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Grassy hollow trail guide

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GRASSY HOLLOW TRAIL GUIDE

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Environmental Education

by
Judy Ann Einboden
June 2008
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Approved by:

Dr. Darleen Stoner, First Reader

Dr. Gary Negin, Second Reader

May 27, 2008
The Grassy Hollow Trail Guide was designed for use at the Grassy Hollow Visitor Center, located six miles west of Wrightwood, California, in the San Gabriel Mountains in the Angeles National Forest. The guide is intended to enable volunteers of the United States Forest Service and primary teachers from the Snowline Unified School District to utilize the educational opportunities available at this location with kindergarten through second grade students. A map and instructions in the guide provide activities for students which promote environmental sensitivity using constructivism and place-based education at 12 stops on a nature hike which follows a portion of the Pacific Crest Trail. Activities are related to the California Content Standards in Science. Students learn how the environment affects their lives and how human activities can affect the natural world. Journal pages for student use provide opportunities to collect data, record information and take notes. Brief descriptions and photographs of local animals, birds and plants are also included.
ACKNOWLEDGMENTS

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CHAPTER ONE
BACKGROUND

Introduction
This project was the development of a trail guide with background information about plants and animals commonly found at the Grassy Hollow Visitor Center. The guide and background information has been and will continue to be used by teachers from the Snowline Unified School District and volunteers of the United States Forest Service for educational activities when leading a nature hike for students in kindergarten through second grade at the Grassy Hollow Visitor Center which is in the Angeles National Forest. These materials are intended to enable teachers and volunteers to facilitate students’ understanding of science concepts and acquisition of science skills related to appropriate grade-level California Content Standards.

The trail guide uses a portion of the Pacific Crest Trail which crosses through the Grassy Hollow Visitor Center grounds. Twelve sites on the trail were selected by the author as locations which could be utilized for activities supportive of place-based, constructivist education. At each of the 12 stops along the trail,
students may take notes, collect data, and make observations in a journal. The additional information includes pictures and facts about local plants and animals which volunteers and teachers can use to answer student questions.

The Grassy Hollow Visitor Center is located on a ridge in the San Gabriel Mountains on Highway 2, approximately six miles west of the town of Wrightwood. From its location, visitors can view a portion the eastern Los Angeles basin to the south and the Mojave Desert to the north. The visitor center is under the jurisdiction of the Angeles National Forest and has been operated by volunteers since it opened on August 17, 1996. The visitor center is at an elevation of 7,300 feet in a coniferous and oak forest. The area is home to several large mammals and a variety of birds.

Geologically, the San Gabriel Mountains were formed by movement along the San Andreas Fault, creating their distinctive east, west direction. The San Gabriel Mountains are an important watershed, providing drinking water to both local desert and Los Angeles Basin communities.

The trail guide uses a half-mile portion of the Pacific Crest Trail which runs through the visitor center
grounds, providing an opportunity to experience the surrounding environment. The Pacific Crest Trail is a 2,650 mile trail, maintained by the United States Forest Service that follows the mountains from San Diego County to the Canadian border. The trail guide also uses the visitor center museum displays of taxidermy mammal and bird specimens. Overall, the characteristics of the natural area make Grassy Hollow an excellent location for learning science skills from the California Content Standards.

I am a first grade teacher in the Snowline Unified School District who has been bringing students on field trips to the Grassy Hollow Visitor Center. The abundance of educational activities possible at the site which support science learning in primary grades became evident to me and I want other teachers to be able to utilize the site with their students.

Also, as a volunteer for several years at Grassy Hollow Visitor Center, I have noticed that teachers with their students have many questions about the plants and animals. Most center volunteers have had to rely on their personal knowledge to answer visitor questions especially when leading visitors on hikes. Based on my experience of the most frequently asked questions, the information
selected for this guide should help volunteers to provide answers to the most commonly asked questions.

Significance of the Project

This guide helps teachers and volunteers to use the local educational opportunities that exist at the Grassy Hollow Visitor Center to teach kindergarten through second grade students the California Content Standards in Science.

Different activities for each grade level address relevant science standards using the same nature trail and locations identified on the trail guide. For example, students in kindergarten may be using their senses to make investigations at a particular stop on the trail, whereby second grade students would construct a graph using data collected in the same location. Use of the trail guide at the visitor center can support further learning by providing students with a hands-on experience in the outdoors.

In my personal experience as an educator, I have observed that students in school classrooms typically spend the majority of class time learning to read, memorizing facts, and practicing math concepts with little practical application that relates learning to their
personal lives. Teachers may agree that outdoor education can provide relevant experiential opportunities to use math, language arts, science, observation skills and critical thinking skills. However teachers may feel they are not prepared to lead their students through a natural area (Simmons, 1998, p. 24).

Purposeful outdoor education included in the curriculum is important (Simmons, 1998, p. 23). David Orr stated, "By what is included or excluded, we teach students that they are part of or apart from the natural world" (2004, p. 12). Environmental education is an instructionally sound teaching method which includes an interdisciplinary approach to learning that can improve student achievement, foster awareness and concern for the natural environment, and develop connections to the community (Simmons, 2005). Using the Grassy Hollow Trail Guide can be beneficial for teachers to enable them to provide an educational outdoor experience for their students.

Organization of Project

The trail activities are designed to meet California Content Standards in Science while involving Kindergarten through second grade students in interdisciplinary
activities whereby they can work together, and discuss their observations and conclusions while gaining science knowledge.

Chapter two provides additional insight into the value of a trail guide for the Grassy Hollow Visitor Center by reviewing relevant literature in the field of environmental education.

Chapter three discusses the methodology used to complete the project. It includes an introduction to the project, the design of the project and information on educators who utilized and reviewed the project.

Chapter four includes the conclusion of the project and a discussion on the value of the guide.

The appendices contain the Grassy Hollow Trail Guide and related pictures and factual information. Appendix A contains the trail map and the trail directions for grades kindergarten through second which address California State Standards in Science at each stop.

Appendix B has mammal cards which have a picture of the mammal and some interesting information. Appendix C consists of bird cards. The cards have pictures of and brief information about several of the most commonly seen birds from the area. Appendix D contains information on several common plants which can be seen at the Grassy
Hollow Visitor Center grounds. The pages in appendices B, C, and D can also be cut into thirds and placed on a ring for use by volunteers and teachers while on the hike.

Finally, the references used to support the development the Grassy Hollow Trail Guide are listed.
CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

Chapter Two reviews relevant literature that guided the development of a trail guide for the Grassy Hollow Visitor Center. First, the definitions and goals of environmental education and outdoor education are investigated as a foundation for teaching educational concepts at this location. Next is a discussion of the development of environmental sensitivity by young children as a component of environmental literacy. Then, constructivism and place-based education are reviewed as teaching strategies that have been shown to be effective in generating interest and involvement, as well as developing knowledge, about the environment. Lastly, research about the benefits of a field trip and how a field trip experience can enhance learning are examined. At the end of each subsection, the literature is discussed in terms of its relevance to the development of the trail guide.
Definition and Goals of Environmental Education and Outdoor Education

A widely accepted definition for environmental education was developed in 1969 by William Stapp and his graduate students. "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the bio-physical environment and its associated problems, and motivated to work toward their solution" (Stapp et al., 1969, p. 31).

The Tbilisi Declaration included important goals for environmental education. This declaration, developed at an intergovernmental conference held in 1977, acknowledged the importance of an agreement on goals for environmental education. The goals were as follows:

To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; to create new patterns of behavior of individuals, groups and society as a whole towards the environment (2005, p. 15).
The objectives of The Tbilisi Declaration further supported the definition of environmental education by Stapp et al. (1969). The Tbilisi Declaration is especially important because it stated that people should acquire values and feelings of concern which will guide them in protecting and improving the environment.

Environmental education taught in an outdoor setting was defined as outdoor education by Stoner, Clymire & Helgeson (1989). Outdoor education uses hands-on, sensory experiences to develop relationships between people and between people and the environment. The objectives of outdoor education are to develop knowledge, critical thinking skills, awareness and attitudes and appreciation of the environment. Students practice decision making skills and in evaluating personal choices (1989).

A visit to a natural area can help young students realize that learning about the environment can be a math lesson as well as a language arts, social studies or science lesson. Discovering these relationships is part of environmental education. Environmental education, because of its interdisciplinary approach, can help students compete in the changing world (Simmons, 2005, p. 66).

Simmons stated that knowledge of the bio-physical world, interrelationships, and consequences of our actions
is necessary to be a member of society. This knowledge has been labeled environmental literacy. Environmental literacy helps people make informed decisions. Educational reforms can lead to higher level thinking and problem solving by citizens. This can be achieved through environmental education (Simmons, 2005, p. 66). The importance of environmental literacy was also noted by Aldo Leopold when he wrote,

We ought to pay full and close attention to the ecological conditions and prerequisites that sustain all life. That we seldom know how human actions affect ecosystems or the biosphere gives us every reason to act with informed precaution. And, because of the scale and momentum of the human presence on earth, it is utter foolishness to assert otherwise. (in Stone & Barlow, 2005, p. ix)

Teachers can utilize the Grassy Hollow Visitor Center as a location whereby young students can learn about their local environment. Thus students will begin to meet the goals of environmental education through gaining knowledge, values and attitudes concerning the natural environment. Participation in an outdoor experience could help students begin to develop the new patterns of
behavior, awareness and concern which the Tbilisi Declaration stated in its goals.

