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## Tree Adventure Passport - A Family Activity Guide

Steven A. Wright

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## Tree Adventure Passport - A Family Activity Guide

**Title:**                   **Tree Adventure Passport - A Family Activity Guide**

**Author:**               **Steven A. Wright**

**Date:**                 **March 2009**

**Abstract:**

As one of the most ambitious undertakings in the Arboretum's history, Tree Adventure is expected to draw record yearly crowds of over 110,000 people. The exhibit includes interpretation at four established Arboretum destinations and is introducing a canopy walk to take visitors through the trees for a new perspective of forest life. As a supplement to this exhibit, a Passport will lead visitors to each of the Tree Adventure locations and provide a variety of educational activities that help to reinforce the messages at each location. This Passport considers various educational theories and philosophies that ensure that all visitors, regardless of age, ability, or learning style, will find it fun and worthwhile, while learning new and exciting things about the environment. Together, the interpretation for Tree Adventure and the Passport should help to fulfill the Arboretum's mission to "promote an understanding of the relationship between plants and people."

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## **Introduction**

Set to open in the summer of 2009, Tree Adventure is to be one of most ambitious undertakings in the Arboretum's history. Born out of a key objective that called for the creation of "compelling visitor experiences," Tree Adventure aims to provide a high quality museum experience that fulfills the arboretum's mission to "promote an understanding of the relationship between plants and people." (From the Morris Arboretum Mission Statement).

The exhibit will lead visitors on a journey to five separate locations: they can stroll up to the treetops at Out-on-a-Limb and down to the roots at the Oak Allee; they can marvel at the living fossils at the Dawn Redwood Grove, build their own wooden structure at the Log Cabin, and appreciate the functionality of the Springhouse. Each of the exhibit locations will help visitors become "excited about experiencing the natural world in the city; engaged with trees-from their roots to their crowns; aware of the interdependence between people and trees; curious about how trees work and how they express their inner structure in their outward appearance; and inspired to plant and care for trees in their communities." (From The Tree Adventure Exhibit plan)

Throughout the Tree Adventure exhibit, strategically placed interpretive panels will help to "expose every visitor to the focused messages about their interdependence with trees" (From the Interpretation Master Plan). It seems unlikely, however, that panels alone can provide the compelling visitor experience the exhibit is intended to provide. So, to accomplish these goals, and add yet another educational component, it was determined that a family activity guide would be a perfect supplement. This activity guide would introduce each of the Tree Adventure locations and offer a variety of activities that contribute to the theme and help drive home the underlying messages. This activity guide is called the Tree Adventure Passport.

## **Objectives**

Tree Adventure aims to provide experiences engaging to the whole family, from young children to older adults, using multiple methods of delivery. This involves combining traditional signage with sensory experiences to accommodate all learning styles and ability levels (Tree Adventure Exhibit Plan). It seems logical that the objectives for the Passport will follow closely to the objectives of the exhibit. Specifically, the objectives of the Passport include:

### **Design objectives:**

1. To be visually appealing, representing the quality that visitors have come to expect from the Morris Arboretum.
2. To be functional/user-friendly (a manageable size and requiring minimal materials)

### **Experiential objectives:**

1. To supplement the exhibit with activities that relate directly to the interpretive panels or sensory activities.
2. To accommodate all learning styles and abilities (considering that “families” include varying ages)
3. To include activities that incorporate history, math, science, and art.
4. To reward visitors for completing the activities

## **Methods**

To accomplish the goals and objectives of Tree Adventure, the following methods will be used:

### **Design methods:**

1. Work closely with Anne Marie Kane of Imogen Design to create a visually appealing design and layout. Following the passport theme, it will be printed on heavier stock paper, saddle stitched, and with rounded corners
2. The dimensions of the Passport are 9” by 4”, the size of a standard brochure, and it will require only a pencil which can be supplied by Visitor Services or Education Volunteers.

### **Experiential methods:**

1. Several of the activities in the Passport will relate directly to the interpretive panels. There will be at least one Passport activity for each of the five Tree Adventure locations that will require visitor participation *at* the location.

