Pre and post field trip activities for the Big Morongo Canyon Preserve: An oasis in the desert

Kira Elizabeth Richert

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PRE AND POST FIELD TRIP ACTIVITIES FOR THE BIG MORONGO CANYON PRESERVE: AN OASIS IN THE DESERT

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
Kira Elizabeth Richert
June 2002
PRE AND POST FIELD TRIP ACTIVITIES FOR THE BIG MORONGO CANYON PRESERVE: AN OASIS IN THE DESERT

A Project
Presented to the
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California State University,
San Bernardino

by
Kira Elizabeth Richert
June 2002

Approved by:

Darleen K. Stoner, Ph.D., First Reader

Michelle Maresh, M.A., Morongo Unified School District, Second Reader

June 9, 2002
ABSTRACT

This teaching unit consists of pre and post field trip activities for the Big Morongo Canyon Preserve in Morongo Valley, California. The lessons provide background information to teachers and provide classroom activities on the desert and wetland environments. The lessons can be easily adapted for kindergarten through sixth grades.
ACKNOWLEDGMENTS

I would like to thank Dr. Stoner for introducing me to environmental education and for the helpful suggestions throughout this writing process. I would also like to thank my family for their unending support and encouragement along the way.
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CHAPTER ONE
INTRODUCTION

Located in the San Bernardino and Riverside counties in California, the Big Morongo Canyon Preserve is a wildlife refuge. The 29,000 acres of the Preserve begin one-half mile southeast of the town of Morongo Valley and continue into Big Morongo Canyon.

The Preserve's desert climate consists of hot, dry summers and moderate winters. Morongo Creek originates in the mountains northwest of Morongo Valley and flows sporadically across the Morongo Basin, seeping into its sandy soil. As it enters Big Morongo Canyon, the creek comes to alternating sandy and cemented rock. These harder layers pull the water to the surface, creating longstanding streams and a wetland in the desert.

Despite the desert climate, a high water table in the canyon has made the growth possible of tall trees such as cottonwoods, willows, and mesquite. Among the brown sand and cacti, lush vegetation sets the canyon apart from its surroundings.

The Preserve is located in an area where two climatic environments combine. From the east, desert conditions come in to mix with coastal conditions from the west. In this area, desert scrub vegetation and coastal sage scrub meet which enables animals and
plants from both habitats to live together. Big Morongo Canyon lies at the transition between the low, hot Colorado Desert to the south and the higher, cooler Mojave Desert to the north. Again, this allows plants and animals from each region to coexist.

As a wildlife refuge, the Big Morongo Canyon Preserve offers food, shelter, and water to many types of animals including bighorn sheep, raccoons, coyotes, and rodents such as kangaroo rats. Many reptile species can also be found here, including rosy boas, gopher snakes, red diamond rattlesnakes, California king snakes, common whiptail lizards, coast horned lizards, chuckwallas, and California tree frogs. In addition to this, it is one of the few remaining desert wetlands on the Pacific Migration Flyway, the bird migratory path between the tropics and the arctic.

In the past the BMCP has been recognized for its many specialized ecological features and is now managed by The Bureau of Land Management (BLM) and the Nature Conservancy. The BLM designated Big Morongo Canyon Preserve as an Area of Critical Environmental Concern. This means that the BLM works with the Nature Conservancy to protect the rare and endangered wildlife, strengthen the riparian areas, promote the growth of a large variety of plants, provide scientific research, and offer educational opportunities.
As an educational center, the Preserve offers a variety of docent-led tours for the public. Self-guided tours are also an option. The primary topics that the Preserve's programs focus on are the importance of protecting wetlands, the variety of habitats for flora and fauna, the Native American uses of local plants, the adaptations of plants and animals to climactic challenges, and local desert ecology. Other topics are addressed upon request.

