 1921.

Point out the mirrored backing to the beds which reflect the plants' beauty and the original columns which were reconstructed in 1995 during renovation of the Main Conservatory. Show guests the metal plates which hide the hose connections.

Conservatory Quick Facts

Orchid House original construction – 1919-1921 made larger 1983

This is a display room housing the best 300-500 of our 9000 plant orchid collection.

Phalaenopsis orchids are the easiest to grow at home.

The “worms” crawling out of the pots are roots!

Epiphytic orchids (meaning they grow *on* trees) like their roots to have air! When you repot your Orchid, the roots will often climb right out again.

Mediterranean Garden Original construction – 1919-1921, redesigned 1993

“Mediterranean” is a climate, not a geographic area

The pepper tree, *Schinus molle*, native to the Andes Mountains of Peru, has foliage and fruit that smells like pepper.

Longwood Gardens has the one of the largest collections of South African bulbs in the United States and many are displayed here.

Music Room constructed in 1923, renovated 2005

The Music Room was designed as a space for the du Pont’s private entertaining.
Present day use is for special exhibitions and events

North Passage and Growing House original construction 1919 to 1921

Currently this space holds informal displays of crops used in the current Orangery and Exhibition Hall displays.

The Growing house at the end of the north passage, also called the Carnation House, is traditionally used to grow cut flower specimens.

Palm House Built in 1966

Cycads and Palms are both in this house. They look similar, but are not. Cycads are gymnosperms, (cone bearing plants) and are either male or female. Palms are angiosperms, (flowering plants) and have fronds that wrap around the trunk.

Common names can be fun to point out – foxtail, lipstick, old man, triangle palm.
Common names can be misleading – The Sago Palm is a Cycad!

Cycads grew when the dinosaurs lived. Cycads peaked during the Jurassic Era.

Conservatory Quick Facts

Rose House original construction 1919 to 1921

Roses bloom beautifully indoors from fall through late spring. To ensure bloom out of season, Longwood's gardeners subject the roses in the Rose House to a period of summer dormancy in July, induced by withholding water and by severe pruning.

When guests sniff the roses and note the lack of aroma, point out that hybrid roses have mostly been bred for appearance rather than fragrance

Silver Garden original construction in 1919 to 1921 for fruit production, redesigned 1987

The Silver Garden Path was designed to mimic a river bed. The plants surrounding it create the scenery around a flowing river – boulders and trees.

The dish garden is a perfect miniature of the Silver Garden.

The olive tree rarely has fruit although at one time gardeners hung wooden fruit on it to weigh and shape the branches.

Tropical Terrace Constructed in 1958 to connect the Rose House and Banana House

The Rabbit's Foot Fern basket was constructed in 1952. It is reinforced with stainless steel wire and has been enlarged several times.

Living Epiphyte tree - Epiphytic plants (meaning they grow *on* trees) grow on an artificial tree made of fiberglass and covered with bark of the cork oak tree (*Quercus suber)*

Tunnel System

Under the Conservatory are approximately 4000 feet of tunnels. They were designed to minimize the "greenhouse look" by putting all the mechanics as much as possible in the tunnels. (Fertilizer tanks, hose lines, electric and heating systems, etc.).

Point out the hose openings in the floor to Guests

The main tunnels are quite high & easily walked. Some older tunnels are crawl spaces – staff almost has to slide through them.

Tunnels run from Children's Garden all the way to the potting shed

Waterlily Pools originally constructed in 1957 with 13 curving pools. It was redesigned and reopened in 1989. The pools are open May through October

The pools are filled with 160,000 gallons of water and are 30 inches deep.

Gardeners raise the enormous hybrid waterplatter *Victoria* × Longwood Hybrid and other waterplatters from seeds started in late January each year.

The water is mixed with a black dye. The black dye, available in the Gardens Shop, is used to keep the water free of algae, but it also hides the mechanics of the pools.

Fall Harvest

-

Purpose

- To connect families to nature and the changing seasons
- To engage children in a seasonal activity exploring the fruits of Autumn
- Show children some of the variety from Mother Nature!
- Get kids to really see the structure of leaves.

Materials

Wood bowl to hold gourds and other fruit of autumn– the fruits of autumn
- Fruit and gourds of different varieties
- Long Snake Gourd
- Felt squash vine

Leaf rubbing supplies (October)
- Leaf place mats for leaf rubbing station
- Leaf rubbing paper
- Leaves for rubbing in page protectors

Leaf, pumpkin and autumn books

Trees laminated fan-book – this shows all the different leaves with information

Basket for books

Puppets for fall – animals that collect or hibernate: squirrels, foxes, owl, tree and the peacock (for mums) among others

Set up

Put out leaf rubbing supplies, felt vine

Placemats out for rubbings

Put out Snake Gourd when you are supervising the cart

At the end of your shift leave small gourds out for investigation along with the gourd flipbooks and sign.(and seek and find cards).

Put away Snake Gourds and other supplies

NOTE- if any leaves or other organic materials start to get moldy send Nancy an email or let her know that one has turned so she can replace it. Remove it from the cart display.

Activities – Make sure to let the child do the activity if they wish - if you do the activity it isn't nearly as satisfying for them. If it is too busy or the child is too young then just do another activity – gourd discovery, puppets, etc.

Fall Harvest

1. **Leaf rubbings This activity can create lots of interesting conversations –**
   - Set Up
     a. Put out the leaf placemats and crayons for rubbings in the basket.
     b. Leaves are in plastic sleeves. Leave the leaves inside the plastic sleeves and place a sheet of rubbing paper over the leaf the kids pick. They should use the side of the crayon. By rubbing a crayon across the surface the leaf pattern shows through.
     c. This activity can create lots of interesting conversations
        i. Talk about how each leaf is different in shape and form.
        ii. Talk about the different parts of the leaf they can see. The veins of the leaf carry oxygen, food and water the parts of the plant. Photosynthesis happens in a different part of the leaf.
        iii. With older kids you can talk about how the leaves change color and why. Leaves change color because the plant stops producing chlorophyll which makes the leaves green in color. The other colors in the leaves begin to show on the leaves. Use the book which talks about this as well.
        iv. Talk about how the veins magically appear, and how leaf veins carry food and water throughout the plant.
        v. Talk about how they are creating magical art

2. **Corn and Gourds** – These are the fruits of autumn. Trees and plants flower. In the flowers are seeds. Some seeds get pollinated. They travel in many ways and reseed in many places. The book Flip, Float, Fly is a great one for this topic. Use the gourd flipbooks to explore the gourds.
   a. Working with the Snake Gourd. This gourd is so fun and truly looks like a snake. Do most of the handling of this gourd yourself so that it doesn't get broken by rough hands or being dropped. That said,I encourage you to drape it over the head of kids and adults. It makes for the perfect photo op!

   b. Encourage them to investigate the different gourds and Indian corn. On the corn you can see the seeds, on the gourds the seeds are inside.
   c. Explore different fruits and vegetables together. Talk about what they see
   d. How does it feel (smooth, bumpy, or fuzzy)? What color is the fruit?
   e. Use the felt gourd vine to talk about how pumpkins and gourds grow on a long vine. Let them touch the brown roots and stems. See the laminated sheet on how pumpkins grow.

f. Ask them to what they might name some of the gourds and see what funny names they come up with.
g. Have them count the number of “ribs” on the small pumpkins.