2. Because this is a “family” piece, and families typically include children that vary in ages and ability levels, the Passport activities will vary in their level of complexity. Some activities are going to be too complex for one family member, but may be just right for another. I will develop the activities using Bloom’s Taxonomy as a guide – including some very basic activities that require little actual learning and others that require more thought and concentration.
3. In addition to differences in ability levels, I will accommodate differences in learning styles. Because people learn in different ways, the Passport activities incorporate two learning style theories. The first being the VARK (visual, auditory, read/write, kinesthetic) theory, and the second being Gardner’s Theory of Multiple Intelligences.
4. Where appropriate, the Passport activities will incorporate other academic areas such as history, math, and science.

## Literature Review

### **Bloom’s Taxonomy**

Published in 1956, *Taxonomy of Educational Objectives: the Classification of Educational Goals* was a handbook that outlined what is now referred to as Bloom’s Taxonomy. Written by Benjamin Bloom and his colleagues (Engelhart, Furst, Hill & Krathwohl), this “taxonomy” was a categorical breakdown of what he considered the six levels of cognition. It was intended to assist educators in developing meaningful assessments that tested learning beyond simple recall of facts and information which, at the time, made up over 95% of test questions (Bloom et al., 1956).

The levels of this Taxonomy were ordered from simple to complex and from concrete to abstract (Krathwohl, 2002). The recall of facts and information was considered to be the lowest level in the Taxonomy and was called the “Knowledge” level. Knowledge was followed by, Comprehension, Application, Analysis, Synthesis, and Evaluation – each requiring a better understanding of the concepts than the previous level. Using this taxonomy as a guide, teachers could now test for deeper understanding and be sure that true learning has taken place.

The table below briefly explains each of the levels of Bloom’s Taxonomy and provides question verbs and sample questions that would be associated with that level of cognition.

<b>Level</b>	<b>Explanation/Skills Demonstrated</b>	<b>Question Verbs</b>	<b>Sample Question</b>
Knowledge	Recall information such as dates, events, places. This is basically repeating memorized information.	List, define, describe, identify, label, name, quote, show, order.	Who were the “log cabin presidents”?
Comprehension	Understand information or grasp the meaning of things. Interpret facts and translate them into new context. Make inferences.	Summarize, describe, explain, estimate, discuss, recognize.	Why were log cabin presidents so popular?
Application	Use information, methods, concepts, or theories in new situations. Solve problems using acquired knowledge.	Demonstrate, calculate, complete, illustrate, classify, experiment.	Use pictures of the log cabin presidents to make a timeline of when they were born.
Analysis	Recognize patterns or differences. Identify components and make connections. Recognize hidden meanings.	Compare, contrast, categorize, discriminate, question, test,	What are the similarities and differences between the campaigns of today’s presidential candidates and those of the 1800s?
Synthesis	Using old ideas to create new ones; generalize from given facts; predict or draw conclusions; relate knowledge from several areas.	Arrange, assemble, combine, compose, collect, design, create, develop, formulate, propose, plan.	Pretend you are running for president. Knowing how the log cabin presidents campaigned, how would you go about campaigning?
Evaluation	Compare and discriminate between ideas; assess the value of theories; think critically and make choices based on reasoned argument.	Measure, recommend, conclude, summarize, judge, criticize, deduce, support, and test.	Of all the log cabin presidents, explain whose birth and life in a log cabin may have had the most impact on the general public?

Sources: Bloom, et al. 1956; Bloom, 1984;



## Learning Styles

Generally speaking, people learn in different ways. Some learn best by seeing or visualizing, others learn best by listening, and others learn best by physically interacting with their surroundings. But learning is much more complex than this and many people learn in some combination of ways. There are dozens of learning theories and models developed by many great minds of education including Kolb (1984), Duff (2004) Felder & Silverman (1988), Dunn & Dunn (1975), and Gregorc (1979) among others (Hawk and Shah, 2007). While they all introduce different points of view, they all agree about the underlying idea that people have different ways of learning and remembering information.

