

Title: Urban Forestry Workshops for Elementary School Teachers

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Abstract:

This project involved planning and leading two workshops on urban forestry for elementary school teachers. Teachers in the Philadelphia City School District and other school districts surrounding Morris Arboretum were targeted. The goal was to create two workshops that were free, carried 5 hours of Act 48 credits, and offered teachers engaging, interactive, useful, and fun activities that could be transferred directly into the classroom. Activities were correlated to the state standards and presented in a way that assisted teachers in seeing the relevance to what they are required to teach.

One workshop was planned for teachers of Grades K-3 and the second workshop was planned for teachers of Grades 4-6. Both workshops consisted of three 75-minute sessions, the first of which involved interactive learning about tree anatomy and function. For the remainder of the day, the grades K-3 workshop concentrated on games and activities for the classroom based on the knowledge gained in Session I. The grades 4-6 workshop concentrated on learning to make the measurements involved in taking a tree inventory. Both workshops included a “make-and-take” segment.

These workshops were funded by an FFA Grant in partnership with W.B. Saul High School of Agricultural Sciences. The students in Jessica (Naugle) McAtamney classes were involved in the planning and facilitation of the workshops.

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Urban Forestry Workshop Materials

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INTRODUCTION

Today it is generally accepted that children are not spending adequate time experiencing the natural world. They are glued to the computer and TV screen. They are growing up with short attention spans and the need for “instant gratification”. They are the offspring of the “me” generation and have little guidance in developing selfless service to the world around them. Richard Louv, in his popular book, “Last Child in the Woods,” has pulled together the evidence

that demonstrates a basic human need for having a strong connection with nature. According to the research he cites, patients heal faster when looking out on a planted courtyard, children with ADD need less medication after a walk outdoors, mental patients are calmer in a natural setting, and school children learn more effectively when part of their day is spent outside. He believes that we are “hardwired” to be in nature, because we are a part of nature. We, like all of the other life forms on this planet, are the product of the evolutionary process. As a result, we are inextricably linked to the rest of our world.

PURPOSE

This project’s purpose was to encourage teachers to enrich their classroom instruction by taking their children outside to investigate trees. Education and outreach are part of Morris Arboretum’s mission. Since the Arboretum specializes in trees and is in the process of constructing the “Out on a Limb” exhibit, it is a good time to strengthen the Arboretum’s connections with area schools. Also, many of Philadelphia’s schools desperately need encouragement to broaden their visions to include time in nature for students. By providing teachers with fun, interactive activities about trees, presented in an engaging way, the Arboretum will enable these teachers to incorporate new strategies for learning in their classrooms. They will begin to “think outside the box” a bit more and they might, eventually, become proactive in changing the landscape of the communities in which they teach.

THEORY

The research used as a basis for assessing the impact of these workshops on professional development and increasing student achievement is that of: (1) Malcolm Knowles (1973) as reported by C. K. Edmunds, et al., in *The Ultimate Educator* (1999); (2) the Theory of Multiple Intelligences by Dr. Howard Gardner (1983/2003); and (3) the theory of “Flow Learning” by Joseph Cornell of the Sharing Foundation (1993, 2009).

Malcolm S. Knowles addressed the issue of adult learning in his book, *The Adult Learner: A Neglected Species* (1973). His results were based on four assumptions:

- Adults are primarily in charge of their own learning.

- Adult experiences are a rich resource for learning.
- Adult needs and interests are the starting points and serve as guideposts for training activities.
- Adults want their learning to be relevant to their circumstances.

The workshops were designed to meet these criteria by: (1) viewing the leaders of the workshops as facilitators, (2) allowing and encouraging teacher exchange and reflection during the day so that ideas based on their individual experiences could be used to inform others and enrich the experience for all, (3) building some flexibility into the workshops with the use of “Demonstration Stations,” so that there was a period of the day where teachers could select what they wanted to engage in and move at their own pace, (4) allow for a seamless flow between open-ended activities and free time (*i.e.*, schedule a time to make something, determine pace, and eat lunch back-to-back so that teachers could move on to the next activity without undue waiting or, conversely, move as slowly as needed if they ran into problems), (5) engaging teachers in activities that are directly transferable to their classrooms, and (6) providing teachers with materials that can be referred to and used for instruction after the workshops are over.

Teachers were engaged in interactive modeling, instructive games, and experiential learning activities based on the Theory of Multiple Intelligences developed by Howard Gardner in 1983 (Gardner, 1983/2003). Gardner’s original theory delineates seven types of intelligences, or general areas of natural ability. These intelligences are useful in the educational field because people have different ways of learning that correlate with these intelligences. A one-pronged approach does not suit all. As a result, these workshops were designed to offer activities and opportunities for new learning in as many ways as possible, using these intelligence types as a guide. The original seven intelligences defined by Gardner are: (1) linguistic (word smart), (2) logical-mathematical (number/reasoning smart), (3) spatial (picture smart), (4) body-kinesthetic (body smart), (5) music (music smart), (6) interpersonal (people smart), and (7) intrapersonal (self smart) (Gardner, 1983; http://www.thomasarmstrong.com/multiple_intelligences.htm).

Gardner eventually delineated an eighth ‘naturalist intelligence,’ and described it as the ability to recognize, categorize, and draw upon certain features of the environment (nature smart) (Smith, 2008). The whole purpose of these workshops was to encourage teachers to further develop the naturalistic intelligence of children.

Joseph Cornell’s “Flow Learning” involves four steps: (1) awaken enthusiasm, (2) focus attention, (3) direct experience, and (4) share information. These components of effective learning were incorporated into the workshops by: (1) providing a rationale explaining the importance of taking their children outside and engaging the participants’ emotions through

meaningful, useful, and fun subject matter and activities, (2) challenging the participants so that, to successfully meet the challenges, they must concentrate on one of their physical senses, (3) engaging the participants in experiential activities that involve them directly with nature, and (4) allowing time for participants to reflect on what they've learned and how it relates to their particular experiences and classroom situation.