Many schools in the area take advantage of the docent-led and self-guided tours that the Preserve offers. The presentations of the topics are geared to the grade level of the attending classes, and primarily consist of nature walks. These nature walks encourage hands-on learning, which enhances the students' observational skills. For example, students have the opportunity to sample edible plants used by the Native Americans, examine animal tracks, listen to the noises that surround them, and spend time becoming acquainted with their outdoor neighborhood.

In order to integrate the activities at the Big Morongo Canyon Preserve with in-class learning before and after a field trip, surveys were conducted at six of the schools located within 40 miles of the Preserve. In the survey, teachers were asked to rate the tours
and activities that the Preserve offers in order of importance for their use.

Lessons and activities have been designed for kindergarten through sixth grade teachers to implement in their classrooms before and after a field trip to BMCP. The lessons target areas of interest found from the survey conducted. The lessons were correlated to the appropriate California Science Content Standards (State Board of Education, 2000, pp. 1-21). (See Appendix D.)
CHAPTER TWO

LITERATURE REVIEW

This review of the literature supports and defines the need for environmental education. The goals of environmental education, barriers to integrating environmental education, and the importance of infusing environmental education into the curriculum are addressed. Finally, the use of constructivist teaching as a tool is reviewed.

The classic definition of environmental education, developed by William Stapp et al. (as quoted in Disinger, 1993, p. 35) is: "Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical and its associated problems, aware of how to help solve those problems, and motivated to work toward a solution."

Concern for the future of the environment led to environmental education programs as early as the 1960s. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) held a conference in 1975 in order to develop a clear focus and guideline for environmental education. From this conference, the following goals for environmental education were created: "(1) to foster clear awareness of, and concern about, economic, social, political, and ecological
interdependence in urban and rural areas; (2) to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; and (3) to create new patterns of behavior of individuals, groups, and society as a whole towards the environment" (Disinger, 1993, p. 35).

In order to further develop the field of environmental education, another UNESCO conference was held two years later. During this conference, it was stated that environmental education should: (1) look at the environment in its totality; (2) be a continuous lifelong process; (3) be interdisciplinary in approach; (4) explore environmental issues from all angles; (5) focus on current and potential environmental situations; (6) promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems; (7) consider environmental aspects in plans for development and growth; (8) enable learners to have a role in planning their learning experiences; (9) relate environmental sensitivity, knowledge, problem-solving skills, and values clarification; (10) help learners discover the symptoms and real causes of environmental problems; (11) emphasize the complexity of environmental problems; and (12) utilize diverse
learning environments and a broad array of educational approaches to teaching/learning about, and from, the environment (Disinger, 1993, p. 35).

General principles and objectives for environmental education were developed at an international conference in Tbilisi, USSR, in 1977. These objectives were designed to focus the environmental curriculum on awareness, knowledge, attitudes, skills, and participation in relation to the environment (Cobb, 1998, p. 6).

The goal of environmental education as defined by Klein and Merritt (1994, p. 15), is to help children develop sensitivity toward their environment, knowledge about the environment, and a commitment to taking action in defense of the environment. Students must learn to make informed decisions, develop action skills and attitudes, and exhibit responsible behavior towards the environment and its current and future environmental problems and issues.

It is important to be aware of environmental problems, but it is essential to have the knowledge and motivation required to take action. The primary goal of environmental education is to promote responsible individual and societal environmental behavior (Disinger, 1993, p. 35). Thus as Chuck Roth, an environmental educator from Massachusetts, so well
stated (in D. Stoner, 1995, p. 1), "Everything we do has an impact on the world around us. Environmental education helps students understand the consequences of their actions, and gives them the tools they need to minimize their negative impacts while creating positive change."

Environmental education is often looked at as a separate subject area and is overlooked by many educators. In a study by Ham and Sewing (1988, p. 17), barriers that inhibit teachers from implementing environmental education programs into their existing curriculum were studied. Ham and Sewing categorized these barriers into four groups: (1) conceptual barriers; (2) logistical barriers; (3) educational barriers; and (4) attitudinal barriers.