Perhaps the most common learning style theory was developed by Fleming and Mills in 1992. Their VARK theory defines learning style as “an individual’s characteristics and preferred ways of gathering, organizing, and thinking about information” (Fleming, 2001). VARK, which stands for Visual, Aural (auditory), Read/write, and Kinesthetic, focuses on the “sensory modalities” used to learn new information. Very simply, Visual (V) learners learn best by seeing or visualizing information in charts, graphs, and diagrams; Aural/Auditory (A) learners learn best by hearing or listening to lectures, tutorials, or group discussions; Read/write (R) learners learn best by seeing displayed words in all forms; and Kinesthetic (K) learners learn best by touching, moving, and constructing. The only senses that VARK does not address are taste and smell (Hawk and Shah, 2007)

A second commonly referenced learning style theory is Gardner’s Theory of Multiple Intelligences. Developed by Howard Gardner in 1983, this theory explains that there are eight different intelligences (Brualdi, 1996). These eight intelligences are briefly defined below (Brualdi, 1996).

Logical-Mathematical consists of the ability to detect patterns, reason deductive and think logically.

Linguistic includes the ability to express oneself rhetorically or poetically.

Spatial gives one the ability to manipulate and create mental images in order to solve problems.

Musical encompasses the capability to recognize or compose musical pitches, tones, and rhythms.

Bodily-Kinesthetic is the ability to use one’s mental abilities to coordinate their own bodily movements.

Interpersonal involves the ability to recognize the moods, temperaments, motivations and intentions.

Intrapersonal involves the ability to understand personal thoughts and feelings

Ecology involves the ability to discern similarities and differences among living organisms.

Gardner argued that there is both a biological and cultural basis for these multiple intelligences and explained that they rarely operate independently. They usually complement each other as individuals develop skills or solve problems (Brualdi, 1996). For example, a dancer can excel in his art only if he has A) a strong musical intelligence to understand the rhythm and variations of the music B) interpersonal intelligence to understand how he can inspire or emotionally move his audience through his movements and C) bodily-kinesthetic intelligence to provide him with the agility and coordination to complete the movements successfully (Brualdi, 1996).

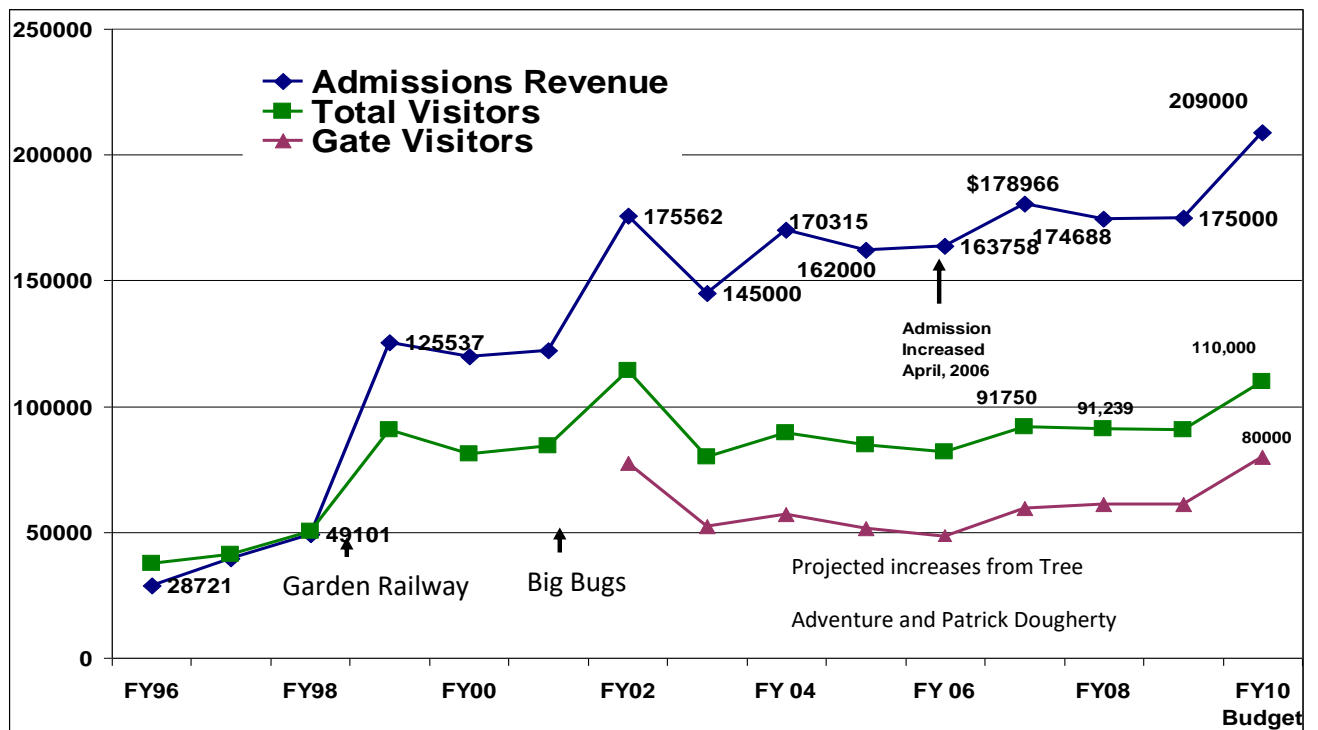
Accepting Gardner's Theory has several implications for teachers in terms of their approach to delivering educational programs. It is important to think of all intelligences as being equally important and teach to a broader range of talents and skills. It is also important to structure the presentation of materials in a style which engages most or all of the intelligences.