PROCESS

Many steps of this process were worked on in tandem because nothing could be left to the last minute. So, the order in which the process is presented is an approximate one.

Step 1 – Overarching theme and audience determination

Given the dire need for trees in cities, and that these workshops were being planned by the urban forestry intern, the theme for the workshops was chosen to be urban forestry. It was decided to concentrate on elementary school teachers and to do two workshops, one for Grades K-3 and one for Grades 4-6. Since Grades K through 6 represent such a range of developmental differences in children, this type of split seemed the best way to present age-appropriate activities. Also, it would be possible to split the teachers in a given workshop into their grade levels so that they could discuss the application of the activities to their specific situations.

Step 2 – Determine if the workshops are desirable for the Arboretum

Despite some reservation about whether or not teachers would be interested in attending workshops at the Arboretum, the concept was approved. Given that outreach and education are part of the Arboretum's mission, the workshops were deemed to be appropriate by the Director of Public Programs of Morris Arboretum, Robert Gutowski.

Step 3 – Contact area people

The Youth Education Coordinator of Morris Arboretum, Liza Hawley, provided the names of many people in the area who could help with this project. One of the most important of these was Jessica Naugle McAtamney, a teacher at Philadelphia's Saul High School, who collaborated in applying for a Future Farmers of America (FFA) Grant to fund the workshops and who also involved her students in the workshops. Steve Wright, the education intern, also agreed to be part of the planning and facilitation process.

Step 4– Develop a basic plan for the workshops

Rough ideas of workshop goals and content were discussed with Dr. Bette Goldstone, of Arcadia University, who kindly offered input on a schedule for the day, the suitability of various activities for the grades targeted, and the approach to adult education used. The basic plan was:

8:00 – 8:30	Registration and Refreshments
9:00 – 9:30	Welcome and Introductions
9:30 – 10:45	Session I
10:45 – 11:00	Break
11:00 – 12:15	Session II
12:15 -- 1:15	Lunch
1:15 -- 2:30	Session III
2:30 -- 3:00	Conclusion and Evaluation

Step 5 – Apply for FFA grant

In order to make the workshops free for teachers, a source of funding was needed. Jessica Naugle McAtamney of Saul High School agreed to collaborate on applying for an FFA Grant. If we received the grant, it would be for the purpose of developing leadership skills in the students. This added a new facet to the project, because time would be needed to work with the students and develop a role for them to play in the workshops. During the summer of 2008, about 40 incoming freshman gathered in Jessica’s classroom to determine whether there was an interest in the workshops. They were very enthusiastic. In September, the FFA officers at Saul endorsed the project. The grant was written and submitted by the end of October.

Step 6 – Access the standards

In order to apply for Act 48 Credit and to offer workshops that are useful to teachers, the content must be correlated to the Pennsylvania Department of Education Standards. The academic standards for Pennsylvania can be found on its website at the following address:

http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp?Q=76716. Additionally, the curricula for the City School District of Philadelphia are available at:

<http://www.phila.k12.pa.us/offices/curriculum/supports/08-09/Psts.htm>.

Step 7 - Apply for Act 48 Provider Status

It was important to be able to offer teachers continuing education credit for their participation in the workshops. Since the Arboretum's Act 48 Provider Status had expired, we needed to reapply. Instructions from the Pennsylvania Department of Education website were followed and we were granted permission to offer 5 hours of credits for each workshop through June of 2009. After June 2009, a new process will be in place through the University of Pennsylvania. Liza Hawley, the Youth Education Coordinator of the Morris Arboretum, has the details on this new process.

Step 8 – Determine Dates

Google Earth was used to locate nearby schools and many of these (about 20) were contacted by mail, email, and phone. Only two principals responded, but their input was sufficient to plot testing dates, probably weeks of testing preparation, professional development days, and vacation times on a calendar. Two days were selected: Wednesday, April 1, 2009 for the Grades 4-6 workshop and Wednesday, April 22, 2009 (a ½ professional development day) for the Grades K-3 workshop.

Step 9 – Advertising the Workshops

The workshops were advertised in many ways. First, they were listed in Morris Arboretum's Spring Course Catalogue. Second, about 20 principals were emailed. Third, the information was submitted to the City of Philadelphia School District listserv, found at: <http://webgui.phila.k12.pa.us/offices/c/communications/forms/publicity-request-form>. The extent to which this information was distributed via the listserv is unknown. Fourth, Jessica and a student made fliers to advertise the workshops and they were emailed to various people. Fifth, a staff member of the Arboretum passed some fliers to her neighbor who, in turn, gave them to teachers at his school. Sixth, some fliers were distributed at a PHS "Kids Grow Expo" meeting.

Step 10 – Developing the Workshops

The first aspect of each workshop involved providing the teachers with a basic understanding of how a tree functions. Many elementary school teachers have a limited science background, and the more comfortable they feel with content, the more likely they are to bring the workshop activities into their classrooms. Another goal of each workshop was to provide the teachers with fun, interactive, yet instructional activities to use with their students. These activities needed to be correlated with the standards so that the teachers could justify using them in their classrooms. The third goal was to make the whole process effortless for them. Teachers have very busy lives and the likelihood of incorporating new activities in their teaching is inversely correlated with the amount of preparation time needed to do it. So, computer discs with support materials and hard copies of worksheets were supplied.

The major differences between the workshops are that the Grades K-3 Workshop was designed to encourage student observation of trees and to consider how important they are to us and other creatures. The Grades 4-6 Workshop provided teachers with methods to measure trees and do a tree inventory. *Detailed plans for both workshops are located in Appendices A and B.*

In order to include relevant age-appropriate reading materials, the librarians at the Chestnut Hill Library were approached and asked to recommend suitable books for the workshops. They gathered the books they had with tree themes and allowed them to be borrowed for display at the workshops. Other books were purchased. Teachers were encouraged to look at these books during the time of the demonstration stations. Two Saul students were assigned the task of sitting at the book table and make note of the books the teachers liked best.