Environmental Sensitivity

Environmental sensitivity, a component of environmental literacy, is a term that has been used in literature for more than 30 years without a formally accepted definition. Environmental sensitivity has traditionally been a person's feelings of appreciation and concern toward the environment based upon personal experiences. Peterson (2005) suggested that environmental sensitivity be defined as, "a set of affective characteristics that result in an individual viewing the environment from an empathetic perspective" (p. 296). This empathetic attitude in turn motivates people to learn more about the environment, further developing environmental sensitivity (Sward & Marcinkowski, 2005, p. 304). Peterson stated that environmental sensitivity forms at an early age and programs that promote environmental education should therefore be introduced to students at an early age (2005, p. 299).

Environmental sensitivity research from two different researchers, Tanner in 1979 and 1980 and Peterson in 1981 and 1982, were compared by Sward and Marcinkowski (2005,
The variables found by Tanner and Peterson which prompted environmental sensitivity included similar influencing factors: a major outdoor experience; habitat alteration; family influences such as vacations; free exploration as a child in the outdoors; hunting or fishing; youth organizations; teachers; reading books; a non-familial role model; peers; solitude; and joining a professional association.

From both the research of Tanner and Peterson, an outdoor experience accounted for 91 percent of the reasons why people became interested in the outdoors (Sward & Marcinkowski, 2005, p. 304). Following the Tanner and Peterson original findings, Seward and Marcinkowski (2005) noted that several other later researchers also concluded that a previous outdoor experience, which includes positive human interactions and knowledge of the environment, leads to influence a person's choices later in life (2005, p. 303).

In summary, research has found that an outdoor experience by youth is closely linked to developing environmental sensitivity. This provides a firm foundation for providing outdoor activities for youth at Grassy Hollow, which is a very close field trip for students from
several elementary schools in the Snowline Unified School District.

Constructivism and Place-Based Education

Constructivism and place-based education are effective strategies for teaching the goals of environmental education and are often used together in environmental education.

Constructivism is a method of teaching in which students are actively involved in their own learning, and learning is focused on real-life problems or questions (Klein & Merritt, 1994). Klein and Merritt (1994) described the four components of constructivism which the teacher facilitates. They are: (1) pose a problem or question to resolve; (2) provide instruction; (3) structure learning so students work together; and (4) evaluate learning by using authentic assessment.

First the teacher poses a problem or question to resolve to students. The teacher questions students based upon their prior knowledge and ability level. Students then ask questions to clarify and validate learning. This helps students make sense of their world and construct new relationships. Next the teacher gives appropriate instruction. At this point the teacher models appropriate
skills that students will need when they work together to come to a conclusion regarding the proposed question or problem. The teacher is responsible for setting up the learning environment. The teacher groups students, provides the materials that students will need, monitors and evaluates student progress. The third component of constructivism requires that students work together to answer the question or solve the problem. Students are experimenting, investigating, observing and discussing during this time. The teacher provides ample time for students to draw conclusions and answer questions. The fourth component of constructivism is authentic assessment. Teachers can assess as students are working or allow students to present their findings in ways that demonstrate knowledge of the broad themes of science. Students can work together and can conclude that there is more than one answer to the problem (Klein & Merritt, 1994, p. 16)

Research has found that students involved in a constructivist approach to learning have demonstrated gains in knowledge and feelings about the environment, and students also feel that they have more control over what they learn (DiEnno & Hilton, 2005; Hardy, Jonen, Moller & Stern, 2006).
In a constructivist approach, knowing what prior knowledge students have about a subject is necessary for teachers. Students may need to be guided through activities that help them refine or make corrections to prior misconceptions (Munson, 1994, p. 34). Active involvement in constructing new knowledge helps students "...depart from previously held attitudes and beliefs to make commitments to new ways of interacting with the world" (Ballantyne & Packer, 1996, p. 29).

To enhance constructivist learning, relevance of learning is supported by place-based education. Sobel (2005) defined place-based education and the effectiveness of its approach as the following:

Place-based education is the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. (p. 7)
Thus, place-based learning can expose students to the environmental concerns that may affect their school and neighborhoods. A local community concern increases the probability that students will become involved in the solutions. Involved students can help promote the awareness of others, making a difference in their community (Powers, 2004, p. 21).

Haluza-Delay (2001) concluded that students should make connections between the location where learning takes place and their home.

Teaching and practicing sensitivity to the natural world will also help participants become aware of nature, even at home. Learning to look at small wonders—instead of just the spectacular scents and pristine expressions of nature—would go a long way toward alerting participants that nature at home should be a source of the powerful feelings generated in wilderness settings (p. 48).

Through the use of constructivism, the Grassy Hollow Trail Guide helps teachers assess initial understanding by questioning prior science knowledge and misunderstandings held by students. The activities in the guide are intended to actively involve students in hands-on learning and to provide opportunities for students to collaborate with
their peers about their findings. Students use a journal to record information, which can be used by teachers to evaluate learning.

Place-based education emphasizes the importance of using a local area to teach the curriculum. Grassy Hollow is a natural area which is close to schools in the Snowline Unified School District where students can learn about local environmental concerns such as ground water and forest fire which affect their local community.

Benefits of a Field Trip Experience

Electronic devices, television, parental choices, restrictions from homeowners' associations and even public government restrictions are some reasons why children are spending less and less time in outdoor areas (Louv, 2005, p. 28). Louv proposed that educators can reintroduce students to natural areas by well planned field trips to local areas in the community. “For more effective education reform, teachers should free kids from the classroom” (G. Lieberman in Louv, 2005, p. 204).

A field trip to a local outdoor area provides students with direct access to the environment. Students visiting a natural community have opportunities to make connections between textbook learning and how that
environment affects their life. Palmberg and Kuru (2000) wrote the following.

Various activities in outdoor education can stimulate environmental education and nature studies in suitable ways so that pupils learn about and experience nature while, at the same time, they learn action strategies to protect it. Experiences in outdoor activities offer great possibilities for the development of strong empathic relationship to nature among pupils (and their teachers) (p. 36).

Havlick and Hourdequin (2005) stated that students usually learn abstract generalizations passively in the classroom. However, students actively involved in a field experience, will have the opportunity to learn from a variety of learning modalities. This helps students develop vivid multidimensional knowledge, unlike what is learned from textbooks (p.387). Students then develop their own generalizations based upon direct involvement with the environment.

Havlick and Hourdequin (2005) also wrote that short field trips are equally worthwhile because knowing about a specific natural area is necessary to introduce students to the environment and demonstrates how human activities affect the world (p. 388).
Knapp (2000) referred to an earlier study by Mackenzie and White whereby three groups of third and fourth grade students were compared. Some students actively participated in a science field trip; the other two groups of students studied the same material but either went on a virtual field trip or had no field experience. The students who participated in a field trip experience learned more and remembered more than the other students (p. 66). It was concluded that students were able to remember events from the field trip long after the original field experience.

Experiencing the outdoors can make a difference in a person’s career choice. Knapp (2000) cited a 1994 survey of educators by the World Wildlife Fund which found that a field trip experience during childhood was one of the top factors that influenced those educators to choose a science field as a career. Sward and Marcinkowski (2005) also noticed that many researchers over the years have stated that career choice can be related to early life experiences and the resulting development of environmental sensitivity (p.308).

An educational outdoor experience for elementary school age children at the Grassy Hollow Visitor Center with involved adult volunteers and teachers can provide a
memorable experience. An enjoyable field trip experience at Grassy Hollow Visitor Center can also help develop knowledge of science concepts.
CHAPTER THREE

METHODOLOGY

Introduction

The Grassy Hollow Trail Guide is designed to be used by elementary school teachers from the Snowline Unified School District and volunteers of the Angeles National Forest with kindergarten through second grade students on field trips at the Grassy Hollow Visitor Center. Appendix A contains the trail map and trail activities for grades kindergarten through second grade which address California State Standards in Science at each stop. Pictures and some information are provided about commonly occurring mammals (Appendix B), birds (Appendix C), and plants (Appendix D).

The Pacific Crest Trail runs through the Grassy Hollow Visitor Center grounds, and the trail guide is to be used by teachers and volunteers when leading students on a hike on a section the Pacific Crest Trail used for school field trips. The teacher’s guide helps students meet California Content Standards in Science through activities and discussion at each stop along the trail. Additional information of interest to students including local Serrano Indians and the unique geologic importance of the area are included in the trail guide.
The four major sections of the Science Content Standards (physical sciences, life sciences, earth sciences and investigation and experimentation) are addressed in activities using the same trail. At each stop on the trail, students participate in different activities based upon the standards for their grade level.

At some stops, there may not be an activity correlated to a science standard for every grade level. For example, physical science is only addressed with second grade students in the trail guide at stops 3 and 9 when students observe gravity and objects that have fallen and look for objects that change position over time.