Using a combination of methods to develop educational lessons or activities allows for what is deemed "authentic assessment" which tests for deep understanding and involves thinking in abstract ways (Brualdi, 1996)

## Results and Discussion

For each of the five locations of Tree Adventure I developed three main activities (see appendix A). I used Bloom’s Taxonomy as a guide to develop the activities with varying levels of complexity and included all of Gardner’s “intelligences” with the exception of interpersonal intelligence. I also included several activities that incorporated visual and kinesthetic activities (or both), but because the Passport is essentially a series of self-guided activities, there were fewer opportunities to incorporate auditory activities. The “Test Your Senses” activity in the Out on a Limb section does, however, ask visitors to listen for and mimic bird songs. Finally, while many of the activities are based in environmental science, some activities introduced math, history, and even art.

Combined with the installation of the Patrick Dougherty sculpture, the Tree Adventure Exhibit is likely to draw in record crowds. The graph below shows the impact of past installations with increases in visitation after the opening of both the Garden Railway and the Big Bugs exhibit. It also shows a projected estimate of visitation for the first year of Tree Adventure and, with an expected 110,000 visitors, the Passport will likely be an important part of the experience for visitors “young and old.”



Data compiled by Bob Gutowski, Director of Public Programs, 2008

## **Acknowledgements**

There are several people that I would like to thank for their assistance in developing the Tree Adventure Passport. Deserving the most credit are Liza Hawley and Jan McFarlan for their incredible leadership and support. I cannot put into words my gratitude for their patience and near daily assistance with brainstorming, proofreading, and addressing all of the “little things” that came along with the process. I would like to thank Lisa Bailey, Judy Hoover, and Debbie Caraher for all of their moral support and always-interesting conversation. Collectively, they have all helped make this a most enjoyable year. I would also like to recognize Anne Marie Kane for her patience in designing and re-designing the Passport; Susan Crane, Melissa von Stade, Alison Thornton and Aimee Dobberstein for their comments and design recommendations; and Bob Gutowski and Paul Meyer for sharing their ideas for design, evaluation and prize considerations.

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## Appendix A

MORRIS ARBORETUM

Join today...  
visit free!

### membership

Membership is your passport to visitation all year long. If you did not have a chance to visit all of the Tree Adventure stations today, simply return with your passport and complete your journey any time. Membership information is available at the Visitor Center or at [www.morrisarboretum.org](http://www.morrisarboretum.org).

### group visits and tours

We welcome bus groups, group tours and school groups by appointment only. To schedule a group visit or learn about tour programs and themes, call 215-247-5777 ext. 157.

### hours

*Weekdays:* 10am-4pm  
10am-8pm Thursdays in  
June, July & August

*Weekends:* 10am-5pm (April-October),  
10am-4pm (November-March)

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Morris Arboretum of the  
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**treeadventure**

# welcome

Type  
Arboretum Traveler

Code of Issuing State  
Pennsylvania

Given Name

Date of Birth

Sex

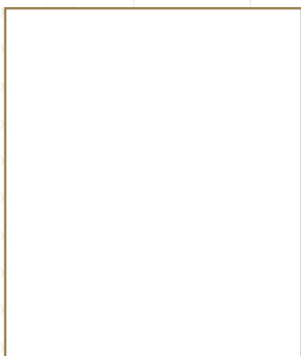
your picture here

Date of Issue

Date of Completion

Authority  
Morris Arboretum

Pick up your prize  
Once you have completed all  
the Passport activities, make  
sure you stop by the Shop  
to receive your special prize.