Step 11 – Working with the Saul Students

Two different classes of W.B. Saul High School students were involved in this project. The first group of students was involved in a fall agro-ecology class (9 students) and the second group of students was from a spring AP Environmental Science class (11 students). The approach used to work with the students was to: (1) review how trees work, (2) discuss their thoughts about interesting activities for elementary school students, and (3) ask for volunteers to take on the development of an activity of their choosing (these became their individual projects). Each day that was devoted to workshop development began with a group activity and the students were asked for their feedback. This activity served to motivate them and acquaint them with the various activities that were being planned. They spent the rest of the period working on their individual projects.

The day before the first workshop (Grades 4-6 on April 1st) the Saul students came to Morris Arboretum and we were able to run through the plans for the day. The students practiced determining their paces, measuring trees, and selecting a partner to work with to take charge of a particular tree that the teachers would measure. The students were to know the measurements for their tree and stay by it to help the teachers as they arrived at that station.

We had hoped to have at least one-half hour to do a similar type of run through on the day before the second workshop (Grades K-3 on April 22nd). However, pouring rain prevented this from happening.

Step 12 – Putting it all together

Teachers were provided with folders of materials that would be used in the workshops. Folders from both workshops are available in the Morris Arboretum library LB1555/G1/2009. In addition, the K-3 teachers took home a tree cookie, sweet birch sapling, and “giving tree” with some contents that they made themselves during the make-and-take session. The 4-6 teachers took home a tree cookie, 100-foot line for measuring tree height, tape measure to determine CBH and DBH, and clinometer that they made themselves.

The Saul students interacted with the teachers throughout the day. Their main roles during the K-3 workshop were to: (1) present a puppet show, (2) participate in the tree ID powerpoint, (3) serve as guides to the trees during the tree observation time, (4) man the demonstration stations on capillary action, tree models, tree game, and dissected bud, and (5) serve as an aide to a hearing-impaired participant. During the 4-6 workshop, they: (1) helped the teachers to determine their paces, (2) assisted the teachers in making and checking their tree measurements, (3) interacted with the teachers during activities, and (4) manned the demonstration stations.

Several interns and volunteers assisted during the workshops. Rebecca Meager, the plant protection intern, shared her tree cookies by manning a demonstration station at both workshops. She spoke about the cause of tree rings to the whole group in the K-3 workshop. Steve Wright, the education intern, and Sara Helm, the flora of Pennsylvania intern, both assisted during the Grades 4-6 workshop to assure that things ran smoothly. They also offered their expertise when certain questions arose from the teachers. Laura Axel and Joan Hanby, Arboretum Guides, came to the K-3 workshop and facilitated by taking notes on teachers’ comments and helping with logistics. Debbie Caraher, Administrative Assistant for Education, went above and beyond the call of duty to arrange for, and organize, the lunches and snacks. Lastly, Alice Farber, a retired art teacher of the Philadelphia City School District, worked with the Saul students on the puppet

show for the K-3 workshop, addressed the teachers to offer her services, and manned a demonstration station during the K-3 workshop to show some of the pieces of art her students have created around the theme of trees.

RESULTS

The workshops were very well received. Many comments were made during the day that indicated the teachers learned a lot, enjoyed the day and felt it was very worthwhile. *The results of the workshop evaluations are available in Appendices C and D.*

CONCLUSION

The goal of enthusing teachers to teach their children more about trees and take their children outside seems to have been met. Eighteen people registered for the Grades 4-6 Workshop on April 1st, and twenty-six people registered for the Grades K-3 Workshop on April 22nd. Possibly because of rain both days, 13 people actually participated in the Grades 4-6 workshop and 19 participated in the Grades K-3 Workshop.

Strong features of the Grades 4-6 workshop were: (1) twig buddies (used as an ice breaker) in which each teacher was given a twig and asked to find someone else who had the same kind of twig, (2) the involvement of the Saul students (the teachers loved having them and were extremely interested in their backgrounds and goals for the future), (3) the tree cookie demonstration station (teachers left so enthused about tree cookies that they asked for more than one tree cookie to take home, as well as extra interpretation), (4) learning more on tree ID and function, and (5) the tree measurement exercises.

One suggestion for improvement of the Grades 4-6 workshop was to organize the distribution of measurement materials by putting them in a bag and handing them out at the beginning. Otherwise, the day was extremely successful.

Strong features of the Grades K-3 workshop were: (1) twig buddies, (2) tree cookies, (3) songs and Simon Says (used for learning about tree forms), (4) coloring a paper plate to represent the cross section of a tree, (5) the “How a Tree Works” powerpoint presentation, (6) the Giving Tree Make and Take activity, and (7) the “Tree Game” demonstration station (developed by two Saul students).

The main suggestion for improvement of the Grades K-3 workshop would be to be sure the Saul students understand their role and the purpose of what each activity is designed to accomplish.

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APPENDIX A: PLANS FOR GRADES K-3 WORKSHOP

Grades K-3 Workshop

April 22, 2009

9:00 – 9:30 Intro and Welcome

--Welcome

--Introduce myself, Urban Forestry Intern at Morris Arboretum. First, I'd like to thank all of you for making the time to come to this workshop. Every one of you had to do something extra to be here today, and you made this effort because you're committed to provide the best education possible to the children you teach. You are models of life-long learning and leaders in elementary education.

--Introduce others: Many people have contributed to the planning stages of this workshop and a few of them are here to help lead us through the day's activities.

- **Jessica McAtamney**, an environmental science teacher at the W.B. Saul High School in Philadelphia, collaborated with Morris to obtain funding for this workshop, and made time in her classes for her students to participate. Introduce Jessica ... what is Saul ... introduce students.
- Student will introduce themselves ... name and grade level.
- **Liza Hawley** is the Youth Education Coordinator at Morris Arboretum. .
- **Rebecca Meager** is the plant protection intern at Morris Arboretum.
- **Louise Clarke** is the Bloomfield Farm Section Leader here at Morris.
- **Joan Hanby** is Chairman of the Guides at the Morris Arboretum.
- **Laura Axel** is also a volunteer guide and a member of the Guides Council.