3. **Use the books** – Place the books in the basket. You can read to the kids or let a mom or dad borrow books to read in the stained glass alcove.

4. **Puppets –** let the kids engage with the puppets around the CG. In the alcove you can use the squirrel story book, and get the kids talking about how the squirrels gather acorns. Have they seen any around the gardens or a home? Let them make up a fall story.

Background Information

<u>The fruits of autumn - Seeds, Fruit, Nuts</u>

Most trees and bushes need seed to reproduce. Their flowers are fertilized during the growing season and often develop into fruits or nuts. In some plants the seeds are protected by a nut, fruit or seed pod. In others, like conifers, the seed has not much protection. As flowers die off we see many examples of beautiful, berries, fruits, nuts and cones containing the seeds of a plant. Whenever you can, leave these fruits, seed pods and nuts on the plants. They are an important food source for animals and birds over the winter months.

<u>Pumpkins and gourds: Some fun questions to get the kids thinking</u>

1. What color can pumpkins be? Yellow, orange, white, green
2. Are pumpkins and gourds fruit or vegetables? They are fruit. A fruit is anything that contains seeds. Vegetables come from the leaves or stems of a plant.
3. What are the world’s largest fruits? The largest fruits are giant pumpkins, specially grown and bred for their size. The largest ones can weigh over 1000 pounds! They can see a very large pumpkin in the Idea Garden.
4. Have you ever seen a pumpkin before? Where?
5. Pumpkins have been around for a very long time. Some pumpkin seeds have been found that are 7,000 years old! Pumpkins are believed to have first grown in North America and were a favorite food of Native Americans.
6. Do they know that you can eat pumpkin and some gourds? What have they eaten that is made from pumpkins? Pie, muffins, bread, pumpkin seeds
7. When you open up a pumpkin, what do you think is inside? Pumpkins are hollow inside and filled with pulp and seeds

Fall Harvest

8. How do pumpkins and squash grow? They grow on a long vine and need lots of sun and water. Show them the vine of the pumpkin plant

Leaves

1. Why do leaves change color?

   Leaves have all the colors in their leaves all along but chlorophyll, the pigment that makes leaves green is the dominant color for most plants during the growing season while the plant is growing vigorously. Chlorophyll is one of the first compounds to breakdown during the cooler days of autumn and then other pigments that cause red, yellow and bronze colors begin to show.

2. Why do leaves fall?

   When the autumn season starts, days shorten, temperatures start to fall and the sun is less intense. This all leads to a decline in plant growth and chemical changes within the leaves. Leaf tissue begins to die. When enough dead cells die at the base of the leaf stalk the leaf falls from the deciduous tree or plant.

   Deciduous plants enter this dormant period and shed their leaves to protect themselves and adapt to the cold, windy conditions of winter. During the winter there is also less water for trees as much of what is in the soil can be frozen. Deciduous leaves are not adapted to cold conditions. Leaf buds will form at different times and be ready to swell and form new leaves when the conditions are right.

   The leaves on evergreen trees such as pines, firs and spruces can survive winter because their needle shape doesn't lose as much water and they often have a waxy coating which makes them more resistant to dry conditions and freezing temperatures.

2016 Bee Habitat Activity

PURPOSE

1. Guests will learn about the different habitats bees live in
2. To make guests aware of the different kinds of native bees and their importance
3. Inform guests about different ways to help protect bees

SUPPLIES

- 4 bee houses
  - Green Bee Shaped House
  - Wooden Square Bee Houses
    - Bamboo pieces for building
    - Wicker tray to catch pieces
  - Miner Bee Sand Nest
    - Unsharpened pencil for making bee holes
  - Homemade Bee House – Native Bee House
    - Instruction sheet
- Bee Matching Game laminated cards in a box
- Pollinator Insect Case & magnifier
- Flip books
  - Builder bees vs. miner bees
  - Bee Life Cycle
  - Why are Pollinators Important?
  - *Pocket Identification Guide*
  - *Conserving Wild Bees in Pennsylvania*
  - *Native Bee Benefits*
- Books
  - *What is Pollination?*
  - *What if there were no Bees?*
  - *The Buzz on Insects*
  - *Bees* – National Geographic Kids
  - *Caterpillar to Butterfly* – National
- Cart Front magnets
  - Cart front
- Puppets
  - Bees and insects
  - Deer
  - Snake
  - Pollinator song sheets

SET-UP

2016 Bee Habitat Activity

When setting up the cart, select the activities you would like to do and put those supplies out.
Display the bee houses neatly where guests can easily see them.
If using card game, arrange the cards neatly on the cart top.
Hang the Puppet Curtain and use the red puppet stand to organize the puppets and place them next to the puppet curtain in the alcove.
Books and flipbooks can be placed in a basket, along the window sill or used with puppets and activities. The basket can be carried to other parts of the Children's Garden if you want to tell stories.
The cart front magnets should remain on the cart front.
Please use the magic sponge to clean the cart surface as needed.

ACTIVITIES

1. **Bee House Exploration**
   Bees live in many different locations and habitats. There will be four bee houses for the kids to explore.

   a) **Ground Nest /Miner Bee Hive** This container of Kinetic sand simulates a miner bee hive which would be made in the ground. Miner bees live in the ground and dig tunnels to nest in.
   Directions
      a. With the unsharpened pencil, allow kids to drill their own bee nest in the sand by pushing the unsharpened pencil down straight into the sand. The end of the tape, closest to the eraser, marks 6" to show how far the bees usually burrow into the ground. There is also a photo of a bee taped to the container. This is a photo of a mining bee and the white silhouette block in the corner is the actual size of this bee.

      b. Ask the kids questions as they work… How hard is it for them to dig? How hard do bees work to make their houses? How can we protect bees that live in the earth?

   b) **Green Bee House** This bee home simulates homes for two solitary types of nesting bees:
   The mason bee Mason bees are nesting bees, and do not drill their own holes. In nature, they look for very small cavities to build their nests. The smaller holes are meant for the mason bees, as they prefer long, narrow nests that they can create sections or rooms using different layers of mud to lay their eggs in.

   Leaf-cutter bee Leaf-cutter bees look for a long, narrow cavity to nest in, maybe 4" in length. These bees cut circular pieces of leaves to line their nests with! Use the laminated photo to show the guests what the inside of a leaf-cutter bee nest would look like.

a. Talk about the idea that these bees are friendly and pollinate many plants for us. Ask the kids how do you think the bees cut holes in the leaves? Encourage them to look for leaves with circular cuts in them in the garden.
b. Talk about how the bees build their nests and lay their eggs in each nest.
c. Leaf cutter and miner bees are important pollinators of wildflowers, fruits, vegetables and other crops like blueberries!

c) Square Bee House Building Activity This wooden bee home simulates a mason bee home.