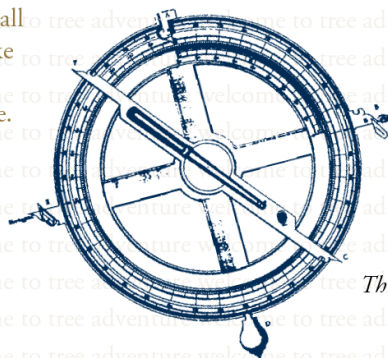
## WELCOME TO TREE ADVENTURE!

The Tree Adventure Exhibit helps us understand the relationship between plants and people. Activities at the different Tree Adventure stations offer exciting ways to engage with trees.

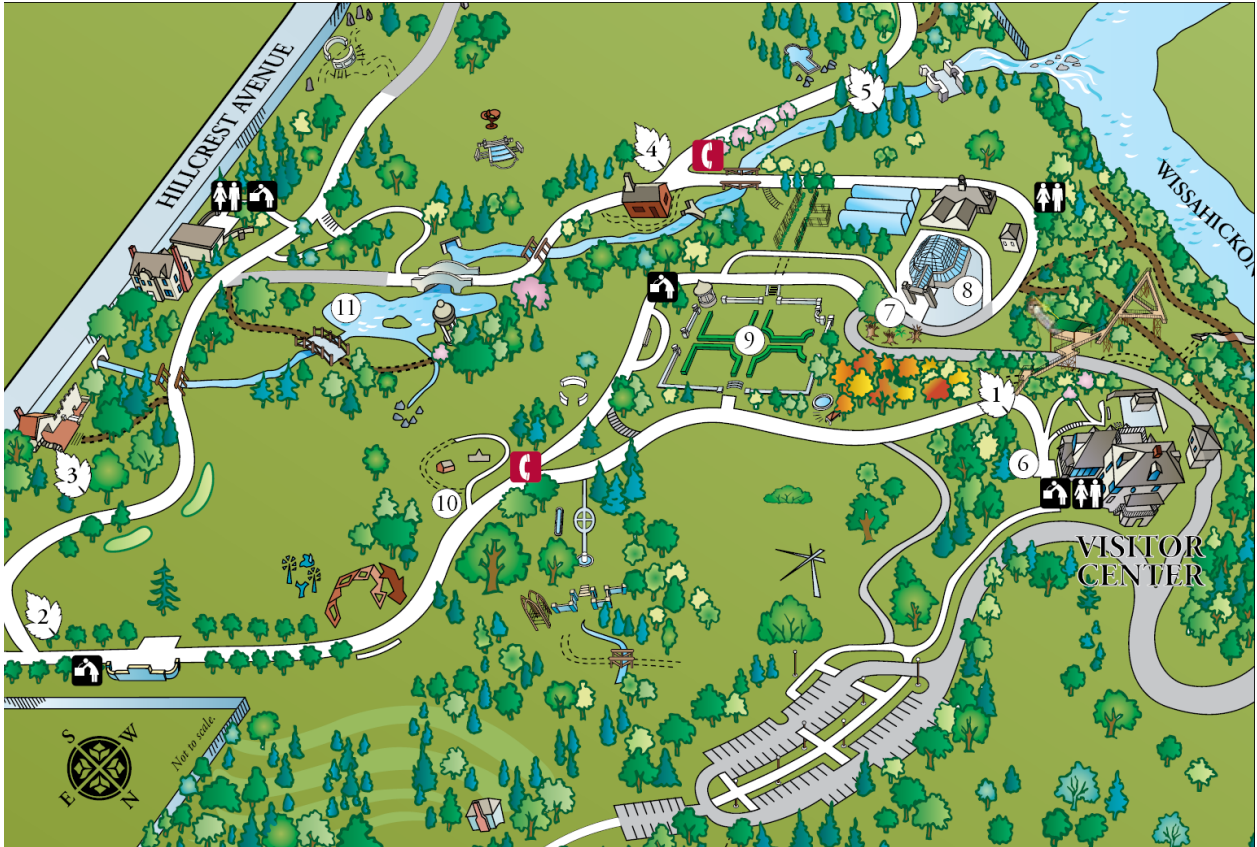
1. Scramble like a squirrel for a bird's eye view of the forest floor on *Out on a Limb*
2. Test your math skills at the Oak Allée
3. Meet the living fossils in the Dawn Redwood Grove
4. Step back in time at the Log Cabin
5. Compare nature's temperatures by the Springhouse

Stop along the way to notice the details – leaf color in fall, bark textures in winter, blossoms in spring, and the fragrant flowers of summer.