At some stops there are activities correlated to science standards for kindergarten through second grade students. For example, children at stop 3 learn the following life science life science concepts: kindergarteners learn about the similarities and differences in the appearance of plants; first grade students identify major structures of plants; and second grade students look for characteristics of plants. Stop 9 which is related to earth sciences provides the following for students: kindergarten students learn about the characteristics of mountains; first grade students discuss weather changes; and second grade students observe and
describe the position of objects and how they move over time. At all stops, investigation and experimentation encourages all kindergarten through second grade students to ask meaningful questions and conduct careful investigations to understand the science content in physical, life and earth sciences.

Questions, activities and discussion items are included in the trail guide directions for volunteer and teacher use with students in kindergarten through second grade at the 12 different stops on the trail. Using constructivist principles such as finding what prior knowledge students have, teachers can help students refine knowledge and correct any misconceptions that they might have about the natural environment. Additional constructivist activities are included whereby students work with a partner, record data and reflect in a journal.

All activities reflect place-based education. They are presented in a natural area near schools in the Snowline Unified School District, while providing experiences which meet science standards and encourage environmental sensitivity, and develop reading, writing and science skills.

The guide contains a map and directions to each stop on the trail using landmarks to identify each point of
interest. Each stop in the guide begins with a discussion of general interest to all students. Specific grade level information comes next in the guide starting with kindergarten, then first grade, and finally second grade. Journal pages to be used at each stop are listed. The science standards which can be covered at each stop on the trail are listed by grade level. Journal pages are provided for each stop as appropriate.

A review of literature revealed the importance of an outdoor educational program in a local setting for students. The Grassy Hollow Visitor Center is an outdoor setting which has been used by teachers for field trips in the Snowline School District, but a trail guide to enhance educational outcomes has been lacking. One school in the Snowline Unified School District is only six miles from this location.

The research reviewed showed that environmental education should be included in a child’s education to develop environmental literacy (Simmons, 2005, p. 67). Using a constructivist hands-on approach in environmental education actively encourages students to analyze, classify and predict, ask questions and interact with other students (Klein & Merritt, 1994). Peterson’s research supported the effectiveness of a field trip for
students to gain environmental sensitivity (Peterson, 2005, p. 299). Thus, using the Grassy Hollow Visitor Center as a field trip location has the potential to enable primary students to develop environmental knowledge, sensitivity and skills.

The literature review also pointed out the importance of place-based education. The Grassy Hollow Visitor Center and its proximity to local schools make it a suitable destination for educational purposes. Using an area in the local environment helps students make important connections between their homes and places where they can learn (Haluza-Delay, 2001).

Development of Trail Guide and Background Information

The need for the development of a trail guide was the result of personal volunteer experience at Grassy Hollow Visitor Center. Different volunteers have been personally observed to emphasize different aspects on hikes depending upon their area of experience. Discussions with volunteers provided further affirmation that they would find a trail guide and lessons useful because local schools often take students on the same trail for field trips. In addition many site volunteers, although they are not professional educators, have been asked about educational standards and
age-appropriate information that could be used with school groups.

Actual development of the trail guide started with a close look at the educational possibilities available on the existing trail at Grassy Hollow Visitor Center. A field trip for students to this location has typically been justified by teachers using science standards; thus it was decided to only include science standards in this project. After reviewing all the possible science standards in grades kindergarten through second grade, eight standards were chosen to focus on for kindergarten, 11 for first grade, and 12 for second grade.

Twelve sites along the trail were chosen by the author as most interesting and educational after referring to the list of applicable standards. Putting stakes into the ground to identify points of interest was considered; but after discussions with other volunteers, it was decided that using landmarks would require no maintenance or commitment from the Angeles National Forest and would not spoil the natural beauty of the area.

Additional information was chosen to be included in the trail guide which would be of interest to students. This information covers Serrano Indians, Mt. Baden-Powell
and items of interest about the plants and animals of the area.

All photographs in the trail guide and appendixes have been taken by the author. Photographs of the taxidermy bird and animal specimens were taken at the San Bernardino County Museum in Redlands, the Grassy Hollow Visitor Center, and the Paunsaugunt Wildlife Museum in Bryce, Utah.

Using the information obtained, student journal pages were developed by the author to help students actively participate in their learning by taking notes, organizing information, keeping records of what they have seen, and writing or drawing pictures about their experiences. The journal pages are designed to help reinforce learning of the California State Science Standards by integrating other subjects such as math, reading, and writing.

The most enjoyable portion of the project was locating and talking with experts in their field to obtain sources of accurate information to include in the project. The volunteers at Grassy Hollow were very helpful with providing sources of information. Ellen Wilson, a volunteer at Grassy Hollow, shared her list of guest speakers with me. From her list I was able to contact Neil Gilbert with the Pomona Valley Audubon Society who sent an
updated list of birds spotted at Grassy Hollow. Doug Milburn, the Angeles National Forest archeologist, was very helpful with information and resources concerning the Serrano Indians. John Aviv provided current information specific to the local Nelson Bighorn restoration project. John Lineau from the Wrightwood Historical Society was very helpful with items of historical interest in the area. In addition, botanist Dr. Kimberly Williams of the California State University, San Bernardino was extremely helpful by providing me with a personal tour of the area and helping with the identification of local plants. She also assisted with the photography of plants included in Appendix D. Linda Daily, field trip coordinator and volunteer at Grassy Hollow Visitor Center provided literature which contained scientific names of local animals. Information obtained from the California Geology class taken with Dr. Sally McGill at California State University, San Bernardino was used for the geology facts. Review of geology information was provided by Debbie Kunath, a current student in the geology program at California State University, San Bernardino. Colleagues such as Sue Williams, first grade teacher and former Boy Scout parent, provided information about Baden-Powell, and Rashelle Cole assisted with the formatting of appendix
pictures enabling them to be used easily by classroom teachers.

Peer Feedback

The Grassy Hollow Trail Guide has been successfully used for field trips by the author and five first grade teachers at Phelan Elementary School. The teachers involved students from all socio-economic levels including English Language Learners in the activities and journaling. In addition seven first and second grade teachers at Phelan Elementary School reviewed the trail guide and supportive information items, giving suggestions for improvement. Both new and experienced teachers who reviewed the guide found the information useful and were very supportive of the project.

As a result of teacher input, the trail guide information was slightly modified. Teachers asked that the information about plants and animals be formatted in a manner making it possible to cut the information apart into cards. Thus the cards could be placed on a ring and carried along on the hike for easy use as a reference if desired.

Volunteers of the Angeles National Forest were helpful by making suggestions and providing help the project. The volunteers have supported the use of a field guide to be used when training volunteers who lead hikes for school groups.
CHAPTER FOUR
RESULTS AND DISCUSSION

The Grassy Hollow Visitor Center has been used by school groups for many years without an outline or guide to assist volunteers and classroom teachers to provide well-planned educational experiences. Volunteers can change from year to year and thus the educational emphasis can vary depending upon the person who is leading the tour. Classroom teachers have varying levels of knowledge about the natural area, related science concepts, and appropriate field-based activities. Thus, the Grassy Hollow Trail Guide was developed to enable teachers and volunteers to provide consistent and quality activities for students. This project was limited in application to kindergarten to second students in its emphasis and alignment with the California State Science Standards. This same format could be extended to the development of trail guide activities for students at other grade levels in the future.

Angeles National Forest Volunteers and some teachers in the Snowline Unified School District have provided positive feedback for the development of the Grassy Hollow Field Guide.
The guide will help trainers of volunteers prepare new volunteers for leading hikes with activities which meet California State Science Standards. Primary teachers who wish to provide the hike directly to their students and who are not familiar with the science standards and educational possibilities at Grassy Hollow Visitor Center can use the guide to help students gain science knowledge.

Research in the field of outdoor education supports the involvement of students in hands-on sensory activities which allow them to integrate other disciplines into their learning (Stoner et al. 1989). Students hiking at Grassy Hollow have the opportunity to use their senses to begin developing a positive relationship with the outdoors by touching trees, rocks and pine cones. They can smell and see the trees and flowers along the trail as well as hear the birds and wind blowing through the trees as they write, draw and record their experiences in a journal.

Environmental literacy is the development of knowledge about the bio-physical world and the consequences of our choices (Simmons, 2005). According to the research of Peterson, students who develop environmental literacy begin to view the natural environment from an empathetic perspective and want to learn more about the environment (2005). Teachers who
bring their primary students to the Grassy Hollow Visitor Center now have a site-specific educational trail guide that will help ensure a positive educational outcome for students.
APPENDIX A

MAP AND TRAIL GUIDE
<table>
<thead>
<tr>
<th>Stop</th>
<th>Materials Needed</th>
<th>Kindergarten</th>
<th>Grade 1</th>
<th>Grade 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sock, pencils-for entire journal</td>
<td>Journal cover</td>
<td>Journal cover</td>
<td>Journal cover</td>
</tr>
<tr>
<td>2</td>
<td>--</td>
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<td>--</td>
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<tr>
<td>3</td>
<td>--</td>
<td>--</td>
<td>Compare pine cones</td>
<td>Compare pine cones</td>
</tr>
<tr>
<td>4</td>
<td>--</td>
<td>Tree rings</td>
<td>Tree rings</td>
<td>Tree rings</td>
</tr>
<tr>
<td>5</td>
<td>crayons with paper removed</td>
<td>Leaf rubbing</td>
<td>Draw the tree</td>
<td>Draw the tree, Draw an acorn</td>
</tr>
<tr>
<td>6</td>
<td>string, hand lens</td>
<td>Observation ring, Bark rubbing</td>
<td>Observation ring, Graph</td>
<td>Observation ring, Trees</td>
</tr>
<tr>
<td>7</td>
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<td>Animals that live in the mountains</td>
<td>Animals that live in the mountains</td>
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<td>9</td>
<td>--</td>
<td>--</td>
<td>Predict the weather</td>
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<td>10</td>
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<td>Measure a pine cone</td>
<td>Measure a pine cone</td>
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<td>12</td>
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<td>Footprints Three things Bear fur</td>
<td>Footprints Three things Bear fur</td>
<td>Footprints Three things Bear fur Mt. Lion First, next, last</td>
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</table>

Materials and journal pages needed by grade level and stop for the Grassy Hollow Trail.
Stop 1: Walk to the Sequoia Trees next to the paved entry road.