--FFA Grant - This workshop is free, because it is funded by a **grant from FFA**, for which we are very grateful. FFA funded this grant to develop

leadership in these students from W.B. Saul Agricultural High School. They have contributed to the content of the workshop and were selected to participate because of their interest and commitment. We are hoping that, by the end of the workshop, some of you will welcome them into your classroom to lead your children in tree-related activities, and possibly to help take your students to a local park on a walking fieldtrip to study trees. Some of them would like to be future teachers.

--**Teacher Introductions:** Name, school, grade, what you're hoping to get out of the workshop (or why you came). **Laura will take notes.**

--**Housekeeping: Bathroom facilities and water fountains** ... locations ...

there will be a break for refreshments, but feel free to help yourself to coffee and refreshments at any time during the workshop.

--**Powerpoint:**

Purpose of workshop

STEWARDSHIP

NATURE-DEFICIT DISORDER

SOCIAL INTERACTION

LEADERSHIP DEVELOPMENT

DEVELOPMENT OF OBSERVATIONAL AND OTHER SKILLS

--**Ice Breaker: Twig Buddies**

Find buddy and each describe a characteristic of your twigs that helped you match them. Sit down after finding your twig buddy, and make sure you remember his/her name. Start with someone ... they introduce their twig buddy ... say what sets their twigs apart.

Follow-up: Ask what use this might be in the classroom.

Reference for later: Hand out bud sheet

--Description of what the day's about.

The activities we do today are intended to stimulate your students' imaginations and spark their interest and creativity.

These activities are correlated with the State Standards using the Anchor Assessment Standards. You'll find these in your folder and on the computer disc that's been provided to you.

In addition, we encourage you to discuss modifications and usefulness with your fellow teachers at the times that have been set aside for this during the day.

Remember as we go through the day, that the activities we'll do model what you can do in your classroom. So, we're asking you to get in touch with your inner child and explore these activities from a Grades K-3 mindset.

9:30 – 10:45 Session I – The Parts of a Tree and Observations of Tree Characteristics

GO OUTSIDE AND GATHER ROUND A TREE.

-A Tree is Like Me (My Friend Tree)

10 minutes

-Let's look at this tree and describe it.

-What are the parts of this tree?

-Sing: *A Tree is Like Me*

-Draw this tree in your journal and label the parts.

-Tree Statues

15 minutes

- Let's be a tree.
- Look at that **Colorado silver spruce** over there.
- Let's look like that spruce tree. Demonstrate columnar form.
- Now, let's look like that Oak Tree. Demonstrate round form.
- Now it's your turn.
- Choose a tree and be that tree.
- GOOD!! Look at everyone. We're all standing in different ways.
- Why is that? Trees have different forms!
- Look in your folder and take a look at the different forms that trees can have.

Let's model some of the different shapes that tree's have:

1. **Apple trees** have **spreading forms**. *Demonstrate*. Be an apple tree.
2. **Elm trees** and the **zelkova trees** you see here at the arboretum have a **vase-shaped form**. *Demonstrate*. Be an elm tree.
3. **Lombardy poplars** have a **columnar form**, like the Colorado spruce we just did. *Demonstrate*. Be a Lombardy Poplar.
4. **Willows** often have a **weeping form**. *Demonstrate*. Be an oak.
5. **Sugar maples** have an **oval form**. *Demonstrate*. Be a sugar maple.

Play Simon Says

-Tree Observations and the Use of the Interactive Notebook. 25-30 minutes

Let's look more closely at this tree and use our interactive notebooks to record what we observe. We'll use as many of our senses as we can ... we won't taste anything,

though, because we might taste something that's bad for us. We can record what we see, feel, and smell. You can also record what you hear, if you want to.

The right hand page is a guide. Whatever you put on the left hand page is your creation. You can put your observations in any form that you want to. Tree etiquette ... don't pull leaves or branches off of the trees.

Go through questions at demonstration tree.

Go through questions at practice tree with teachers coming up with answers.

Now, you have five trees to observe on your own. Their locations are given on the map in your packet. Also, the Saul students will be waiting at each tree and should be able to help you if you run into a problem. Let's form groups of three to do this exercise. We'll meet back inside in 20 minutes.

-Powerpoint: Characteristics of Trees

10 minutes

Introduce Ian

Me

-Tree Leaf Twister and Group Discussions

15 minutes

- Break up into Grade Levels with Joan, Laura, Rebecca, Jess.
- Students demonstrate Tree Leaf Twister.
- Teachers discuss morning's activities and how to best adapt them to their students.

10:45 – 11:00 Break (might run a little late ... make up for by

shortening Session II)

11:00 – 12:15 Session II – How Trees “Work”

-Powerpoint: How Trees Work

10-15 minutes

- Wine Glass and Plate
- Stack of five soda cans

-Make a Tree Cookie

10 minutes

Pass out paper plates and crayons

-Role Play a Happy Tree

10-15 minutes

- Make a Happy Leaf:
- Bring in water through your roots (sippy sound).
- Up through your trunk (elevator sound)
- Out through your branches and into your leaf (KaBAM)
- Now, hold your leaf up and gather some carbon dioxide from the air and some sunlight ... get the air's attention and the sun's attention ... make your leaf happy!!!
- What's special about a happy leaf, do you know? It can make its own FOOD!!!
- Who has a happy leaf? Hand out stickers or markers ... make a smiley face on all of the happy leaves.
- Tape onto tree branches.

-Sing: The Tree Song

10 minutes

-Leaf Rubbing Activity

10 minutes

Talk about using on screen image. Do leaf rubbing, add water arrows.