We hope you have fun on *your* Tree Adventure and remember, ***we need trees and trees need us!***



*This Passport supported by* \_\_\_\_\_



## Key to treeadventure

Travel to all five stations of Tree Adventure and explore your interdependence with trees!

- 1 *Out on a Limb*: This canopy walk will let you scramble around at heights of over 40 feet!
- 2 *Oak Allee*: This tree-lined walkway is a great place to learn about root growth and functions.
- 3 *Springhouse*: Here, you can check nature's temperature and escape the summer heat.
- 4 *Log Cabin*: One of Lydia Morris's favorite retreats that reminds us that trees can also be homes.
- 5 *Dawn Redwoods*: This grove of living fossil trees exists today because of plant explorers.

- 6 Visitor Center & Shop
- 7 Stumpery
- 8 Fernery
- 9 Rose Garden
- 10 Garden Railway
- 11 Swan Pond

- Restrooms
- Water Fountains
- Emergency Phone
- Accessible Paths
- Other Paved Paths
- Unpaved Paths



**Morris Arboretum of the  
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*Official arboretum of the Commonwealth of Pennsylvania*





# Oak Allée

## ADVENTURE

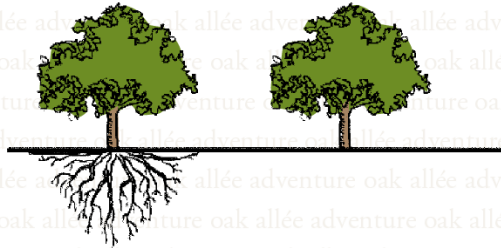


Allée (à la') French for a tree lined walkway

Once an entrance to the property, this oak-lined allée is a great place to learn about roots. You'll read about how roots work, how they grow, and what they do for trees. Don't forget to stop by the Stumpery for an even closer look into the world of roots. The stumps represent the "hub" of activity in trees as the water and nutrients gathered by the roots are sent up through the trunk to the leaves where food is made. This food, in the form of sugar, flows back down the trunk to the roots and the incredible, life-sustaining cycle continues on.

### WHAT'S WRONG WITH THIS PICTURE?

After reading about roots and how they grow, can you spot some problems with the drawing on the left? Can you draw what a tree's roots *really* look like on the tree on the right?



So, what is wrong with the drawing on the left?

1. \_\_\_\_\_
2. \_\_\_\_\_

— Oak Allée Adventure supported by Carole Haas Gravagno

### DON'T BE A PUSHOVER!

A tree's roots spread out and help keep the tree from falling over. To see how this works, find a partner and:

- Ask them to stand with their feet together and see how hard it is to push them over (gently of course). Then...
- Ask them to spread their feet apart and see how hard it is to push them over.

Can you tell the difference? Which do you think represents the way roots anchor the tree?

### MULTIPLICATION MASTER

Think about this, a tree's roots grow really fast when it is young and gradually slow down as it grows old. Assume that tree roots grow 2 feet per year for their first 20 years and 1.5 feet per year after that and calculate the following:

- If a tree is **your age**, how far do its roots spread?
- If a tree is **20 years old**, how far do its roots spread?
- If a tree is **50 years old**, how far do its roots spread?

### How far do *these* roots spread?

Most of the trees in the Allée were planted in 1994, so using the information above, calculate how far the roots spread right now and pace it off. Consider one pace is about three feet.

After you finish these activities,  
**STAMP YOUR PASSPORT**

# Springhouse ADVENTURE



## WHAT IS A SPRINGHOUSE?

Use the panel to help you fill in the blanks:

- Springhouses were used to cool \_\_\_\_\_ products.
- The workroom was used to churn \_\_\_\_\_ and separate \_\_\_\_\_.
- \_\_\_\_\_ cans and other jugs were set inside to keep cool.