Materials: an old sock

Information for All Students:

On today's field trip you will see and hear about forest plants, birds and animals. Feel free to ask questions or ask to stop to look at something closer. You can use your journal to draw pictures or write about what you do and what you see today.

Grades 1 and 2:

Plants:

Here is a plant that is not normally from this forest. The Giant Sequoias planted near the road are not native to this area. Our forest does not get the same rainfall as in their native forest further north so these trees may not grow as well as they normally would. So far, these trees are getting the water, nutrients from the soil and sunlight that they need to grow. Many trees in our forest are not growing well because we have had less rain in the past few years.

- Do the trees have the water, nutrients from the soil and sunlight to survive? Answer: Yes, plants receive water, food, and sunlight so they can live here.
Cheat Grass is growing on the hills and it is also not from this area. It is growing well in open areas.

- How do you think the Cheat Grass may have gotten here?
  
  Demonstrate how animals can carry seeds on their feathers and fur or in their droppings. Use a sock to show how materials can easily be picked up.

Journal page:

K, 1, 2: Cover page: Students write their name on the cover.
Science standards:

✓ Kindergarten - for the entire journal: Investigation and Experimentation - Scientific progress is made by asking meaningful questions and conducting careful investigations. Students should develop their own questions and perform investigations.

✓ Grade 1 - Life Sciences 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

✓ Grade 1 - Life Sciences 2. b. Students know both plants and animals need water, animals need food, and plants need light.

✓ Grade 2 - Investigation and Experimentation 4. d. Write or draw descriptions of a sequence of steps, events, and observations.
My Grassy Hollow Field Journal

Name

Date
Stop 2: Walk to the Pacific Crest Trail sign.

Information for All Students:

Pacific Crest Trail:

We will walk on a small portion of the Pacific Crest Trail. The Pacific Crest Trail is 2,650 miles long. It goes from the Mexican border to the Canadian border, following the San Gabriel Mountains and then on to the Sierra Nevada mountains. It can take all summer to walk the trail. Hikers who travel the entire trail will have a friend or relative send supplies at intervals to towns like Wrightwood which are close to the trail. Hikers pick up supplies along the way as they travel the trail.

Trail etiquette:

**Keep the forest beautiful:** If you see trash along the trail, please pick it up. Be careful that you do not drop anything of yours. Leave pine cones, rocks and other items where you found them. Be careful not to harm plants or animals living in the forest so others can enjoy looking at them.

**Be safe on the trail:** Do not throw rocks or pine cones. Watch your step on the trail. Some rocks are loose and there are places where you step over tree roots. Always stay on the trail with your group.
**How to enjoy your hike:** Walk quietly and we might see or hear birds or squirrels. A good way to remember your field trip is by taking notes in your journal, or drawing pictures to help you remember what you saw. When you get back to school or when you go home, share your journal with others to discuss what you saw on the field trip. Leave rocks and pine cones on the ground for everyone to enjoy.

**Grade 2:**

**Environmental effects:**

You will notice that no plants are growing on the trail.

- Why do you think there are no plants growing on the trail?

  **Answer:** Plants do not grow where people walk. Our footsteps compact the soil and kill any plants that try to grow. That is why we ask that you stay on the trail.

No journal pages at this stop.
Science Standards:

✓ Grade 2 - Life Sciences 2. e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.
Stop 3: Deer Bush: Walk between these trees to the patch of Deer Bush on the left side of the trail.

Information for All Students:

Plants:

This thorny plant is called Deer Bush or Mountain Whitethorn. Look carefully at the pointy thorns on the plant.

- Why do you think it is called Deer Bush? Answer: This plant is a source of food for deer.

- How do you think the deer eat this plant when it has thorns on it? Answer: The deer only eat the tender shoots at the ends of the branches. Deer Bush does not loose its leaves in the winter, providing food for the deer when other plants loose their leaves or are under snow.

- Think of another plant you have seen that has thorns. Why do these plants have thorns? Answer: To protect them from being eaten by animals.
Grade 1:

Pine trees:

Pine trees are tall trees that keep their leaves all year. Their leaves are the long pointed needles. They have cones instead of flowers to produce seeds. Look for the little pine trees that are growing in open areas.

- How the small pine trees like the big pine trees? Are they similar to the big pine trees, are they different? Answer: They are similar in that they have roots, trunks, branches, and needles. They are different in size and their trunks may look different. The small trees do not have pine cones on them.

- Is a tree trunk like a stem on a flower? Answer: Yes, they both help bring nutrients and water to the entire plant.

Grades 1 and 2:

- Do you know what a pine cone is? Look for a pine cone on the ground. Answer: Confirm answers or identify a pine cone for students.

- When the scales or parts of the cone open up, what is inside? Answer: Pine seeds. Not all pine seeds become trees; many animals including birds and squirrels depend upon them for food.
• Can you find a pine cone with the scales missing? Why do you think the scales are missing? **Answer:** A squirrel probably pulled them off to get to the seeds.

• Do you think you can hear a pine cone falling from the tree? **Have students listen quietly for a few seconds to listen for falling pine cones.**

• Who could live in the trees? **Answer:** Birds and squirrels.

**Journal page:**

**Grade 1 and 2:** Compare pine cones.

No journal page for Kindergarten.
Science standards:

- Kindergarten - Life Sciences - 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior or plants and animals.
- Kindergarten - Life Sciences - 2. c. Students know how to identify major structures of common plants and animals.

- Grade 1 - Life Sciences - 2. a. 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
- Grade 1 - Life Sciences - 2. c. 2. b. Students know both plants and animals need water, animals need food, and plants need light.

- Grade 2 - Physical Science 1. e. Students know objects fall to the ground unless something holds them up.
- Grade 2 - Life Sciences "2. c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment."
Compare Pine Cones

These are both pine cones. What do you think happened to the one on the right? Try to find one like the one on the right.

What did you observe that helped you make your decision?
Stop 4: Tree Rings: Ahead and on the right side of the trail is a
downed tree, cut to reveal the tree rings.

Information for All Students:

This tree blew over in a strong wind storm. The exposed roots
could not take in water and nutrients, so the tree died.

Tree rings:

Trees generally grow one ring per year. Look for larger rings which
show a year with plenty of rain. A narrow ring will grow if there was not
much rain.

- Draw the rings of a tree in your journal. You can show wet and
dry years. Predict what kind of a ring will grow this year.

Tree Roots:
• What part of the tree is exposed here? Answer: The roots. You can touch the roots on this tree. Look for the big hole in the ground. When the tree fell, it pulled up its roots and soil with them.

• What do you notice about the roots? Answer: The roots are as large as branches. The roots need to be large to hold up a tall tree and take in nutrients. Some of the roots broke off in the soil when the tree fell.

• What color is the soil? Answer: Very light in color, almost white. You might notice that the soil is very light in color around the roots. The dark topsoil is actually very thin and does not hold water well. The roots need to spread far to get nutrients and water for the tree.

Information for all Students:

• Why do you think this tree was left here and not cut up for firewood and taken away? Answer: Dead trees can be homes for animals and insects. As the wood rots, it will provide nutrients for the soil.

Journal page: K, 1, 2 – Draw tree rings
Science standards:

✓ Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior or plants and animals.

✓ Kindergarten - Life Sciences 2. c. Students know how to identify major structures of common plants.

✓ Grade 1 - Life Sciences 2. b. Students know both plants and animals need water, animals need food, and plants need light.

✓ Grade 1 - Life Sciences 2. e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

✓ Grade 1 - Investigation and Experimentation 4. b. Record observations and data with pictures, numbers, or written statements.

✓ Grade 2 - Investigation and Experimentation 4. a. Make predictions based on observed patterns and not random guessing.
Draw the rings on this tree.
Show dry years and wet years.
Stop 5: Walk ahead to the large California Black Oak on the hill to the left.

Materials: Crayons with the paper removed.

Information for All Students:

The California Black Oak will lose its leaves in the fall. The leaves are larger than on other types of oak trees. This tree can grow from 50 - 75 feet tall. The California Black Oak has acorns which are food for animals and some fall to the ground and sprout into new trees (Grade 2). Acorns might grow when buried by squirrels who forget where they hid them. Serrano Indians who lived near Grassy Hollow would also collect acorns for food.

- Look for an acorn on the ground.