-Stations

20 minutes

- Tree Game
- Tree Models
- Tree Cookies
- Alice and Art
- Books

12:15 – 1:15 Lunch

1:15 – 2:30 Session III

-Habitats

15 minutes

- Puppet skit
- Puppet song

-Alice and Art

5-10 minutes

-Make and Take

50 minutes

- Giving Tree
- Stick Puppets
- 3-D Objects of things that trees provide

2:30 – 3:00 Conclusion

- Questions?
- Liza and Tree Adventure
- Out on a Limb and Morris Arboretum Courses
- PHS Programs – Tree Tenders and Green Teachers
- Thank you's
- Fill out evaluations
- Sign sheet for Act 48 CEU credit
- Distribution of materials ... like tree cookies.

Basic materials handed out at beginning ... DVD of powerpoints, worksheets, websites;
written booklet; tree ID booklet; Morris Course Brochure and info on Out on a Limb; info on
Tree Tenders and Sally McCabe's Teacher program.

APPENDIX B: PLANS FOR GRADES 4-6 WORKSHOP

Grades 4-6 Workshop

April 1, 2009

9:00 – 9:30 Intro and Welcome

--Welcome

--**Introduce** myself, Urban Forestry Intern at Morris Arboretum. First, I'd like to thank all of you for making the time to come to this workshop. Every one of you had to do something extra to be here today, and you made this effort because you're committed to provide the best education possible to the children you teach. You are models of life-long learning and leaders in elementary education.

--**Introduce others:** Many people have contributed to the planning stages of this workshop and a few of them are here to help lead us through the day's activities.

- **Jessica McAtamney**, an environmental science teacher at the W.B. Saul High School in Philadelphia, collaborated with Morris to obtain funding for this workshop, and made time in her classes for her students to participate. Introduce Jessica ... what is Saul ... introduce students.
- Student will introduce themselves ... name and grade level.
- **Liza Hawley** is the Youth Education Coordinator at Morris Arboretum.
- **Steve Wright** is the education intern at Morris Arboretum.
- **Rebecca Meager** is the plant protection intern at Morris Arboretum.

--This workshop is free, because it is funded by a **grant from FFA**, for which we are very grateful. FFA funded this grant to develop leadership in these students from W.B. Saul Agricultural High School. They have contributed to the content of the workshop and were selected to participate because of their interest and commitment. We are hoping that, by the end

of the workshop, some of you will welcome them into your classroom to lead your children in tree-related activities, and possibly to help take students to a local park on a walking fieldtrip to study trees. Some of them would like to be future teachers.

--**Teacher Introductions:** Name, school, grade, what you're hoping to get out of the workshop (or why you came). **Liza will take notes.**

--**Housekeeping: Bathroom facilities and water fountains** ... locations ...

there will be a break for refreshments, but feel free to help yourself to coffee and refreshments at any time during the workshop.

--**Powerpoint:**

Purpose of workshop

STEWARDSHIP

NATURE-DEFICIT DISORDER

SOCIAL INTERACTION

LEADERSHIP DEVELOPMENT

DEVELOPMENT OF OBSERVATIONAL AND OTHER SKILLS

--**Ice Breaker: Twig Buddies**

Find buddy and each describe a characteristic of your twigs that helped you match them. Sit down after finding your twig buddy, and make sure you remember his/her name. Start with someone ... they introduce their twig buddy ... say what sets their twigs apart.

Follow-up: Ask what use this might be in the classroom.

Reference for later: Poster board with twigs in back of room, colored photos of buds on disc.

--Description of what the day's about.

The tree measurements we'll do today are real skills used by professionals to do tree assessments and inventories. Your students will be engaged in developing academic knowledge and skills in a real-life application.

These activities are correlated with the State Standards using the Anchor Assessment Standards. You'll find these in your folder, as well as on the computer disc that's been provided to you. What we do today is relevant to math ... etc.

In addition, we encourage you to discuss modifications and usefulness with your fellow teachers at the times that have been set aside for this during the day.

Remember as we go through the day, that the activities we'll do model what you can do in your classroom. So, we're asking you to get in touch with your inner child and explore these activities from a Grades 4-6 mindset.

9:30 – 10:45 Session I

Separate into grades: 4 (me), 5 (Steve), 6 (Liza)

Puzzle Activity:

15 minutes

Have the members of each group work together to put the sentence puzzles together. Sentences state benefits of trees. Each group will read theirs out loud to everyone else.

Benefits of Trees Yarn Toss:

15 minutes

Say your first name and one benefit of trees (either from what you learned from the sentence puzzles, or your own personal knowledge) and, holding onto a piece of the yarn, toss the ball of yarn to someone. This person should remember your name and what you said. They say their name and state what you said, adding another benefit of trees. Then, keeping hold of the string, they toss the ball to someone else. This person says their name, states the two benefits of trees that have been given, adds one of their own and repeats the process. When everyone has done this, the ball of yarn is tossed in reverse order. This time, each person says the name of the person their tossing to and repeats all of the benefits of trees that were given.

Discussion: Participants will be encouraged to spend a few minutes commenting on the exercise and offering their recommendations for modifications or suggestions on how they might use this activity in their classroom. They might also suggest other activities that get across the same info.

Reassemble into a big group:

Powerpoint: How trees work

15 minutes

Start with gross parts of tree and their functions ... include ways of demonstrating things in the PP (like: 1. model of tree with a wine glass sitting on a dinner plate to represent the canopy versus the root diameters and also the shallowness of the root system; 2. stack of 5 soda cans to represent the depth of most of the root system). Include term dripline.

Internal system of the tree and functions.

Role Play a Tree (count off by 5's)

10 minutes

Visit Stations (and, when done, break)

20 minutes

1. Capillary action (dying a carnation)

2. Chlorophyll of leaves (smushed leaves with green chlorophyll squeezed out and/or leaf chromatography)
3. Transpiration (moisture collected in plastic bag tied around plant)
4. Tree cookie with labeled parts + interesting tree cookies
5. Dissected bud showing baby leaves.
6. Saul's tree game
7. Browse books
8. Saul's tree models

10:45 – 11:00 Break

11:00 – 12:15 **Session II (Everyone together)**

Questions/feedback on stations. 10 minutes

Quiz from Session I 10 minutes

Benefits of trees and how trees work ... fill out as group.