Directions

a. Encourage the guests to use the bamboo pieces to stack inside the crate, building a bee home! Use the wicker tray to contain the pieces as the kids build, and don't be scared to dump them all in the basket at once. Kids like to hear and see all of the pieces fall out. Have them take the pieces and stack them in the nest any way they like. This allows them to see what they can use for a bee nest of their own.
b. Talk about the mason bees and how they might build their nests in the bamboo tubes. How many eggs might they imagine could fit in each piece of bamboo tube?
c. Could they make one of these at home for bees?
d. Talk about how they can observe bees in nature but shouldn't bother bees.
e. Encourage kids to visit Longwood's mason bee house at Pollinator Overlook.

d) Homemade Bee House

a. Show kids this example of how they can construct a simple bee home with materials they may find in their homes.
b. Please show them the laminated sheet with instructions on how to make their own mason bee nest. Tell them they are welcome to take a photo of the page with a camera or phone in order to take the instructions home.

Bee Matching Game

Use the cards to match the photos in a concentration game. Turn the cards over and arrange them neatly so the child can flip two over at a time, looking for matches. As they play the game, explain that the bee and the house pictured in the photo is they type of house that bee lives in.

Pollinator Insect Case

Let kids look at the various bees in the case (carefully) using the magnifier.

2016 Bee Habitat Activity

Puppet Play

- Puppets can be used in the Alcove with the puppet curtain or you can carry puppets around the Children's Garden and engage guests with puppets anywhere. The puppets we are using are pollinator puppets, coordinating with the theme of pollination.
- Set up the station using the puppet curtain and red puppet stand. Please be sure you are able to keep an eye on the puppet area throughout your shift. One volunteer should supervise that area. It is important that it remains secure in the Alcove and that no one accidently walks away with a puppet. With three to a shift for the Teen Volunteers, one person should feel free to roam the Children's Garden with a puppet and seek and find cards in your hands.
- There is a laminated song sheet with songs about pollinators written by our very creative story time volunteer, Sally Braffman. Use these in the puppet Alcove to put on a show.

Cart Front

- Have kids match the magnets of pollinators to the photos on the cart front. There is a part of the pollinator's body shown on the cart front, so it should give the kids a clue.

<u>Quick Facts</u>

- There are over 20,000 known bee species in the world.
- There are only 10 honey bee species world-wide.
- There are over 4000 bee species in the US - only one of them is a honey bee, and it isn't even native to the US. It is the European Honey Bee, brought from European settlers.
- Not all bees sting, and most are not aggressive. They are too busy to be running after you!
- A bumble bee's wings flap over 130 times per second.
- 6 mason bees will pollinate 1 fruit tree…it normally takes 10,000 honey bees to do that!
- Bees are closely related to ants!
- About 70% of all bees burrow nests in the ground. Go easy on that mulch!

<u>How can all of us help bees and native pollinators?</u>

- Plant a variety of flowers in your garden, so you have blooms continuously from early spring to late fall
- Minimize your use of weed barrier plastic or landscape fabric, as bees cannot tear through these materials to reach the soil surface. If you must use a barrier, try laying down newspaper instead – it will biodegrade over time.

2016 Bee Habitat Activity

- Limit pesticide use. Pesticides are not selective to just the insect you want to get rid of, so when you spray it, it kills all insects, including bees!
- Install artificial nests for mason and leaf-cutter bees. There are lots of fun ideas for these types of nests, including the example in the cart!
- Plant a pollinator garden and register it at: http://millionpollinatorgardens.org/

Background Information for Bees and their Habitats

Mason Bee Quick Facts

- Mason bees are very effective pollinators. Just two or three females can pollinate a mature apple tree!
- Mason bees are unable to excavate their own nesting cavities
- These bees are solitary bees. There is only one bee per nest, not thousands.
- Rarely sting.
- Are early spring bees & emerge about the time cherries bloom.
- Use holes in wood or nesting tubes for egg laying

Mason Bee

- In the wild, mason bees lay their eggs in small natural cavities such as woodpecker holes, insect holes and hollow stems, and might also use artificial nesting cavities such as wooden blocks with holes drilled in them, cardboard tubes and paper straws.

- Female mason bees emerge in early spring and immediately begin to forage for pollen and nectar, which they collect from fruit trees, berries, flowers and vegetables.
  They pack this food into the far end of their nesting cavity until they decide there's enough there to feed a young bee.
  Then she lays an egg and seals up the cell. This process continues until the bee has filled the entire chamber with a series of pollen/nectar/egg cells.

- Once the mason bee has completely filled one chamber, she will begin filling another one. This pollen-collecting and egg-laying will continue for four to six weeks, after which the bee will die.

- Mason bee larvae hatch just a few days after the eggs are laid. They munch away on the food that's been stored in their cell, which usually lasts them about 10 days. Then the larva spins a cocoon and pupates inside the nest. They remain inside their cocoons until the next spring when the weather warms in the spring, the cycle starts again.

Leaf-Cutter Bees

- Leaf-cutter bees are solitary bees and do not make colonies like the social honeybees or bumblebees.

- They emerge in the spring and have a similar life cycle to the mason bees.
- Each female creates her own nest excavated out of partially rotted wood or made in hollow canes and stems.
- The nest cells are lined with the leaf fragments the bees cut. The cuts are made rapidly and are about the size of a quarter, then are carried back to the nest. The constructed cell is then packed with a plug of pollen and nectar and an egg is laid on it.
- When finally sealed with a bit more leaf material, the cells look like a miniature cigar butt. In larger nests, a dozen or more such cells may be stacked one after the other. The immature bees remain in the nest over the winter, developing into adult bees the following spring and emerging. One generation is produced per year, with peak activity of leaf-cutting typically occurring in June and July.

http://nurturing-nature.co.uk/wildlife-garden-videos/leaf-cutter-bees-harmless-useful-and-often-neglected-pollinator/

Carpenter Bees

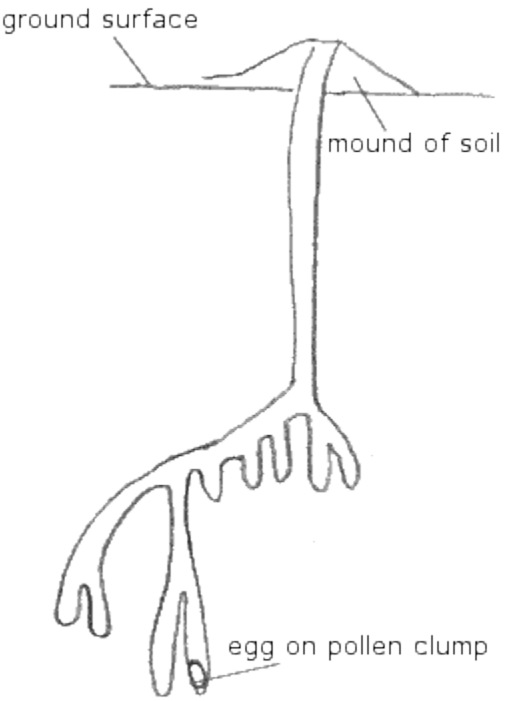
- The Eastern Carpenter Bee, which is the only carpenter bee you will see in Pennsylvania, is very common.
- These solitary bees nest in holes they bore through unpainted and bark-free wood.
- They are very effective pollinators, and providing them with other sources of wood may keep them from nesting in or near your home.
- After drilling a hole about 1” in depth, the bee turns 90° and bores through the wood, going with the grain. The nests are built by scraping wood shavings off of the wall. These shavings are then used to create partitions between nesting cells. The nests are usually round and have an average of 1-4 tunnels. They have multiple branches with each adult female living and laying eggs in a separate branch, but females share one common entrance because the nests are extremely costly to build, it is common for females to try to reuse old nests.