Indians:

Serrano Indians would travel through the Grassy Hollow area hunting animals for food, collecting acorns or other seeds or to travel between villages. There was a large village in West Cajon Valley on the east side of Wrightwood and another in the Valyermo area, a few miles
to the west. The word Serrano is Spanish for “mountaineer” or a person who goes to the mountain. Indians hunted for Big Horn Sheep, bear, deer, squirrels, and rabbits, in this area.

Kindergarten:

- Pick up an oak leaf from the ground. Make a leaf rubbing by putting the leaf under your paper and rubbing the side of the crayon over your paper to reveal the outline and veins of the leaf.

- You can also make a pine needle rubbing on your page in the same way, put the needle under the paper and rub a crayon over the paper.

Grades 1 and 2:

Draw a tree in your journal. Tell your neighbor which tree you are drawing. Use position words such as above, next to, left or right of, to explain which tree it is.

Grade 2:

Draw an acorn.
Science standards:

✓ Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior or plants and animals.
✓ Kindergarten - Life Sciences 2. c. Students know how to identify major structures of common plants and animals.

✓ Grade 1 - Life Sciences 2. c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
✓ Grade 1 - Investigation and Experimentation 4. b. Record observations and data with pictures, numbers, or written statements.
✓ Grade 1 - Investigation and Experimentation 4. d. Describe the relative position of objects by using two references (above and next to, below and left of).
✓ Grade 1 - Investigation and Experimentation 4. e. Make new observations when discrepancies exist between two descriptions.

✓ Grade 2 - Physical Science 1. e. Students know objects fall to the ground unless something holds them up.
✓ Grade 2 - Life Sciences 2. f. Students know flowers and fruits are associated with reproduction in plants.
Make a leaf rubbing.
Put a leaf under this page and rub the side of a crayon over it to show the veins and outline.
Draw the tree.
Draw an acorn from the Black Oak tree,

Draw an animal that sometimes plants acorns.
Stop 6: Walk to the top of the hill.

**Materials:** Crayons with paper removed, 24" length of string.

Hand lens (Provide one hand lens per student if available).

**Information for All Students:**

**Jeffrey Pine:**

This is a Jeffrey Pine. Jeffrey Pines have cones with the prickles poking inward. Remembering that the gentle Jeffrey does not poke you when you pick up the cone will help you remember this type of tree.

- We will use our senses at this stop. Sniff the bark on the trees near the trail. Find the one that smells sweet. Tell your neighbor what it smelled like to you.

- What does the bark of the tree smells like? **Answer:** It smells sweet. Some students say it smells like vanilla.

- Grade 1: Construct a graph which shows what ten people think the tree smells like. Color or mark the boxes to show student responses. Compare your results with the results of your friends.

**Listen for birds:**

There are several different kinds of birds that visit or live at Grassy Hollow. You might hear birds but not be able to see them. Listen and try to hear different kinds of calls.
• How many different birds do you hear today? Answer: The different kinds of birds may vary by season.

• Where do the bird sounds come from, high in the trees or low to the ground? Answer: Some birds prefer the tree tops, others like to be near the ground.

Observation ring:

Hand students a piece of string. Demonstrate how to make a circle on the ground with the string.

We will call this your observation ring. Look carefully at what is inside the circle. There may be small insects, parts of plants, pine needles, rocks or other items of interest inside the circle. You can use a stick to move items around and see what is under rocks or leaves. Remember to not hurt insects if you find them and return rocks and leaves to where you found them. Give students a hand lens to magnify items or get a closer look.

• What does the soil look like? Is the same color as the soil around the tree roots that we saw? Answer: No, the soil is very dark in color.

• Describe something you see in your observation ring and tell your neighbor about it. Can your neighbor find the item that you are describing?
• Grades 1 and 2: In your journal, draw what you see inside your observation ring.

**Bark rubbing:**

*Kindergarten* - Feel the bark on the trees. Tell your neighbor how the bark feels to you.

• Find a tree with different bark and feel the difference. You can do a bark rubbing at this location. *Place the page of the journal up against the bark. Hold it firmly in place with one hand and rub the side of a crayon over the paper with the other.*

**Grades 1 and 2:**

• Look for different kinds of trees. Make a chart of the different kinds of trees that you see. Write the name of the tree if you know it and tell whether it is tall or short. You can make a quick sketch of the shape of the tree. Make tally marks to show how many trees of each type you saw.
Journal pages:

Kindergarten – Observation ring, Bark rubbing.

Grade 1: Graph.

Grade 2: Chart trees.
Science standards:

✓ Kindergarten - Life Sciences - 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals.
✓ Kindergarten - Life Sciences - 2. c. Students know how to identify major structures of common plants and animals.
✓ Kindergarten - Investigation and Experimentation - 4. a. Observe common objects by using the five senses.
✓ Kindergarten - Investigation and Experimentation - 4. b. Describe the properties of common objects.
✓ Kindergarten - Investigation and Experimentation - 4. c. Describe the relative position of objects by using one reference such as above or below.
✓ Kindergarten - Investigation and Experimentation - 4. e. Communicate observations orally and through drawings.

✓ Grade 1 - Life Sciences 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
✓ Grade 1 - Investigation and Experimentation 4. a. Draw pictures that portray some features of the thing being described.
✓ Grade 1 - Investigation and Experimentation 4. b. Record observations and data with pictures, numbers, or written statements.
✓ Grade 1 - Investigation and Experimentation 4. c. Record observations on a bar graph.

✓ Grade 2 - Investigation and Experimentation 4. e. Construct bar graphs to record data, using appropriate labeled axes.
✓ Grade 2 - Investigation and Experimentation 4. f. Use magnifiers to observe and draw descriptions of small objects or small features of objects.
✓ Grade 2 - Earth Science 3.b. Students know that soil is made partly from weathered rock and partly from organic materials and soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.
What's inside your observation ring?
Use a crayon to make a bark rubbing from a tree.
Choose an area where you can see several different kinds of trees. Record the different kinds of trees you see.
Graph

What does the tree smell like? Ask 10 friends and graph their answers.

<table>
<thead>
<tr>
<th>Smells like Vanilla</th>
<th>Smells like Butterscotch</th>
<th>Smells like</th>
</tr>
</thead>
</table>
Stop 7: Walk ahead on the trail to the burned area.

Information for All Students:

Fire:

This area was burned in the 1997 Narrows Fire. At least 2,500 firemen fought to keep the fire from coming any closer to the visitor center. This fire burned 18,000 acres. The fire originated at a campground when someone was not careful with fire.

Plants:

Look for all the young plants growing in this area. Although this area burned, the forest is replanting itself and a lot of new vegetation is growing back.

- Are the plants the same as in the rest of the forest? Tell your neighbor about something you have observed. Answer: No, after a fire, many different wildflowers and plants grow in the open areas.

Smokey Bear:

Smokey Bear was a real bear that was burned during a fire in a different forest in New Mexico. He became a mascot for the National Forests after he was rescued from a tree. A bear called Smokey has
become the symbol for the National Forest, reminding people to be careful with fire.

**Mt. Baden-Powell:**

You can see Mt. Baden-Powell from this spot (The Mountain straight ahead of you with an altitude 10,064’). This mountain was considered sacred to Serrano Indians. The mountain was named after the founder of the Boy Scouts, Robert Stephenson Smyth Baden-Powell. The hike to the top of the mountain is a popular hiking spot for scouts looking to receive a merit badge. To help you remember the name Baden-Powell, you can think of the Boy Scout Motto: Be Prepared. The initials, BP are also the initials in Baden-Powell's name.

No journal pages at this stop.
Science Standards:

✓ Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals.

✓ Grade 1 - Life Sciences 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

✓ Grade 1 - Investigation and Experimentation 4. e. Make new observations when discrepancies exist between two descriptions.

✓ Grade 2 - Life Sciences 2. e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.
Stop 8: Walk further along the trail where you can see Mt. Baden-Powell better.

Information for All Students:

Bighorn Sheep:

There are approximately 229 Bighorn Sheep living in the San Gabriel Mountains. Bighorn Sheep live at altitudes of 3,000 to 10,000 feet. The Bighorn Sheep population is getting smaller because the Mt. Lion population is growing. Look for the Mt. Lion when you go inside the visitor center.

Bears:

Black Bears live in the San Gabriel Mountains. Their color ranges from black, to brown to blonde. Bears have a good sense of smell and are attracted to food that campers leave unattended.

If a bear comes to depend upon human food, he can become aggressive and dangerous. Vincent, the bear in the visitor center was a nuisance bear that returned to this area after being relocated. He had to be killed when he became aggressive and returned to campgrounds looking for food. It is better to put all food away when finished eating than encourage a bear to your camp. When bears start eating human food instead of their natural diet, relocating them to a different part of the forest seldom solves the problem. Bears often find
their way back and continue to look for human foods. Bears are large and strong and because they have huge, sharp claws and big teeth, they are dangerous. Look for Vincent Bear inside the visitor center.

- Are there animals in your neighborhoods that come to get into your trash or eat your pet’s food? Answer: Coyotes, raccoons, bobcats, ravens, mice, rats.
- How do you keep wild animals from returning? Answer: Don’t leave pet food or trash where animals can get to them.