Intro to Session II: We will now develop the background needed to do a fundamental tree inventory and make some measuring devices that you can take home with you.

Handout tree ID booklets (or already in folders)

Powerpoint: Tree ID

20 minutes

Broad-leaved vs. coniferous

Deciduous vs. evergreen

Leaf/branch arrangement: opposite vs. alternate MADCAPHORSE

Leaf type: simple, compound

Leaf shape: elliptical, obovate, etc.

Leaf margin: serrated, entire, lobed

Pubescence: midrib, top/bottom surfaces, buds, twigs

Bud shape: pointed, rounded

Bud scales: imbricate, valvate, naked

Twigs: color, zigzag/straight

Bark Texture: furrowed, smooth, exfoliated, corky

Other bark characteristics: lenticels, shiny/dull, color

Form of tree: vase-shaped, globose, columnar (fastigate), weeping

Explain how to use booklets (dichotomous key)

5 minutes

Make and Take and Determine Pace

30 minutes

Two tasks to do before lunch. Have Saul students manning stations to help build clinometers and determine pace. Participants can determine which one to do first.

Should have 3 stations for pace, outside. Adequate materials for make and take.

12:15 – 1:15 Lunch

1:15 – 2:30 **Session III**

Measuring Trees

10 minutes

1. DBH (diameter at breast height) or CBH (circumference at breast height)

Measured with a tape measure in inches

2. Spread (distance across dripline)

Can be measured with a tape or paced off. Also, can use a wheel (borrow Bob's for demo purposes)

3. Height (distance from ground to top)

Can measure with ruler or with clinometer

Explain plan for conducting tree inventory

5 minutes

Pair up with someone from your grade

Visit as many of the trees on the map as you can in 30 minutes. Number each tree in sequence.

There will be a student at each tree to answer questions on measuring and to check your answers.

As you visit the trees, record the information on your data sheet.

The ID is located on a brass tag on the tree and your Saul student can tell you, as well.

Outside Instruction on How to Measure

20 minutes

DBH/CBH

Spread

Height (will take the most time)

We will meet back in the upper gallery in 30 minutes. There will be some signal to let people know when to come in.

Tree Inventory

30 minutes

Pairs visit trees that are plotted on a simple map.

Saul students help them and check measurements.

Cow bell or something when time is up.

Analysis of Tree Inventory

15 minutes

Examples of things that can be done with the data.

Comments and suggestions on the tree inventory

5 minutes

2:30 – 3:00 Conclusion

-- Questions?

-- Liza and Tree Adventure

-- Out on a Limb and Morris Arboretum Courses

-- PHS Programs – Tree Tenders and Green Teachers

-- Thank you's

-- Fill out evaluations

- Sign sheet for Act 48 CEU credit
- Distribution of materials ... like tree cookies.

Basic materials handed out at beginning ... DVD of powerpoints, worksheets, websites;
written booklet; tree ID booklet; Morris Course Brochure and info on Out on a Limb; info on
Tree Tenders and Sally McCabe's Teacher program.

APPENDIX C: SUMMARY OF EVALUATIONS FOR GRADES K-3 WORKSHOP

Workshop Evaluation Summary – Grades K-3

15 forms returned

1. Please rate today’s workshop, overall: Excellent Very Good Good Fair Poor

11 1 3

2. What did you like most about this workshop?

- Make and Take activity (the giving tree)
- Make and Take activity
- Make and Take
- puppet show
- tree game
- tree game
- outdoor activities
- morning – education on trees
- Lois’ presentation
- gaining more factual background knowledge about parts of trees and how they work
- the invaluable content. Information was so teacher friendly. Friendliness of employees
- sharing ideas
- hands on projects to take back to school
- hands on projects
- many activities were hands on. Kids love to touch things. I liked the tree

parts on the paper plate.

--twig buddies

--new ideas

--all the info and freebies

--so much info that I could use with my students

--lots of info, everyone was helpful, the arts projects: paper plate and smiley

leaf

--networking with others

3. What did you like least?

--loved it all

--the rainy day! Everything was great.

--nothing

--nothing

--nothing

--nothing

--nothing

--none

--some stations

--the craft project. I prefer to use biodegradable/recyclable/recycled materials for art projects – i.e. no foam!

--I appreciated the effort the teenagers put into their program but they weren't good at keeping the program moving.

--puppet show and Make and Take

2. Rate this workshop in terms of:

	Excellent	Very Good	Good	Fair	Poor
Organization	___10___	___2___	___3___	_____	_____
Clarity	___9___	___2___	___4___	_____	_____
Information	___10___	___2___	___3___	_____	_____

3. How likely do you think it will be for you to use the workshop activities in your classroom? *(I messed up this question by giving out the form from previous workshop, so it wasn't tailored to the activities of this one)*

Twig Buddies: Very Likely = 9; Possible = 2; Unlikely = 0

Tree ID: Very Likely = 6; Possible = 1; Unlikely = 0

Leaf Twister: Very Likely = 1

4. Overall, were the demonstration stations useful? Yes No Some

10 1 2

If so, which stations were most useful?

--Books – 3

--Tree Game – 4

--Tree Cookies – 3

--Capillary Action - 2

5. Were you able to connect and discuss ideas with other teachers of your grade

level? Yes – 15 No - 0

Do you value this? Yes - 15 No – 0

Absolutely! We have so little time for this at school.

6. Was this workshop what you expected?

____10____ It was better than expected.

____5____ It was about what I expected.

_____ It did not meet my expectations.

Thanks for offering this terrific program.

7. Would you recommend this workshop to another teacher? Yes - 15 No - 0

--Another teacher recommended it to me.

8. Would you attend another workshop at Morris Arboretum on a different topic?

Yes -15 No - 0

9. Please offer any suggestions that will help us improve this workshop or plan useful workshops for teachers in the future.