If a guest asks how to help control carpenter bees, give them this website to go to: http://ento.psu.edu/extension/factsheets/carpenter-bees

Miner Bees

- Solitary bees but some of the lawn nesting species nest communally.
- Diggers which generally nest in the ground, often in paths or lawns
- The entrance to their burrows is often marked by a small mound of excavated soil.
- These bees are good pollinators. In reasonable numbers, these bees won't harm your lawn.

2016 Bee Habitat Activity



Eastern Bumble Bee

- The common eastern bumble bee is a pollinator of flowers and numerous fruit and vegetable crops, including tomatoes, blueberries and cucumbers.
- Bumble bees have fur all over their bodies; these hairs collect and trap pollen, allowing the bees to carry pollen from one flower to another.
- They are a social bee, meaning they have one queen bee that begins a colony in the spring, and the bees live and work together in the same nest throughout the summer.
- They do not make honey, but these bees are highly important to the pollination of certain crops.
- They are able to “buzz pollinate”. They vibrate pollen off of the anthers of the flower – shaking the pollen out of the flower to land on them!
- Bumble bees are efficient pollinators to even the most difficult flowers to pollinate.

European Honey Bee

- Although it is one of our top pollinators in the U.S., the European honey bee is not native to North America. It was brought by European settlers during the 1600s for the production of honey.
- This bee is one of ten species world-wide that produces honey, and it is the only species in the U.S. that produces honey. With the decrease

in bee population, a bee hive built in the wild is rarely seen, and the only reason we see the actual bee in the wild today is because of the maintenance of man-made hives.

- Honey bees are a social bee, with hives consisting of a queen, female worker bees, male drone bees, and a continuous population of eggs and pupae. Because a worker bee's life-span is only about 6 weeks, in order to make it through the summer, the hive must maintain a healthy population of larva and pupae to grow and replace the other bees.

COMMON QUESTIONS

- You will inevitably get questions about bees being destructive or aggressive. Simply listen to the guest with a genuine ear, and try to point them in a positive direction with one of these links.
  - How do I stop the carpenter bees from nesting in my home?
    - A good start is to try to have other wood around that they can nest in, such as a nest built specifically for them or a vacant post you may have in your yard.
    - For other helpful tips, follow this link: http://ento.psu.edu/extension/factsheets/carpenter-bees (Feel free to let them take a photo of this link, so they can have it at home)
  - There are several ground bee nests in my yard. How do I make sure they don't hurt my kids when they are outside?
    - Ground bees are not aggressive. The stinger they do have is actually not even strong enough to go through skin. They are also a short season bee, so even if they are in your yard, just tell the kids to avoid that area for a few weeks, and the bee will have made its nest and be gone for the year.
    - Ground bees are actually really great to help aerate a nice lawn!
  - How can I help bees?
    - The web is full of resources on how to help declining bee populations. Penn State Extension and Xerces are great organizations to research different options depending on your location. (There are also some very simple answers located on page 4 of this document.)
  - Where do bees live?
    - Depending on the type of bee, bees can live in lots of different places. About 70% of bee species mine tunnels to live underground. Others, live in last season's dried, hollow stems or abandoned, narrow cavities. Others are able to build their nests by carving out tunnels in wood or by building a nest similar to a bird's nest.
  - How can we take care of bees?

        - By beeing conscious!! There are lots of easy steps to take in order to help care for the bees in your garden.
        - Minimize your use of weed barrier plastic or landscape fabric, as bees cannot tear through these materials to reach the soil surface. If you must use a barrier, try laying down newspaper instead – it will biodegrade over time.
        - Limit pesticide use. Pesticides are not selective to the individual insect you want to get rid of, so when you spray it, it kills all insects in its path, including bees!
        - Limit herbicide use. Although these are not meant to kill the insects, the plant still absorbs them, and the bees feed off of the plants. If the bee takes pollen from a plant that has been sprayed with a herbicide, it is taking in a poisonous pollen.
    - What can I do in the garden for bees?
        - Plant a variety of flowers in your garden, so you have blooms continuously from early spring to late fall.
        - Install artificial nests for mason and leaf-cutter bees. They are lots of fun ideas for these types of nests, including the example in the cart!
        - Plant native plants in your garden. Bees are different sizes, and their size usually depends on the plant they are accustomed to feeding from. By having the native plants they are more accustomed to, the more the bee population will flourish.
    - Why are bees so important?
        - One in every three bites of your food is pollinated by a bee.
        - Bees pollinate foraging crops, such as clover, for livestock to eat. This provides us will different meats, such as pork, beef, or poultry. It also feeds dairy cows that give us milk…meaning that bees play in imperative role in giving us the ingredients for ice cream!!
    - But bees sting!!!!
        - More accurately, bees sting when they feel threatened. However, some bees, such as many ground mining bees, have stingers that are not strong enough to break through human skin.
        - Rarely is a bee ever aggressive. It is not in their nature, as their real mission in life is to find as many blooms as possible to provide for the eggs they lay or others in their hive. They are much too busy to be thinking about you.
        - Often times, social bees are the ones that will sting if they feel threatened. Social bees are bees that live in a hive with other

bees. When they sting, a scent can be detected by other bees in their hive, warning them that danger is near.

GLOSSARY

Generalist forager – Bees that will forage and collect nectar from many different flowers

Specialist forager – Bees that will only forage for a certain crop or flower

Social bee – Bees that live in colonies or hives, consisting of different roles for each bee

Solitary bee – Bees that build their nests alone without the help of a hive

HELPFUL LINKS

- http://www.xerces.org/
- http://extension.psu.edu/pests/ipm/native-pollinators
- http://www.xerces.org/wp-content/uploads/2010/02/pa-nj-native-bee-benefits1.pdf ***
- http://extension.psu.edu/publications/uf023 ***
- http://www.xerces.org/download/pdf/PA_Pocket_Guide.pdf ***
- http://www.gardeners.com/how-to/about-mason-bees/8198.html
- http://www.bumblebee.org/OTHERbees.htm
- http://www.attainable-sustainable.net/bees/
- http://www.fs.fed.us/wildflowers/pollinators/documents/BumbleBeeGuideEast2011.pdf

*** Excellent Resource and also in the cart

Orchids for Kids Activity

PURPOSE

- Introduce kids to orchids
- Families will learn orchid have many parts
- Families will learn that orchids come in many shapes and colors
- Connect families to the rainforest – the home of more than 20,00 orchids

SUPPLIES

- Sorting Game supplies:
    - 4 green felt sorting baskets
    - Laminated Orchid color cards
- Orchid pollination flipbook
- Orchid puppet, orchid pollinator puppets(bird, bee, butterfly)
- Rain Forest Basket
    - Rainforest puppets(tree, monkey, snake, gecko)
    - Laminated rainforest book
    - Rainforest puppets, objects and scent jars
    - Rainforest Hidden Animal Picture laminated sheet
- Magnets for cart front
- Orchid sourcebook for background information for volunteer use

SET UP

The magnets should be on front of the cart. (Please use the magic sponge to keep the cart front clean.)
Everything else will go out as you use it. Set up supplies attractively.
Puppets can go out in a small basket, or on the puppet stand
Game supplies – these will be stored in the seasonal supply plastic box.
Put out laminated flipbooks

ACTIVITIES AND DIRECTIONS

1. Orchid Sorting Game

    a. Orchids come in many colors and shapes. The kids can sort by color or by any method they would like… Small flowers. Large flowers, flowers with matching “lips”. Our youngest guests can sort the laminated orchid pictures and put them into the matching labeled green felt basket. The older kids can sort by shape…just turn the baskets around and they can create their own sorting characteristics just like scientists do when they create categories for flowers, insects or stars.