Grades 1 and 2:

- Your journal page for this stop asks about animals that live in the mountains. You will see other animals to add to this list when you go inside the visitor center at the end of the hike.

Journal page: Grades 1 & 2 - Animals that live in the mountains - this page can be finished at stop 12.

No journal page for Kindergarten.
Science Standards:

✓ Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals.

✓ Grade 1 - Life Sciences 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
✓ Grade 1 - Investigation and Experimentation 4. e. Make new observations when discrepancies exist between two descriptions.

✓ Grade 2 - Life Sciences "2. c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.
✓ Grade 2 - Life Sciences 2. d. Students know there is variation among individuals of one kind within a population.
Name three animals that live in the mountains.

1. ______________________________

2. ______________________________

3. ______________________________

Write one thing you learned about one of the animals.
Stop 9: Stop at the top of the trail where it begins to drop down to the road.

Information for All

Students:

Plants:

Here you can see a plant with a funny name, Poodle Dog Plant. It is called this because some people think its leaves look like the fur on a poodle. Don’t touch this plant, it will make you itch!

Earthquake fault:

At this location you can see evidence of how the San Andreas Fault has changed the land. To the north at the bottom of the hill is a small valley where the San Andreas Fault runs along the mountains. Jackson Lake just below us is on the fault.

An earthquake happens because of friction between two sections of the earth’s crust. If you rub your knuckles together hard enough you can make your hands slide. The fault moves just like your hands move when you push hard enough. When there is enough pressure to make the plates overcome the friction, the fault will move. The last big earthquake in this area was January 9, 1857, over 150 years ago.
Earthquake Myths

➤ Big Earthquakes happen at night. False, they happen at any time, day or night.

➤ The doorway is the safest place in a house. Not always, the best place would be under a sturdy table.

➤ Earthquake weather produces earthquakes. False. Earthquakes happen deep under the earth’s surface. Weather at the Earth’s surface does not affect earthquakes that happen deep under the surface.

Mountains:

At this stop along the trail you can see the Mojave Desert in the distance to the north. The desert is dry because the San Gabriel Mountains block moist air from the ocean. The south side of the mountains receives more rain than the north side because the mountains block the moist air that comes from the ocean. These mountains collect water for communities below on both the north and south sides. Water seeps deep into the mountains after winter storms and is retrieved by wells in the local communities of Wrightwood, Phelan and Pinon Hills. In the winter these mountains get snow because it is colder here than at lower elevations. In the summer, it is cooler in
the mountains and people like to come to Grassy Hollow to escape the desert heat.

- Turn to your neighbor and tell him what a mountain is. **Answer:** A naturally raised part of the earth, larger than a hill.

**Grade 1:**

- What kind of weather will we have today? **Answer:** Responses will vary by season.
- Is this the kind of weather you would expect for this season?  
  **Answer:** Responses will vary according to the season and daily temperature.

**Grade 2:**

Look for airplanes flying overhead. If it is a warm day in the desert, look for sailplanes gliding on the air currents. If you see an airplane, describe its location to your neighbor. If there are no airplanes, look for clouds. Sailplanes may circle on thermal updrafts of warm air, or dust devils or follow the mountain ridges. Power planes generally will fly in straight lines.

- Are there clouds today? Which direction are they moving?  
  **Answer:** Clouds at lower elevations may be pushed up as they hit the mountain.
Journal page: Grade 1 - Predict today's weather. No journal page for Kindergarten or Grade 2.
Science Standards:

✓ Kindergarten - Earth Sciences 3.a. Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.
✓ Kindergarten - Earth Sciences 3.b. Students know changes in weather occur from day to day and across the seasons, affecting Earth and its inhabitants.

✓ Grade 1 - Earth Sciences 3.b. Students know that the weather changes from day to day but that trends in temperature or of rain (or snow) tend to be predictable during a season.

✓ Grade 2 - Physical Science 1. b. Students know an object's motion can be described by recording the change in position of the object over time.
Predict Today’s Weather

I think the weather will be:

hot
cold
rainy
snowy

because it is this season:
Stop 10: Here your trail meets the paved access road that leads to the group camp to the west. Turn left on the paved road, walking toward the east.

Information for All Students:

Pinyon Pine: On the right side of the road you will see a short pine tree. It is a Pinyon Pine tree. The seeds inside the cones are good to eat. Serrano Indians harvested them for food and people still eat them today.

- How do the cones look compared to pine cones on the other trees that we have seen? **Answer:** They are smaller. Measure a pine cone and record its length in your journal.

Canyon Live Oak:

The oak tree near the Pinion Pine on the right side of the road is different than the Black Oak we saw earlier. This oak, the Canyon Live Oak keeps its leaves all winter long. The acorns are eaten by animals and Serrano Indians used to harvest the acorns for food also.

- Tell your neighbor one difference between this oak tree and the first one we saw. **Answer:** The leaves are smaller and have fuzz on the bottom. This oak is shorter than the Black Oak. The acorns have thicker acorn cups.
Grade 2: Compare your acorn drawing with this acorn. How are they different? Answer: The Canyon Live Oak has a thicker acorn cup.

Grade 1:

This stop is on the south side of the mountain. It is usually warmer here because of the sun hitting the rocky hill behind us. The south side of your house or a building will also be warmer because of the sun’s warming rays.

Journal page: Grades 1 & 2 - Measure a pine cone.

No journal page for Kindergarten.
Science Standards:

- Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior or plants and animals.
- Kindergarten - Life Sciences 2. c. Students know how to identify major structures of common plants and animals.
- Kindergarten - Investigation and Experimentation 4. b. Describe the properties of common objects.
- Kindergarten - Investigation and Experimentation 4. d. Compare and sort common objects by one physical attribute. (Color, shape, texture, size, weight)

- Grade 1 - Earth Sciences 3.c. Students know the sun warms the land, air, and water.

- Grade 2 - Life Sciences 2. c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.
- Grade 2 - Life Sciences 2. d. Students know there is variation among individuals of one kind within a population.
Measure A Pine Cone

Find a pine cone and measure its length. Use the inch or centimeter ruler on your journal.

[Blank space for inches and centimeters measurement]

Circle one
Stop 11: Walk ahead to where the road starts to slightly go down hill.

Look at the rocks (on the left side in the road cut).

Information for All Students:

The San Gabriel Mountains are pushed up by the San Andreas Fault. The fault moved these rocks to where you see them today. These rocks are smooth and flat with shiny specks in them. Pick up a small rock and feel how flat it is. When these rocks break apart, they usually have flat smooth sides.

Grade 2: These rocks are often used for landscaping in local areas.

Soil:

- Is the soil different than the soil under the trees where you used the observation ring? Is it different than the soil at home or at school? Answer: This soil is made of larger pieces of rock with less dark soil and organic matter.

No journal pages for this stop.
Science Standards:

- Kindergarten - Investigation and Experimentation 4. a. Observe common objects by using the five senses.
- Grade 1 - No new science standard at this stop.
- Grade 2 - Earth Sciences 3.e. Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.
- Grade 2 - Earth Science 3.a. Students know how to compare the physical properties of different kinds of rocks and know that rock is composed of different combinations of materials.
- Grade 2 - Earth Science 3.b. Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.
Stop 12: Follow the paved road back to the visitor center and go inside.

Information for All Students:

Animals:

Inside the visitor center you will see mounted animal specimens that live in this area. You generally don’t see these animals when you are hiking because they usually hear you before you see them and they run away. All the animals except for Vincent Bear and the Mt. Lion were found dead and mounted. The Mt. Lion ran out in front of a car on Highway 2 east of Wrightwood. It is a female and unusually large.

- How can these animals live in the cold mountains in the winter?  
  *Answer:* They have thick fur. Some may migrate in winter.

- Can you find an animal that can be food for a different animal?  
  *Answer:* Squirrels and birds can be food for bobcats, coyotes and Mt. Lions.

- Can you tell what an animal eats by looking at its teeth?  
  *Answer:* Yes, the animals that prey on other animals have sharp teeth.

- How are the gray squirrels similar and different than the ground squirrels that live around your school or home?  
  *Answer:* Gray squirrels are different because they have big bushy tails. Gray squirrels also look like they have more fur on their bodies. They
have similar shaped bodies but the ground squirrels are not gray in color. Gray squirrels make nests from leaves in the trees but ground squirrels live in holes underground.

- Can you think of one question to ask the volunteers? **Answer:** Responses will vary.

- You can draw pictures in your journal of your favorite animals that live in the forest. Look for the footprints on the ground and feel the bear fur in the box. **Answers to footprints page:** From top to bottom, bear, deer and raccoon.

Journal pages:

Kindergarten 1 & 2 - Animal footprints, Three things you saw and Bear fur.

Grade 1 - Animals that live in the mountains (finish from Stop 8)

Grade 2 – Mt. Lion, Write about what happened-First, next, last.
Science Standards:

✓ Kindergarten - Life Sciences 2. a. Students know how to observe and describe similarities and differences in the appearance and behavior or plants and animals.
✓ Kindergarten - Life Sciences 2. c. Students know how to identify major structures of common plants and animals.
✓ Kindergarten - Investigation and Experimentation Scientific progress is made by asking meaningful questions and conducting careful investigations. Students should develop their own questions and perform investigations.
✓ Kindergarten - Investigation and Experimentation 4. a. Observe common objects by using the five senses.
✓ Kindergarten - Investigation and Experimentation 4. b. Describe the properties of common objects.
✓ Kindergarten - Investigation and Experimentation 4. e. Communicate observations orally and through drawings.