Parts of plants

Seed growth

Adaptations of plants (where they live)

Schools Represented:

J.S. Jenks	(2 teachers)	K
NPSD		K-5
Enfield Elementary	(3 teachers)	K
Erdenheim Elementary	(5 teachers)	K
Substitute at Colonial School District		K-6
J. Hampton Moore		K-5
1 st Philadelphia Charter School for Literacy		K-3 (Reading Specialist)
Philadelphia Public Schools		K-3

No forms returned from:

Germantown Academy		Pre K
LaSalle Academy		K-6
Gladwyne Montessori		Pre K- K
Lori Fisher (parent?)		?

APPENDIX C: SUMMARY OF EVALUATIONS FOR GRADES K-3 WORKSHOP

Workshop Evaluation Summary – Grades K-3

15 forms returned

1. Please rate today's workshop, overall: Excellent Very Good Good Fair Poor

	11	1	3		
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2. What did you like most about this workshop?

- Make and Take activity (the giving tree)
- Make and Take activity
- Make and Take
- puppet show
- tree game
- tree game
- outdoor activities
- morning – education on trees
- Lois' presentation
- gaining more factual background knowledge about parts of trees and how they work
- the invaluable content. Information was so teacher friendly. Friendliness of employees
- sharing ideas
- hands on projects to take back to school
- hands on projects
- many activities were hands on. Kids love to touch things. I liked the tree

parts on the paper plate.

--twig buddies

--new ideas

--all the info and freebies

--so much info that I could use with my students

--lots of info, everyone was helpful, the arts projects: paper plate and smiley

leaf

--networking with others

3. What did you like least?

--loved it all

--the rainy day! Everything was great.

--nothing

--nothing

--nothing

--nothing

--nothing

--none

--some stations

--the craft project. I prefer to use biodegradable/recyclable/recycled materials for art projects – i.e. no foam!

--I appreciated the effort the teenagers put into their program but they weren't good at keeping the program moving.

--puppet show and Make and Take

2. Rate this workshop in terms of:

	Excellent	Very Good	Good	Fair	Poor
Organization	___10___	___2___	___3___	_____	_____
Clarity	___9___	___2___	___4___	_____	_____
Information	___10___	___2___	___3___	_____	_____

3. How likely do you think it will be for you to use the workshop activities in your

classroom? *(I messed up this question by giving out the form from previous workshop, so it wasn't tailored to the activities of this one)*

Twig Buddies: Very Likely = 9; Possible = 2; Unlikely = 0

Tree ID: Very Likely = 6; Possible = 1; Unlikely = 0

Leaf Twister: Very Likely = 1

4. Overall, were the demonstration stations useful? Yes No Some

10 1 2

If so, which stations were most useful?

--Books – 3

--Tree Game – 4

--Tree Cookies – 3

--Capillary Action - 2

5. Were you able to connect and discuss ideas with other teachers of your grade

level? Yes – 15 No - 0

Do you value this? Yes - 15 No – 0

Absolutely! We have so little time for this at school.

6. Was this workshop what you expected?

____10____ It was better than expected.

____5____ It was about what I expected.

_____ It did not meet my expectations.

Thanks for offering this terrific program.

7. Would you recommend this workshop to another teacher? Yes - 15 No - 0

--Another teacher recommended it to me.

8. Would you attend another workshop at Morris Arboretum on a different topic?

Yes -15 No - 0

9. Please offer any suggestions that will help us improve this workshop or plan useful workshops for teachers in the future.

Parts of plants

Seed growth

Adaptations of plants (where they live)

Schools Represented:

J.S. Jenks	(2 teachers)	K
NPSD		K-5
Enfield Elementary	(3 teachers)	K
Erdenheim Elementary	(5 teachers)	K
Substitute at Colonial School District		K-6
J. Hampton Moore		K-5
1 st Philadelphia Charter School for Literacy		K-3 (Reading Specialist)
Philadelphia Public Schools		K-3

No forms returned from:

Germantown Academy		Pre K
LaSalle Academy		K-6
Gladwyne Montessori		Pre K- K
Lori Fisher (parent?)		?

APPENDIX C: SUMMARY OF EVALUATIONS FOR GRADES K-3 WORKSHOP

Workshop Evaluation Summary – Grades K-3

15 forms returned

1. Please rate today’s workshop, overall: Excellent Very Good Good Fair Poor

	11	1	3	
--	----	---	---	--

2. What did you like most about this workshop?

--Make and Take activity (the giving tree)

--Make and Take activity

--Make and Take

--puppet show

--tree game

--tree game

--outdoor activities

--morning – education on trees

--Lois’ presentation

--gaining more factual background knowledge about parts of trees and how they work

--the invaluable content. Information was so teacher friendly. Friendliness of employees

--sharing ideas

--hands on projects to take back to school

--hands on projects

--many activities were hands on. Kids love to touch things. I liked the tree

parts on the paper plate.

--twig buddies

--new ideas

--all the info and freebies

--so much info that I could use with my students

--lots of info, everyone was helpful, the arts projects: paper plate and smiley

leaf

--networking with others

3. What did you like least?

--loved it all

--the rainy day! Everything was great.

--nothing

--nothing

--nothing

--nothing

--nothing

--none

--some stations

--the craft project. I prefer to use biodegradable/recyclable/recycled materials for art projects – i.e. no foam!

--I appreciated the effort the teenagers put into their program but they weren't good at keeping the program moving.

--puppet show and Make and Take

2. Rate this workshop in terms of:

	Excellent	Very Good	Good	Fair	Poor
Organization	___10___	___2___	___3___	_____	_____
Clarity	___9___	___2___	___4___	_____	_____
Information	___10___	___2___	___3___	_____	_____

3. How likely do you think it will be for you to use the workshop activities in your

classroom? (*I messed up this question by giving out the form from previous workshop, so it wasn't tailored to the activities of this one*)

Twig Buddies: Very Likely = 9; Possible = 2; Unlikely = 0

Tree ID: Very Likely = 6; Possible = 1; Unlikely = 0

Leaf Twister: Very Likely = 1

4. Overall, were the demonstration stations useful? Yes No Some

10 1 2

If so, which stations were most useful?