2. Pollination: Flipbook of orchids and pollinators. Orchid mimicry - talk to families about how the flowers trick the pollinator into picking up its pollen.

Orchids for Kids Activity

3. Orchid plant investigation. Orchids are really cool. Use a laminated flipbook and orchid puppet to help kids understand what neat plants they are. Show them orchid roots, the column and other flower parts. Encourage them to try the cart front –interactive magnetic orchid flower puzzle

4. In the Red Chair Alcove - Use Rainforest Travel Box to engage kids in rainforest study. Do not leave the rainforest travel box unattended. The parts and pieces will disappear. This is something you can do with the families.
    a. Let them investigate the different things that come from a rainforest which are in the "suitcase". They can sniff the smell of coffee, vanilla and cocoa which all come from the rainforest. They can think about the wood and bamboo which comes from the rainforest and who lives in the rainforest.
    b. Use the laminated storybooks to help them understand the Rainforest layers and where the creatures and plants of the Rainforest live.
    c. Use the Hidden Animal Picture activity and they can seek the animals.
    d. See if they can imagine that the Children's Garden is a rainforest they are traveling through.

BACKGROUND INFORMATION

ORCHIDS

Orchid anatomy

Column **-** Orchids are unique in that their reproductive parts are fused together into something called the column. One large stamen and one large style are fused together to form a club headed rod of varying sizes in every orchid. This is the reproductive organ of the orchid.

Labellum – this is the petal which has evolved to serve as a landing platform for insect pollination.

Orchid Pollinators in Nature

In nature insects and other pollinators are attracted by color, nectar, fragrance or shape. Most orchids have very specific pollinators. Each one fits the orchid flower like a key in a lock. They also use many tricks to attract pollinators.

Over time, flowers and their pollinators evolve unique characteristics to enable successful pollination, reproduction and plant survival. Flowers are fragrant to attract pollinators. The unique smell of the flower alerts pollinators that the plant is ready to be pollinated, and when the pollinator is attracted to the fragrant flower pollen gets transferred.

What attracts birds Bird pollinated orchids visually attract nectar-eating birds, such as hummingbirds, through their typically red, orange, or yellow blooms. Since birds have a poor sense of smell, bird pollinated orchids have no fragrance.

They have long, tubular flowers for birds to poke their beaks into for easy access to the nectar. As a hummingbird sips nectar, it simultaneously picks up sticky pollen packets (called *pollinia*) on its long beak. The pollinia will be transferred to the next flower the hummingbird visits.

Orchids for Kids Activity

What attracts butterflies? Butterflies cannot hover in place and consequently must land when feeding. Butterfly-pollinated orchids have horizontal, broad flowers that are ideal landing pads for butterflies. In addition, their blossoms are typically red or yellow—colors that are particularly attractive to butterflies.

Nectar is hidden in deep, narrow tubes which a butterfly may only reach via its long, specialized mouthpart called a proboscis. As the butterfly feeds, it brushes against pollen pellets (*pollinia*) which stick to its head. When the butterfly goes to feed on another flower, it transfers the pollinia and thereby pollinates the orchid.

What attracts moths since moths are nocturnal; these orchids typically have white- or cream-colored blossoms that can be seen at night. They are also heavily perfumed to attract moths from great distances, thanks to the insects' large, feathery antennae that detect scent. The scent is often produced only at night to enhance pollinator specificity.

The vertical or pendulous flowers of these orchids reflect the moths' ability to hover while feeding. Unlike butterflies, moths do not require a "landing pad."

What attracts bees? Bee-pollinated flowers often have a strong scent during the day and are bright in color. Most bee-pollinated orchids guide the bees with sweet nectar fragrances and visual markings, such as stripes that lead toward the center of the flower. As the bees feed on nectar, they unknowingly pick up pollen and transfer it from flower to flower.

Some orchids such as *Oncidium*, mimic the color pattern of a rival male bee and trick another male into attacking the flower. As this bee repeatedly attacks the flower to drive off the rival, it picks up and deposits pollen; pollinating the orchid

Orchid Pollinators in Cultivation – Creating Hybrids

In cultivation humans serve as the pollinators. Breeders cross pollinate orchids to create new hybrids. Many orchids now are grown using tissue culture techniques so growers can quickly create new plants and also create plants which are exact duplicates of each other.

Orchids at Longwood

Plants on display shouldn't be pollinated. When a flower is pollenated it no longer blooms. The flower's purpose, fertilization, is complete and fruit and seeds will start to form.
Longwood only grows one orchid from seed; the Disa orchid. All other orchids are maintained in good health by removing old tissue when needed and repotting new growth.

Tropical Rainforests

Tropical rainforests are lush and warm all year long! Temperatures don't even change much between night and day. The average temperature in tropical rainforests ranges from 70 to 85°F (21 to 30°C). The environment is pretty wet in tropical rainforests, maintaining a high humidity of 77% to 88% year-round. The yearly rainfall ranges from 80 to 400 inches (200 to 1000 cm), and it can rain hard. It can downpour as much as 2 inches (5 cm) in an hour!

Orchids for Kids Activity

Tropical rainforests are so big that they are divided into four zones.

The top layer of the rainforest is called the **emergent layer**. Giant trees grow here that are much taller than the trees below.

The next layer is the **canopy**. It contains trees standing 60 to 150 feet (18 to 45 meters) tall. Their branches form a canopy, like a big beach umbrella that shades the forest floor. Thick, woody vines are found in the canopy. Over 2,500 species of vines grow in the rainforest. Some vines, called lianas, are sometimes as big around as a person! They climb the trees in the canopy to reach for sunlight.

The next layer, the **understory**, is a dark, cool area below the canopy, but above the ground. The understory is shaded from much of the sunlight by the canopy.

The **forest floor** is the bottom layer of the rainforest. This is the area where fallen, decomposing plants and trees lay on the ground. Many insects live here. Temperate rainforests have all of these zones except the emergent layer. The tallest trees in the temperate rainforest canopy grow to be about 300 feet (90 meters) tall.

Tropical Plants

One type of plant often found in a rainforest is an epiphyte. Epiphytes are plants that live on the surface of other plants, especially the trunks and branches. They often grow on trees to take advantage of sunlight in the canopy. In temperate rainforests common epiphytes are mosses and ferns, while in tropical rainforests there are many kinds of epiphytes, including orchids and bromeliads. There are more than 20,000 varieties of orchids found in the rainforest.