✓ Grade 1 - Life Sciences 2. a. Plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
✓ Grade 1 - Life Sciences 2. c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
✓ Grade 1 - Life Sciences 2. d. Students know how to infer what animals eat from the shapes of their teeth.
✓ Grade 1 - Investigation and Experimentation 4. a. Draw pictures that portray some features of the thing being described.
✓ Grade 1 - Investigation and Experimentation 4. b. Record observations and data with pictures, numbers, or written statements.

✓ Grade 2 - Life Sciences “2. c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.
✓ Grade 2 - Life Sciences 2. d. Students know there is variation among individuals of one kind within a population.
✓ Grade 2 - Investigation and Experimentation 4. d. Write or draw descriptions of a sequence of steps, events, and observations.
What animals made these footprints? Look for them inside the visitor center.

Guess________

Guess________

Guess________
Draw or write about three things you saw on today’s hike. Circle the one you would like to learn more about.
What does bear fur feel like?

Is a bear like another animal you see? What animal?
Name three animals that live in the mountains.

1. __________________________

2. __________________________

3. __________________________

Write one thing you learned about one of the animals.
A Mt. Lion is also called:

____________________________________

____________________________________

Write three things you observed about the Mt. Lion:

1. ____________________________________

2. ____________________________________

3. ____________________________________
APPENDIX B

MAMMAL CARDS
### Badger

Badgers have strong claws for digging out their prey. They sometimes plug up a squirrel’s back door before digging them out. Special membranes over their eyes protect them from the dirt.

### Bat

These small mammals are about the size of a mouse. No other animals compete with bats for insects at night. They have a very fast heartbeat, about as fast as a hummingbird.

### Bighorn Sheep

The Bighorn Sheep in these mountains are cut off from other populations. There are about 229 Bighorn Sheep in the local mountains. They are prey for Mt. Lions.
**Bobcat**

The Bobcat has a short "bobbed" tail that is black only on the top. They are members of the lynx family and are active mostly at night. They will eat birds, rabbits, and other small animals.

**Black Bear (Card A)**

This light colored bear is a Black Bear. They can range from blonde to black in color. Black Bears were introduced to San Bernardino in 1930 by California Fish and Game.

**Black Bear (Card B)**

An adult Black Bear can weigh 200-400 lbs. They eat berries, rodents, meat and fish. They have a good sense of smell. They usually will run from you if you see one.
<table>
<thead>
<tr>
<th>Coyote</th>
<th>![Coyote Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coyotes are members of the dog family. They live in underground dens. They will eat everything and are attracted to trash and pet food left outside.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mule Deer</th>
<th>![Mule Deer Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>To escape predators the Mule Deer will deliberately jump over logs and obstacles. They have large ears for good hearing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gray Fox</th>
<th>![Gray Fox Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>These shy animals are known for being clever at stealing a meal. They eat rodents, lizards, and bugs. Both parents help bring food to the young. Curved claws help them climb trees.</td>
<td></td>
</tr>
<tr>
<td><strong>Gray Squirrel</strong></td>
<td>![Gray Squirrel Image]</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>A rodent with white fur on the bottom and grey on top with a big fluffy tail. They eat acorns and pine seeds. Gray Squirrels can be up to 24 inches long.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mountain Lion</strong></th>
<th>![Mountain Lion Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Also called a panther, puma, paintar or cougar. It is against the law to hunt them since 1990. They eat small animals and large animals such as deer. They have a very long tail and can weigh up to 175 lbs. and can be up to 7.5 feet long.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Rabbit</strong></th>
<th>![Rabbit Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active mostly at night. Rabbits are food for many other animals.</td>
<td></td>
</tr>
<tr>
<td><strong>Raccoon</strong></td>
<td>![Raccoon Image]</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Raccoons are nocturnal animals that eat most everything, including trash and fruit growing in people's yards. They are attracted to trash cans and can weigh up to 10-25 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ringtail</strong></th>
<th>![Ringtail Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ringtail is a seldom seen nocturnal animal. Ringtails eat mice, insects, birds, lizards and sometimes fruit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Skunk</strong></th>
<th>![Skunk Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The scent glands at the base of the skunk's tail can spray as far as 10-15 feet. They eat fruit, berries, eggs, insects, rodents and small reptiles.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C

BIRD CARDS
<table>
<thead>
<tr>
<th><strong>Acorn Woodpecker</strong></th>
<th>![Acorn Woodpecker Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>These woodpeckers have red on the top of the head and a white spot on the rump. The male and female work together to raise their young. They use the same nests each year. Size: 8.5-9.5&quot;.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Allen's Hummingbird</strong></th>
<th>![Allen's Hummingbird Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The male has a green back and head with red throat. They have a small territory that they defend during breeding season. Size: 4&quot;. Spring and Fall.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>American Robin</strong></th>
<th>![American Robin Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown on top and red on the bottom with a white eye-ring. The nest is made of grass and mud, usually in a bush. Robins are successful because they easily adjust to living near people. Size: 9.5-10&quot;. Can be seen all year.</td>
<td></td>
</tr>
<tr>
<td><strong>Anna’s Hummingbird</strong></td>
<td>![Hummingbird Image]</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>The male is metallic-green on top and the whole head is a rosy-ruby color. The nest is neatly woven onto a branch and looks like a saddle and has 2 white eggs. Size: 4”. Spring, Summer, Fall</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Band-tailed Pigeon</strong></th>
<th>![Pigeon Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>They have a purple head and breast. There is a band across the tail feathers. They breed in the pine trees. Sounds like “coo-coo.” Size: 14-14.5”. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Beswick’s Wren</strong></th>
<th>![Wren Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tail is held high and wagged back and forth. They have white eyebrows. They use existing holes such as woodpecker holes for nests, using a wide variety of materials to build a nest. Size: 4.5-5.5”. Can be seen all year.</td>
<td></td>
</tr>
<tr>
<td><strong>Black-headed Grosbeak</strong></td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>They have a large cone shaped bill with a black head, back and tail. They are cinnamon colored on the underside. The male sings when sitting on the 3-5 spotted greenish-blue eggs. Size: 8.5”. Seen in Spring.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Bushtit</strong></th>
<th>![Bird Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A tiny gray bird usually seen flying in flocks. Spider’s webs and cocoons are used to build relatively large woven nests. Size: 4.5”. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>California Quail</strong></th>
<th>![Bird Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The male has black and white on the head with a comma shaped crest. The well hidden nests are lined with grass and leaves. The eggs are spotty brown. They are found throughout California. They are the California State Bird. Size: 9-11”. Can be seen all year in dense brush.</td>
<td></td>
</tr>
<tr>
<td>Calliope Hummingbird</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---</td>
</tr>
<tr>
<td>A tiny bird with green on top and white below. The male has red-purple streaks on the throat. They eat nectar and insects and can catch insects in midair. Size: 3”. Spring and Summer.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cassin’s Finch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The male has a light dusting of pink on it. They like pine forests. Look for brown on the back of the neck. Size: 6-6.5”. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dark-eyed Junco</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Look for the white edges on the tail. They are easily found throughout North America. Nests are in hidden spots on the ground, lined with moss or hair. Size: 6-6.5”. Can be seen all year.</td>
<td></td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>![Golden Eagle Image]</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
</tr>
</tbody>
</table>
| **The Golden Eagle has brown both on top and the bottom with a little gold color on the neck and head. A huge bird that you might see in the winter.**  
Size: 30-30.5". |

<table>
<thead>
<tr>
<th>Mountain Chickadee</th>
<th>![Mountain Chickadee Image]</th>
</tr>
</thead>
</table>
| **The whole body is gray. They have a black stripe through the eye with a white eyebrow. A bird that eats and lives high in the trees.**  
Size: 4.5-5.5".  
Can be seen all year. |

<table>
<thead>
<tr>
<th>Mourning Dove</th>
<th>![Mourning Dove Image]</th>
</tr>
</thead>
</table>
| **Brown birds with a pinkish breast. These birds have adapted to living near people. They have a long breeding season. They can hatch 3-4 broods each season.**  
Size: 11.5-12".  
Can be seen all year. |
### Northern Flicker

The Northern Flicker has a brown back and wings, spotted with black and a black spot on the breast. Can be seen climbing trees. They will make a nest in an existing hole. Size: 12-13”. Best seen in Winter.

### Northern Pygmy Owl

They are a small owl with a long tail often seen in daylight. They fly straight and fast. Size: 6-7”. Not often seen but are at Grassy Hollow throughout the year.