--Books – 3

--Tree Game – 4

--Tree Cookies – 3

--Capillary Action - 2

5. Were you able to connect and discuss ideas with other teachers of your grade

level? Yes – 15 No - 0

Do you value this? Yes - 15 No – 0

Absolutely! We have so little time for this at school.

6. Was this workshop what you expected?

____10____ It was better than expected.

____5____ It was about what I expected.

_____ It did not meet my expectations.

Thanks for offering this terrific program.

7. Would you recommend this workshop to another teacher? Yes - 15 No - 0

--Another teacher recommended it to me.

8. Would you attend another workshop at Morris Arboretum on a different topic?

Yes -15 No - 0

9. Please offer any suggestions that will help us improve this workshop or plan useful workshops for teachers in the future.

Parts of plants

Seed growth

Adaptations of plants (where they live)

Schools Represented:

J.S. Jenks	(2 teachers)	K
NPSD		K-5
Enfield Elementary	(3 teachers)	K
Erdenheim Elementary	(5 teachers)	K
Substitute at Colonial School District		K-6
J. Hampton Moore		K-5
1 st Philadelphia Charter School for Literacy		K-3 (Reading Specialist)
Philadelphia Public Schools		K-3

No forms returned from:

Germantown Academy		Pre K
LaSalle Academy		K-6
Gladwyne Montessori		Pre K- K
Lori Fisher (parent?)		?

APPENDIX D: SUMMARY OF EVALUATIONS FOR GRADES 4-6 WORKSHOP

Workshop Evaluation Summary – Grades 4-6 13 participants and 13 completed forms

1. Please rate today’s workshop , overall:	Excellent	Very Good	Good	Poor
	10	3	0	0

(2 of the “very good” ratings said the workshop was better than expected)

2. What did you like most about this workshop?

--I liked the mix of lecture and hands-on activities. The presenter was great, and the Saul students added a lot to the day.

--The activities.

--Great ideas

--The activities

--We actually did work hands-on after we talked about theory.

--Instructor was excellent. High school students were great.

--Hands-on, clarity.

--Tree measurements/Tree samples

--Ideas for use at home (from a homeschooling parent).

--Liked the activities, I learn best with doing! Loved having the FFA.

--Working outside with hands-on activity.

--Getting more ideas of things to try with students.

--Measuring trees’ height, learning how to use Tree Finder books.

3. What did you like least?

I liked everything.

All elements good

None

I enjoyed all of the day.

Being a tree ... great 4 kids

Rain ☺

Hmmmm, the rain wasn't really a problem, but I would've stayed out longer!

Six participants had no response to this question.

4. Rate this workshop in terms of:

	Excellent	Very Good	Good	Poor
Organization	__12__	_____	_____	_____
Clarity	__12__	_____	_____	_____
Content	__12__	__1__	_____	_____

5. How likely do you think it will be for you to use the workshop activities in your classroom?

	Very Likely	Possible	Not Very Likely (if this one, why?)
Twig Buddies	__10__	__2__	_____
Yarn Toss	__10__	__2__	_____
Tree ID	__10__	__2__	_____
Tree Measurements	__10__	__2__	_____

6. Overall, were the demonstration stations useful? Yes – 12 (Some – 1) No - 0

If so, which stations were most useful?

Capillary action - 2

Transpiration - 3

Tree Cookies - 7

Dissect the Bud – 5

Hemlock Stomata - 4

Books - 3

Tree Game - 1

I found all of them informative and useful.

Tree Models - 1

7. Were you able to connect and discuss ideas with other teachers of your grade level? Yes - 11 No – 0

Do you value this? Yes - 11 No – 0

8. Was this workshop what you expected?

____9____ It was better than expected.

____4**____ It was about what I expected. (2 of these rated workshop “excellent”)

____0____ It did not meet my expectations.

*I love Morris; *I expected excellence at Morris Arboretum and it was excellent.

9. Would you recommend this workshop to another teacher? Yes - 13 No - 0

10. Would you attend another workshop at Morris Arboretum on a different topic?

Yes - 13 No - 0

11. Please offer any suggestions that will help us improve this workshop or plan useful workshops for teachers in the future.

--More time using new skills (outside measuring)

--It may be helpful if before the workshop that all of the materials could be put into individual bags to prevent scrambling around for items. This wasn't a problem but, it may be of help in the future.

--The photographs of the buds were great, they would have been even better if they were in color.

--Feeding us was nice but not necessary.

--Can we connect with Tree- vitalize?

--Make tree cookies available to teachers (NOTE: this person would like teachers to have a selection of interesting tree cookies for their classrooms)

--I found the activities to be very helpful. Perhaps more sharing time with teachers of same grade level.

--Walk around grounds, stopping at significant tree species specimens, learning details about them.

--Winter tree IDs

--Activities to do with students to acquaint them with making models of various layers of trees, simulate these layers in action.

--Four participants had no response to this question.

Schools Represented:

CES (Substitute)	K-6
The Miguon School	4
Lowe School	1-7
Friends Select School	Pre K - 5
Springfield Middle School	5
Plymouth Meeting Friends School	4,5,6
Greene Street Friends School	4
The School in Rose Valley	Pre K - 6
Homeschooling Parent	K - 6
Two Parents/Volunteers at Nature Center	N/A
Enfield Elementary	4
John Story Jenks	5

Nine of the thirteen participants indicated that they would be interested in bringing a class for a Tree Adventure tour. For three participants, this question was N/A, because they are parents and don't have formal classes. One teacher did not fill out this part of the form.

With regard to the workshop, one homeschooling parent said, "I think there's a lot of interest – this could be repeated (funds permitting)."

Three teachers indicated that they'd like to receive extra tree cookies showing various phenomena for their classrooms. Two or three teachers took extra ones after the workshop.

One participant stated, "Science and Environmental Education will be part of the PSSA soon. School districts should have someone or more than one connected to supporting curriculum."

One teacher found out that she couldn't get coverage, called ahead of time, and arranged to stop by after the workshop to pick up the materials. She did not fill out a form and her school is not represented above.