Another remnant of the past, the Springhouse represents a historical use of water, not for milling or drinking, but for preserving food. Though now obsolete, it remains a symbol of early America and might be thought of as the “coolest” place in the Arboretum. Just how cool is it? Check its temperature and compare it to other nearby locations. Step inside to escape the summer heat, or even the winter chill, and imagine what might have been stored here over a century ago. Find out how it works, why the temperature is so constant, and how trees contribute to its success.

## HOW COOL IS IT?

Step inside the Springhouse to feel how cool it is. In the middle column, write down what you think the temperature is at different nearby locations. Then, find the panel with the actual temperature readings from each location and see how close your estimates were.

## Record the Temperatures

	My Guess	Actual Reading
In Springhouse		
In Ground		
In Water		
In Shade		
In Sun (grass)		
In Sun (blacktop)		
In Tree		

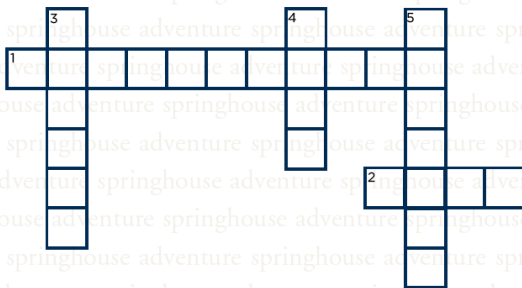
## SPRINGHOUSE CROSSWORD

### Across

1. Name of the building
2. It kept things...

### Down

3. What runs beneath it
4. What was kept in it
5. Big tree beside it



After you finish these activities,  
**STAMP YOUR PASSPORT**

Springhouse Adventure supported by Andrea Baldeck and Bill Hollis

# Log Cabin ADVENTURE



## LOG CABIN PRESIDENTS

Log cabins were once a symbol of tough pioneer life. Presidents who were born in them were considered “men of the people.” Use the binder inside the Log Cabin to help you unscramble their names below.

CANSJKO \_\_\_\_\_

ICLNONL \_\_\_\_\_

RILFMLEO \_\_\_\_\_

LOKP \_\_\_\_\_

YTLARO \_\_\_\_\_

So, why do you think people liked “log cabin presidents?”

All kinds of animals depend on trees to build their homes, keep warm, find and store food, and raise their families. The Log Cabin is a perfect example of how people rely on trees to provide these same things. Tucked away in a lush gully, a visit to the Log Cabin is like a step back in time – a reminder of a bygone era. Although no one lived in it, the Log Cabin was one of Lydia Morris’s favorite garden retreats and is sure to become one of yours. Stop in where the scent of the fireplace still lingers; see the historical photos and read the stories, relax on the porch, and enjoy the sights and sounds around you.

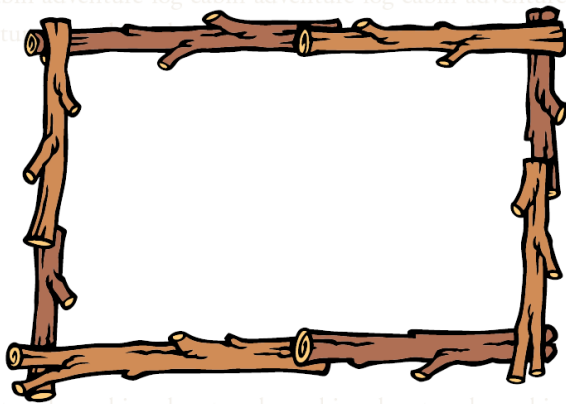
## WHO’S LIVING IN THAT TREE?

Look around for signs of life. Can you see bees on the flowers, birds in the trees, or bugs on the leaves? Do you see some animals on some trees that you don’t see on others? Make a sketch below of the insects, birds and other creatures you spot.