Most trees in tropical rainforests have thin, smooth bark. They don't need thick bark to keep them from drying out because the rainforest is so wet. Also, smooth bark makes it difficult for other plants, such as epiphytes, to grow on the tree surface. Trees often have buttresses, large branching ridges near the base, for support because their roots are often shallow and they grow tall to reach the sunlight. Prop roots also help support trees in shallow soils. Many plants in the rainforests have adapted leaf shapes that help water drip off the plant to avoid too much moisture, which might make bacteria and fungus grow.

Animals

A common characteristic found among mammals, birds, reptiles and amphibians, is an adaptation to living in trees. One example is New World monkeys that have prehensile tails that curl around branches allowing the monkey to hold onto the tree with its tail! Other animals are brightly colored, sharply patterned, have loud vocalizations, and like to eat lots of fruit. Most of the animals in the tropical rainforest live in the canopy. There is so much food available up there that some animals never go down to explore the forest floor! Birds are important to rainforests because they like to eat seeds and fruit. Their droppings grow into new plants and help rainforests to survive. In turn, tropical rainforests are important to birds because they provide winter grounds as migratory destination. Parrots are not the only type of birds you will see in the rainforest. In fact, about 27% of the bird

species in the world live in tropical rainforests. Insects make up the largest single group of animals that live in tropical forests. They include bright beautiful butterflies, menacing mosquitoes, camouflaged stick insects, and colossal colonies of ants.

Human Interactions and the Rainforest

Tropical rainforests are important because they provide oxygen, take in carbon dioxide, and are a huge source of biodiversity and cultural diversity. However, people also rely on tropical rainforests for food, medicine, timber, travel, and more. Rainforests around the world provide people with food and spices, for example, allspice, vanilla, cacao, cassava, ginger, bananas, black pepper, sugar cane, nutmeg and more.

Some scientists estimate that rainforests the size of Pennsylvania are lost each year due to people. There are many causes of deforestation. People log for firewood, charcoal, building materials and other uses. Trees are removed for commercial agriculture, which may cause permanent damage. Converting rainforests to pasture land for cattle ranching destroys many rainforests. Mining for gold, bauxite, and other minerals can destroy the land, and make it vulnerable to erosion.

What can people do to help our world's rainforests? One way to help is to learn more about the plants, animals and people, as well as the issues surrounding rainforests and deforestation.

Here's a great easy way to remember some tips to help our rainforests and ecosystems around the world

Trees:

Teach others about the importance of the environment and how they can help save rainforests.

Restore damaged ecosystems by planting trees on land where forests have been cut down.

Encourage people to live in a way that doesn't hurt the environment

Establish parks to protect rainforests and wildlife

Support companies that operate in ways that minimize damage to the environment

Insect/Pollinators Activity

Purpose

- To connect families to insects
- To engage children in activities exploring insects
- To emphasize the importance of insects as pollinators
- To illustrate the necessity of insects for our own food supply

Materials

- Cart Front
    - Magnets of insects
- Memory Game
    - 8 memory card pieces with insect images
- Insect Lifecycle
    - 1 ladybug lifecycle set (4pcs)
    - 1 fly lifecycle set (4 pcs)
    - 1 holographic card with images of a fly life cycle
- Insect-eye Viewers
    - 3 different types of insect-eye viewers
    - 1 laminated printout giving an example of how insects see
    - Baby wipes for cleaning viewers
- Mouthparts
    - 4 plastic insects: butterfly, grasshopper, fly, wasp/mosquito
    - 4 mouthpart simulators: straw, pliers, sponge, syringe
    - 4 cards detailing the mouthparts of each insect
    - Small container of water for kids to try the mouthparts
- Insect Display Case
    - Insect Display Case with pinned pollinator insects
    - Magnifier loops for looking at insects
    - 1 “Slug and Bug” guide
    - 1 “Butterfly and Moth” guide
- Puppets
- Books
- Stickers

Insect/Pollinators Activity

Set up

- Select activities to focus on and display neatly. Place all supply boxes out of sight.
- Place puppets and book basket in music alcove if someone will be volunteering in that area.
- Put supplies away at the end of your shift. Please keep the various activities sorted so they next volunteer can find what they need.

Activities

There are several activities to choose from. See which your favorites are and which the kids most enjoy. You can offer more than one at any time. You can also carry puppets and seek and finds around the CG and choose to not do a cart activity. If it is too busy or the child is too young then just do another activity – books, puppets, etc.

1. Cart Front
    a. This cart front is focused on pollinators and the flowers they pollinate. Each photo has a bit of the pollinator on it and each pollinator photo has a bit of the flower so they should be able to match them up. Have children attempt to match the bugs to the flowers which they pollinate
2. Insect Memory Game
    a. Have the older children play memory, there are 4 matching pairs.
    b. Younger children may enjoy naming and/or counting insects on cards. You might have them play an "easy" version of the game, with all the cards all facing up.
3. Insect Lifecycle Models
    a. Talk to kids about the different life cycles of insects. There are two life cycles – the ladybug and the fly. Older children can try to place the pieces of the life cycle in the correct order. (Hint – they are all numbered underneath so you know the order!) Talk about the transformation bugs make in their lifetime and discuss how a bug maturing is different from a human maturing.
    b. For younger children you can help them arrange the pieces and guide them through the process of a bug going from a "baby bug" to a "grownup bug".
    c. Both age groups can enjoy the holographic card.
4. Insect-eye viewers
    a. Have children look through each type of viewer and discuss what each one shows.
        i. **Compound Eye Viewer**: This is what a bug would see looking out of its main eyes. These eyes detect movement, and are made of hundreds of hexagonal units called ommatidium. Flying insects generally have larger compound eyes than walking insect in order to judge distances better while in flight.
        ii. **Ocelli Viewer**: Along with their compound eyes, insects have 3 simple eyes called ocelli. Ocelli are probably not used to locate objects but instead to differentiate shade from sunlight.
    b. Use baby wipes as needed to clean lenses

Insect/Pollinators Activity

5. Insect Mouthparts – This is a great interactive way to talk about insects. Each of four insects has different mouthparts. We are using everyday items to help the kids understand how each mouth works.
    a. Set out the supplies.
    b. Ask children how they think bugs eat. Do bugs have teeth like we do? Go through each item and explain what bugs eat. Ask children how they eat. Explain that instead of teeth bugs have mouths and jaws that are adapted to help them eat their favorite foods. **When insects eat nectar or visit flowers pollen sometimes sticks to their body parts. They carry that pollen to another flower and can pollinate it.** Use the image cards to illustrate the different mouthparts. The kids can try and match the plastic insect model to the "tool" which matches each insect mouth.
        i. Butterfly/straw: Butterflies and moths often feed on nectar from flowers. They have long, tongue-like mouthparts that are used like a straw to sip up nectar.
        ii. Grasshopper/pliers: A grasshopper's mouthparts work something like pliers to tear and chew plants. Their jaws move sideways, not up and down like people. If there are leaves available the kids can try to tear the leaf with the pliers.
        iii. Fly/sponge: A house fly's mouthparts work like a sponge to soak up liquids (pour out a little water and let them sop it up with a sponge)
        iv. Mosquito/syringe: Female mosquitoes use their needle-like mouthparts to draw up blood, just like a doctor uses a syringe. (let them put the syringe into the plastic containing water and suck some up)

6. Insect Display Box
    a. Handle the box carefully. The kids love to look at these insects. This is how real entomologists collect insect samples for study.
    b. Have children use their magnifiers to look closely at the bugs. See if they can notice that butterfly and moth wings are made of scales, just like the ones on fish.
    c. Ask how insects might use their special bodies help them transfer pollen (Look for small hairs on insects where pollen might get stuck)?
    d. Talk about the shapes and colors of the bugs, why is the butterfly so bright (monarchs are bright in order to alert predators to their toxicity)?
7. Puppets/Books
    a. Read to children or invite parents to read to children, and play with puppets.
    b. Volunteers can use books as a resource for info on insects.
    c. The beetle puppet has 4 wings and six legs just like a real insect!
    d. Use the flower puppet to show pollination.