### Northern Saw-whet Owl

These small owls are common in most forests. They are brown with spots of white. Size: 7.5-8.5”. They are around throughout the year but not often seen at Grassy Hollow.
<table>
<thead>
<tr>
<th>Olive-sided Flycatcher</th>
<th>![Image of Olive-sided Flycatcher]</th>
</tr>
</thead>
<tbody>
<tr>
<td>These birds are brown on top with a streaked breast and a white throat. They nest in dead standing trees, like the burnt areas around Grassy Hollow. Size: 7-7.5&quot;. Can be seen in Spring and Summer.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Raven</th>
<th>![Image of Common Raven]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A huge crow, black in color. Builds a huge nest of twigs. Often preys on other birds and eggs. Size: 23-24&quot;. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Red-breasted Nuthatch</th>
<th>![Image of Red-breasted Nuthatch]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dirty looking birds because they get pitch from pine trees on them when they rub the pitch on the hole of their nest. It is not known why they do this. Look for the black stripe through the eye. Size: 4.5&quot;. Can be seen all year.</td>
<td></td>
</tr>
<tr>
<td><strong>Red Tailed Hawk</strong></td>
<td>![Red Tailed Hawk Image]</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>A very large bird easily seen in all of North America. Usually darker on top and lighter on the bottom. Nests are a large mass of twigs high in trees. Males and females both sit on the eggs. Size: 19-25&quot;. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ruby-crowned Kinglet</strong></th>
<th>![Ruby-crowned Kinglet Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>These birds have a greenish color on top and the male has red on top of the head, but it is difficult to see. Listen for the high pitched calls of Kinglets. Size: 4.5&quot;. Winter, Fall.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Rufous Hummingbird</strong></th>
<th>![Rufous Hummingbird Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Their throat has ruby red feathers. Often seen at different altitudes in the mountains. They may follow flowering plants as they bloom in the spring. Size: 4&quot;. Spring, Fall.</td>
<td></td>
</tr>
<tr>
<td><strong>Stellar’s Jay</strong></td>
<td>![Stellar’s Jay Image]</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>The Stellar’s Jay looks similar to a Blue Jay with dark blue feathers and a very dark head. They breed in pine trees. They eat acorns and will move to where acorns are ripe in the fall.</td>
<td></td>
</tr>
<tr>
<td><strong>Size:</strong> 10.5-11.5”</td>
<td></td>
</tr>
<tr>
<td>Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Western Bluebird</strong></th>
<th>![Western Bluebird Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>They have blue feathers on top and rusty colored feathers below. They like the burnt areas at Grassy hollow, nesting in holes in the trees. <strong>Size:</strong> 6.5-7.5”</td>
<td></td>
</tr>
<tr>
<td>Best seen in Spring, Summer and Fall.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Western Tanager</strong></th>
<th>![Western Tanager Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Western Tanager is an active bird with a bright orange head and yellow underparts. Often seen in the pines in the summer. <strong>Size:</strong> 7-7.5”</td>
<td></td>
</tr>
<tr>
<td>Spring and Summer.</td>
<td></td>
</tr>
<tr>
<td><strong>Western Wood Pewee</strong></td>
<td>![Western Wood Pewee Image]</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>The Western Wood Pewee is a dull brown color with two wing bars. You can see this bird in the summer at Grassy Hollow. Size: 6”.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>White-breasted Nuthatch</strong></th>
<th>![White-breasted Nuthatch Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>They have a black head and white around the eyes and underparts. These birds stay in their breeding territory throughout the year. Size: 5-6”.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>White-headed Woodpecker</strong></th>
<th>![White-headed Woodpecker Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>An all black bird with a white head. These are quiet birds, making them hard to find. They eat pine cones. Size: 9-10”. Can be seen all year.</td>
<td></td>
</tr>
</tbody>
</table>
The Yellow-rumped Warbler can be identified by the yellow rump and warbling sound. Size: 5-5.5". Winter, Spring, Fall.
<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bigcone Douglas-fir</td>
<td>Native only in Southern California mountains. Height: 40-80 feet.</td>
</tr>
<tr>
<td>California Black Oak</td>
<td>This deciduous oak has large, lobed leaves that fall in autumn. It can grow very tall. Deer like to eat the leaves. Height: 30-80 feet.</td>
</tr>
<tr>
<td>California Sagebrush</td>
<td>These plants have a strong sage odor that repel insects. The leaves can also be made into tea. Green with white hairs on the bottom side.</td>
</tr>
<tr>
<td><strong>Canyon Live Oak</strong></td>
<td>![Canyon Live Oak Image]</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>An evergreen tree with leaves that have golden fuzz on the bottom. They have thick acorn cups. Indians preferred these acorns. Height: 20-100 feet.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cheat Grass</strong></th>
<th>![Cheat Grass Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A non-native grass. Seeds are dispersed by sticking to animals or by the wind. 300 seeds can be produced per plant.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Coulter Pine</strong></th>
<th>![Coulter Pine Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>This pine has the largest and heaviest of all pine cones, weighing 4-5 pounds. Trees have 3 long needles in a bundle. Height: 40-70 feet.</td>
<td></td>
</tr>
<tr>
<td>Deer Bush - also called Mountain Whitethorn.</td>
<td>![Image of Deer Bush]</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Branches have pointy thorns. Deer like to eat the tender shoots on the ends.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deer Vetch</th>
<th>![Image of Deer Vetch]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A member of the pea family which is a favorite food for deer. They have deep yellow flowers from April to August. It is pollinated with the help of insects.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fremont's Bush Mallow</th>
<th>![Image of Fremont's Bush Mallow]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pink flowers resemble hibiscus flowers and the leaves are light green and fuzzy on the top.</td>
<td></td>
</tr>
<tr>
<td>Golden Yarrow</td>
<td>![Golden Yarrow image]</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>This plant looks like a shrub with a woody base. It has lots of yellow flowers that bloom in spring in rounded clusters.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indian Paintbrush</th>
<th>![Indian Paintbrush image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Paintbrush is a common flower in California. They have red flowers that bloom throughout the summer.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incense-cedar</th>
<th>![Incense-cedar image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Incense-cedar has scale-like flat leaves that have a nice smell when crushed. The wood is used for cedar chests and wooden pencils. Height: 60-150 feet.</td>
<td></td>
</tr>
<tr>
<td><strong>Interior Live Oak</strong></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---</td>
</tr>
<tr>
<td>The Interior Live Oak is an evergreen with spiney leaves. They can look like shrubs or can grow to a height of 30-70 feet. The acorns have thin lipped cups.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Jeffrey Pine</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Jeffrey Pine is also called a Western Yellow Pine. It has 3 needles in a bundle and the bark smells like vanilla or butterscotch. Height: 80-130 feet.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Lichen</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>An organism that is a fungus and an alga living together. They have no roots and grow when moist alga absorb light, making sugars used for food. Grows on all sides of tree trunks at Grassy Hollow.</td>
<td></td>
</tr>
<tr>
<td><strong>Lupine</strong></td>
<td>![Image]</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>There are 82 different species of Lupine in California. They have a long stem with several purple pea like flowers at the top which flower in the spring.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mojave Linanthus</strong></th>
<th>![Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A very small plant with small white flowers with yellow centers. They bloom in the spring.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Naked Buckwheat</strong></th>
<th>![Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A grayish plant with flowers on erect leafless stems. The flowers are tiny and light purple to cream and bloom throughout the summer.</td>
<td></td>
</tr>
<tr>
<td><strong>Nightshade</strong></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>Nightshade is a member of the potato and tomato family. This variety at Grassy Hollow has large leaves on a long branch.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Pinyon Pine</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinyon Pines are bushy trees, about 15-35 feet tall with one needle per bundle. The cones have big edible seeds. Pinyon Pines usually grow at lower elevations but there are some on the south facing side of the mountain here at Grassy Hollow. The Serrano Indians harvested the pine seeds for food.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Poodle Dog Bush</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The flowers are lavendar colored and smell bad. It can make you itch if touched. It grows well in burned areas. Called Poodle Dog bush because the dead leaves look like Poodle fur.</td>
</tr>
<tr>
<td>Rubber Rabbit Bush</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>The green flexible branches have a covering of felt-like hairs. A type of latex (rubber) can be made from this plant. It has yellow colored flowers in the fall.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sierra Gooseberry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jam can be made from the spiny berries on this plant that ripen in the summer. There are also spines on the stems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sugar Pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>The giant cones which hang from the tips of the branches can reach 21 inches long. Sugar from the resin has laxative properties and the wood is made into lumber.</td>
</tr>
<tr>
<td><strong>Sulfur Flower</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>A member of the buckwheat family. Cream colored or yellow flowers that look like balls at the end of long stalks. Blooms in June to August.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Western Wallflower</strong></th>
<th>![Western Wallflower Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A member of the mustard family. A tall stem with yellow flowers. Flowers in March to July.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>White-fir</strong></th>
<th>![White-fir Image]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cones are erect on the branches. The cones are not found on the ground; they disintegrate on the tree to disperse the seeds. Height: 70-160 feet.</td>
<td></td>
</tr>
<tr>
<td>Table Row</td>
<td>Text</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Witch’s Hair or Dodder</strong></td>
<td>This orange colored plant looks hairy and grows over other plants in spring. It is a parasite, attached to a host plant which provides the Dodder with its food.</td>
</tr>
<tr>
<td><strong>Wright’s Buckwheat</strong></td>
<td>This is a low growing plant with little pink flowers late in the summer.</td>
</tr>
<tr>
<td><strong>Yerba Santa</strong></td>
<td>The leaves look oily and can be used for congestion. Indians would chew it to freshen their breath - it tastes like mint.</td>
</tr>
</tbody>
</table>
REFERENCES