## WHICH WOOD WOULD YOU USE?

Find the stack of different logs in the Cabin. Pick them up and examine them closely. Logs from some trees are heavy and hard and logs from others are light and soft. So if you were building a log cabin, which of these types of wood would you use? And, why would you choose that wood? (Remember, there are no right or wrong answers)

I would choose \_\_\_\_\_



Log Cabin Adventure supported by Pamela and James Hill

After you finish these activities,  
**STAMP YOUR PASSPORT**

# Dawn Redwoods

## ADVENTURE



### THINK ABOUT IT

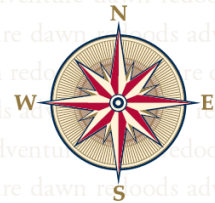
The trees in this grove have grown very large, very fast. In fact, some are quite a bit larger than the two dawn redwoods by the Swan Pond even though they are about the same age. Look around; can you think of any reasons this has happened?

While there are several rare and unusual plants at the Arboretum, few are as storied and awe-inspiring as those in the Dawn Redwood Grove. Once common across North America, these trees were thought to have become extinct nearly two million years ago. Today, they exist because of the efforts of early plant explorers. On the panel, you can read their story of discovery and redistribution and learn why the dawn redwoods are often referred to as “living fossils.” This grove includes some of the oldest and largest dawn redwoods in the country. See for yourself just how large they’ve grown.

### USE THE COMPASS

Early plant explorers didn’t have today’s technology. To find where they were going, they used a compass. So, use the compass and grid below to fill in the blanks. The numbers represent the number of spaces to move and the N, E, S, and W represent direction. For example, 1 N means move up one space, and 2 W and 3 S means go left 2 spaces and down 3. Always start from the preceding letter.

A	F	K	P	U
B	G	L	Q	V
C	H	M	R	W
D	I	N	S	X
E	J	O	T	Y



### USE YOUR IMAGINATION

Find the panel that explains how to measure the height of these trees. Then, figure out how tall one of the smaller ones is. What do you come up with?



The small tree is \_\_\_\_\_ feet tall

If the small tree is that tall, how tall do you think the biggest trees are? And, did you know the dawn redwood is a cousin of the coast redwoods, the tallest trees in the world?

The tallest coast redwood is nearly 380 feet tall! Can you imagine that tree growing in this grove? Can you picture how high it would reach?

start here > **P**  $\frac{1S}{1W}$   $\frac{2W}{1N}$   $\frac{3S}{2E}$   $\frac{1S}{1E}$

$\frac{3W}{4E}$   $\frac{1N}{1W}$   $\frac{3N}{1S}$   $\frac{1W}{1S}$   $\frac{3S}{2N}$   $\frac{1E}{2S}$   $\frac{3W}{2S}$   $\frac{2N}{3E}$

(Hint: He/She searches for rare plants)

After you finish these activities,  
**STAMP YOUR PASSPORT**

— Dawn Redwood Adventure supported by Linda and David Glickstein

## Appendix B

Tree Adventure Location	Passport Activity	Learning Style (V,A, R, or K)	Level/Bloom's Taxonomy	"Intelligences" covered (From Gardner's theory)	Curriculum tie-ins
Out on a Limb					
	Bird Words	V, K	Knowledge	Linguistic	Env. Science
	Spot the Differences	V, K	Analysis	Bodily-Kinesthetic	Env. Science
	Test Your Senses	V, A, K	Application	Bodily-Kinesthetic, Musical	Env. Science
Oak Allee					
	What's Wrong...?	V, R, K	Analysis	Logical-Mathematic, Linguistic	Env. Science
	Don't be a Pushover	K	Comprehension	Bodily-Kinesthetic	Env. Science
	Multiplication Master	R, N/A	Analysis	Logical-Mathematic	Math
Springhouse					
	Crossword	V, R	Knowledge	Linguistic	Env. Science

	What is a Springhouse?	V, R	Knowledge	Linguistic	History
	How Cool is it?	V, K	Analysis	Logical-Mathematical	Earth Science
Log Cabin					
	Who's Living...Tree?	V, K	Knowledge	Bodily-Kinesthetic, Spatial	Env. Science and Art
	Log Cabin Presidents	V, R	Knowledge	Linguistic, Bodily-Kinesthetic	History
	Which Wood...Choose?	R, K	Analysis	Bodily-Kinesthetic, Logical-Mathematic	Env. Science
Dawn Redwoods					
	Use Your Imagination	V, K	Analysis	Spatial, Intrapersonal	Geometry
	Think About It	R	Evaluation	Logical-Mathematic	Env. Science
	Use the Compass	K	Application	Logical-Mathematic	History