Insect/Pollinators Activity

Insect Fun Facts and Basic Information

- All adult insects have:
    - 3 pairs of legs
    - 3 body segments – head, abdomen & thorax
    - Pair of antennae
    - Compound eyes
    - Exoskeleton
    - They may have 2-4 wings

- Fireflies and ladybugs are beetles. They are beetles with two pairs of wings so they can fly.
- What do insects see? Insects do not see thousands of images when they view something through their compound eyes. Instead, each facet or ommatidium, which is hexagonal in shape, sees part of an image. Thus, they see a mosaic of whatever they are looking at. Insects can separately distinguish about 200 pictures per second.
- Ladybugs are wonderful beneficial insects. A single adult may eat more than 5,000 aphids in its lifetime! Ladybugs have a similar life cycle to fireflies.
- In nature insects and other pollinators are attracted by color, nectar, fragrance or shape.
- Pollinator Overlook highlights the relationship between native plants and their pollinators. Pollination is the basis for most food in the world as well as for plant survival through reproduction. Protecting the native habitat of pollinators and plants is crucially important. Insects, pollinators and plants have evolved over thousands of years to have symbiotic pollination, host and food relationships in the food web.
- Over time, flowers and their pollinators evolve unique characteristics to enable successful pollination, reproduction and plant survival. Flowers are fragrant to attract pollinators. The unique smell of the flower alerts pollinators that the plant is ready to be pollinated, and when the pollinator is attracted to the fragrant flower pollen gets transferred.
- Butterflies cannot hover in place and consequently must land when feeding. They seek horizontal, broad flowers that act as ideal landing pads.
- Moths are nocturnal so they seek white or cream-colored blossoms that can be seen at night. Moths use their large feathery antennae to detect scent, so they seek heavily perfumed flowers. Certain flowers' scent is produced only at night to enhance pollinator specificity. Unlike butterflies, moths do not require a "landing pad."
- Bee-pollinated flowers often have a strong scent during the day and are bright in color. Bee-pollinated orchids guide bees with sweet nectar fragrances and visual markings, such as stripes that lead toward the center of the flower.
- Plant Native plants - What is a native plant?
  A native plant is one that existed in an area of the United States before settlement by Europeans. Native plants include ferns and club mosses; grasses, sedges, rushes, and their kin; flowering perennials; annuals, which only live one year; biennials, which have a two-year life cycle; and, of course, the woody trees, shrubs, and vines that covered

Insect/Pollinators Activity

"Penn's Woods" when the first settlers arrived. More than 2,100 native plant species make up the botanical diversity of Pennsylvania. (Source: www.dcnr.state.pa)

- Why plant native plants

  Native plants are naturally provide more habitat for native insects, a prime source of protein for other animals and crucial to the food chain.

  Once established, native plants are durable low maintenance plants which require little water and no fertilization or pesticide use

  Native plants support important pollinators which feed and live on these native plants

  To attract pollinators such as butterflies and insects that feed on native plants.

Seed Exploration

Purpose
Introduce children & families to starting seeds and growing plants at home
Introduce children to basic plant needs – water, sun, soil
Introduce children to the great variety of seeds
Get kids engaged in nature & connected to our Earth

Activities
Make and take seed babies
Seed discovery & seed matching
How do seeds travel Suitcase?

Supplies
Seed Babies supplies
- Small plastic bags
- Cotton balls
- Seeds
- Spray bottle
- Yarn
- Take home directions bookmark

Seed discovery laminated books
Sprouting Jar and seeds
Seed and meadow storybooks
Seed sound tubes in basket
Apple and bird puppet
Woven "suitcase" for Alcove

Set up
At the end of your shift leave out –magnets, scavenger hunt cards and sprouted seeds in jars
PUT AWAY – everything else

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Activities Directions

On the cart
1. <u>Seed babies activity:</u> Take out all the supplies needed: Small plastic bags, cotton balls, seeds, spray bottle, yarn, directions bookmark. Use container to hold bookmarks. Put out seeds and cotton balls in baskets
    a. To do ahead: Punch a hole in the bookmark and thread a yarn through it to make a necklace they can wear. These are the take home directions.

    b. While kids create seed babies ask them what they think seeds need to grow. Talk about what a seed needs to grow – water, light warmth. Their seed baby gets water, warmth from their body warmth & light. Seeds often come with their own energy or food source. Beans have food inside seed. The seed is supported by the food of the

two bean haves until it is has strong roots and leaves. Fruits feed the growing seeds (apples, grapes). You can show them the small baby bean plant growing with a tiny root in the sprout. Ask them where seeds come from. (From a flower which then forms a fruit)

c. Directions for Bean Babies

i. Give each child a cotton ball. Spray it with water or let them spray it. They can also wet it in the nearby fountain. Squeeze off extra water. Talk to them about how plants need water to grow just like us. These seeds are beans and will grow to be a bean they can eat.
ii. Give them a seed and have them tuck it into the cotton ball.
iii. Put the seed & cotton ball into one small bag & close. Help by looping a string through the hole & tying it so they can wear it around their neck. You can pre-thread the bags with yarn ahead of time if you would like. Talk about the light and warmth they need to sprout and grow.

2. Seed Sprouting
   a. Let them look at the seeds in the jars which are sprouting. They can use the magnifying glass. Show them the sprouting seedlings and point out the different parts. You can sprout many different seeds such as mung beans, clover seeds, watercress etc. One important key is to rinse the seeds with clear water every day.
   b. Let them fill and drain the sprouting seeds using the water fountain nearby. The seeds should stay inside the jar with the netting on top. You can pull one out to show them the roots if you need to. Explain that people can eat these sprouts. Sprouts are yummy in salads, sandwiches or stir fries.
   c. Let them compare the sprouts which have been growing a few days and the new sprouts. What parts can they see? (Roots, leaves, parts of seeds)

3. Seed Matching Game Inside the square metal tin are two different seed matching games. You can let kids try to match the seed tins to the images. They can also do this on the front of the cart. They can also play concentration with the seed packets.

In the Red Chair Alcove

4. How do seeds travel This activity is for the red chair alcove where you can read to kids as they come along or let parents read. Not all kids will want to be read to but the seed travel activity can be done without reading.
   a. Read flip float fly. Talk about how seeds travel.
   b. Use the seed wand to illustrate how seeds fly. Let the kids blow on the seeds to see how they would fly (oak seeds, dandelion seeds).
   c. Let them manipulate the Velcro to think about how seeds stick like burrs and other sticky seeds.

   d. Use the circular water tube to let them see how seeds float. Most water plants have floating seeds. The seeds in the tube come from our own large water platter plants out in the Waterlily Pools.
   e. Use the puppets to talk about how animals both carry seeds and eat them. The seeds they eat get "pooped out" – something gross that kids will love of course!
   f. Use the apple puppet to talk about how seeds use a fruit for food. See the laminated book on fruits and seeds.
5. Seed sound tubes in round basket Let the kids explore the different seeds in the tubes by turning them upside down to create a unique sound. Each seed makes a different sound.

Additional Information

- Seeds need warmth, water and air to grow. Seeds have food stored in the seed for the young seedlings.
- When a seed gets warmth, air and water, it starts to change. The stem and the root emerge from the seed. This is called germination. Germination occurs if the seed is in a warm place. We plant seeds in the spring when the ground is warming up. The seed is the food for the baby plant until it can grow its own root system. A seed is germinated when it can grow without the food stored in the seed.
- Seeds come in different shapes, sizes and colors. Some can be eaten and some can't. Some seeds germinate easily while others need certain conditions to be met before they will germinate.
- Seeds travel. They can't just get up and walk to a new location, but structures on the seed may allow it to move to a new location. Some of the moving forces may be wind, water, animals, and gravity.
- Each seed has three parts: seed coat, embryo and cotyledon/endosperm (food). The outer covering of the seed is called the seed coat. Seed coats help protect the embryo from injury and also from drying out. Seed coats can be thin and soft as in beans or thick and hard as in locust or coconut seeds. Endosperm, a temporary food supply, is packed around the embryo in the form of special leaves called cotyledons or seed leaves. These generally are the first parts visible when the seed germinates.

Puppet Play

Purpose

Using puppets to interact with children is an excellent means to interpretation. Puppets can be used to foster imaginary play, teach children small things about plants or critters in a casual manner, encourage positive behaviors in the Garden and offer fun and create joy.

Some of you may hesitate to try the puppets. Give it a try and see what you think. Try out a few of the ideas below and I think you'll find kids of all ages naturally gravitate to puppets.

Materials

Puppets available – there are many and we do rotate them in and out of use throughout the year according to the theme of the seasons. They include both finger puppets and hand puppets. If a puppet is not out and you would like to use it, please email your staff coordinator.

- Insect puppets such as a ladybug, butterfly, bee, walking stick
- Rainforest puppets including frogs, lizards and bats
- Children's Garden focused puppets such as the peacock and dragon
- Birds of all sorts including owls, hummingbird
- Meadow puppets including a squirrel, mouse, rabbit

Puppet Curtain – stored in a clear plastic storage envelope

Set up

- Use puppets as an accessory to an activity or as the activity itself. For example put out pollinator puppets with pollination activity.
- You can carry puppets in your apron around the Garden, use them with the Puppet curtain, or at the cart
- Make sure to put puppets away when you have to leave the cart alone. We don't want them to "walk away".

Ideas for Using Puppets

1. **Talk to children through the puppet.** Wear a puppet and talk to the children through the puppet.

☺ Ask if they have a name for the puppet
☺ Ask if they have any food (flower nectar, bird seed, etc.) or water for the puppet. Maybe they can help the frogs catch imaginary flies.
☺ Ask where the puppet might live in nature or in our garden
☺ What sound do they think the puppet makes?
☺ Talk to them about their visit…where should their friend the puppet go?
☺ Do they see a sculpture in the garden which matches their puppet?
☺ Use the turtle to talk to shy children…"Tom the turtle is shy but he's lucky he has a house to hide in" and then pull the turtle's head in.

Puppet Play

2. **Moving the Puppet**

   You'll find different movements make different puppets more alive. Experiment…

- nod the head & flutter the wings of the butterfly or bee,
- drape the lizard over your arm,
- tuck the turtle's head into its shell
- Flap & spread the feathers on the peacock

3. **Encourage children and other guests try the puppets**

- Ask them if they'd like to play with or try a puppet.
- Which puppet would they like to use?
- Ask if they want Grandma, Mom, dad whichever adult is with them to try a puppet so they can "talk" to each other.
- Rules:
  - ☺ They must stay in your view with the puppet. Encourage them to stay close by.
  - ☺ Remind them that butterflies & other critters don't like to get wet
  - ☺ Also if they get the puppet wet we'll have to put it away☹.

4. Puppet shows

Guests can create a puppet show using the puppet curtain.

Puppet Curtain –The puppet curtain hangs neatly in the red chair alcove and stores best rolled neatly inside its plastic holder in the cart lying on the top shelf on a diagonal so it fits inside the cart. I attached some photos. There is also a handy red wire puppet stand you can place the puppets on.

NOTE: Just a few of the puppets are for sale in the GardenShop

Seek and Find Activity

Purpose

To encourage guests to take a closer look at the more interesting elements of the Children's Garden – textures, art and plant
To provide an activity for children who like to search things out.

Materials

Laminated scavenger hunt cards – several levels of difficulty from easy to genius
Genius is the most difficult hunt.
Laminated Seek and Find Location Keys - these cheat sheets should be in the side pocket of the cart
Note: at times there will be a specialty seasonal hunt – bird nests, butterflies or Christmas hunts. These cards should only be out if the items are out in the Garden

When/Where to Use

This activity can be offered at the same time you do another activity. You can carry them around in your apron pockets. We also leave them set out on the cart, as well as near the GSA station for guest to try when you are not there.

What to do

1. Ask children if they would like to try a seek and find hunt.
2. Explain that all the items are here in the Children's Garden
3. Let them choose which card they want to start with.
4. When they come back ask if they found all the items on their card.
    - If they found them all - ask where they found one item on the card. If the answer is correct give them a high five and congratulations!
    - If they can't find some of the items – give them a hint and they generally will head out again
    - Some of them may get bored and stop but that's ok too.

Tips
Try to do the hunts yourself. It is a great way to learn the garden!
SCHOOLGROUPS – Give groups of 2 -3 a card to share. They can solve the hunt as a team.

When you leave the cart

Leave out the sign that says "Try a Seek and Find hunt".
Leave a small selection of various seek and find cards scattered on the cart; and the rest in the side pocket of the cart.
Make sure that the Seek and Find Location Keys are in the side pocket and visible.

Seek and Find Activity

Seek and Find Locations cheat sheet

Ants on a vine – in staircase on metalwork
Birds - fountain in Bamboo maze
Bubbling birds - fountain in Bamboo maze
Deer - on mural in square maze area
Dragon – drooling Dragon
Dragon tail - Drooling Dragon
Firefly – door near bamboo maze area
Fox - on mural in square maze area
Frog life cycle – sculpted into base of fountain in central cove
Hummingbirds – fountain in Bamboo maze
Lobster – on fountain at end of runnel ramp
Peacock - fountain in Bamboo maze
Pelican - fountain in Bamboo maze
Rabbit - in mural on square maze area
Salamander - on fountain at end of runnel ramp
Snail – on fountain at end of runnel ramp
Snake - bottom of stairwell ceiling
Spider web - Square Maze grill
Sun – Bamboo maze alcove
Treasure Chest - in staircase on metalwork
Turtle painting - on mural in square maze area
Two fish – in the grotto cave
Water & stone pillars – Rain Curtain
Water spigot – top of stairwell

Use the map in section 1 to help you identify locations.

There are additional Seek and Finds not listed here available.