Conceptual barriers deal with the misconceptions of environmental education. One of these misconceptions is that environmental education is only relevant to the science curriculum. Another misconception is that environmental education is often thought of as only outdoor education and a separate area of study (Ham & Sewing, 1988, p. 17).

Logistical barriers are defined as a lack of time, lack of funding, lack of resources, class size, etc. Educators are concerned that they do not have the time to develop comprehensible, usable, objective and goal
oriented environmental education curriculum along with all that encompasses their role. Time also affects the ability of educators to prepare effective materials and lesson plans (Ham & Sewing, 1988, p. 17).

Ham and Sewing (1988, p. 18) found that educational barriers affected the use of environmental programs. Educators did not feel competent in this area, had poor background on the subject, and often times just were not interested. Likewise, Mirka (1973) found that the primary reason teachers did not conduct outdoor activities was their lack of knowledge about how to develop and approach these activities.

Ham and Sewing (1988, p. 18) also found that the attitudes of the teachers greatly affected the success of an environmental program. If teachers did not have a positive attitude towards environmental education, very little instruction in this area would occur.

It was suggested that efforts should be made to integrate environmental education into other curriculum areas besides science (Ham & Sewing, 1988, p. 23). This concept would alleviate the misconception that environmental education is a separate entity from other curricular areas. As so well-stated by another educator, (Cobb, 1998, p. 6), "Environmental education should be infused at all levels of education, not replacing existing curriculum but rather augmenting it.
with environmental examples and experiences that can be used to validate the existing courses of study."

Infusing environmental education into all areas of curriculum not only promotes and expands language arts, math, art, health, physical education, and social studies, but it enhances the area of science as well. The 1989 report, Science for All Americans, by the American Association for Advancement of Science "pointed out the American science education typically emphasizes the learning of answers rather than exploring questions, memorization rather than critical thought, and fragmented learning as opposed to understanding in context" (in Cobb, 1998, p. 6).

Environmental education focuses on real-world issues and problems and is a framework for all areas of learning. Students will gain general and disciplinary knowledge, use critical thinking and problem solving skills, learn basic life skills (cooperation and interpersonal communications), and develop an understanding and appreciation for their surroundings when they are exposed to environmental education (Lieberman & Hoody, 1998, p. 7). Because environmental education encompasses all learning areas, "adding environmental education doesn't add another layer to the curriculum; it becomes the common fabric that holds
the curriculum together" (stated by Donnan Stoicovy in Rasmussen, 2000, p. 6).

Environmental education is supported by the constructivist theory that "ideas are constructed or made meaningful when children integrate them into their existing structures of knowledge" (Clements & Battista, 1990, p. 34). Thus, when children encounter new information, they access prior beliefs, knowledge, and experiences to expand their knowledge base and construct new meanings and understandings (Riordan-Karlsson, 2000).

When new ideas are created using pre-existing experiences and knowledge, students are challenged to actively think about the new information. This new information means more to the student because "knowledge is actively constructed by the cognizing subject, not passively received from the environment" (Lerman, 1989, p. 211). The theory of constructivism is committed to the position that knowledge is not transmitted directly from one knower to another, but is actively built by the learner (Riordan-Karlsson, 2000, p. 2). Students connect with the information more easily when they can personally make it meaningful.

According to Klein and Merritt (1994), the constructivist theory suggests that thought and knowledge develop out of physical and social
experiences and interpretations. Students learn best by constructing their own knowledge from their personal experiences.

A successful constructivist lesson consists of four main components (Klein & Merritt, 1994). A lesson would begin with an introduction by the teacher of a real-life problem to investigate and solve. During this process, students ask questions and try to solve the problem. Students use their prior knowledge and skills to make sense of the question.

The second component of a successful constructivist lesson, according to Klein and Merritt (1994), is to support the introduction of a problem with student-centered instruction facilitated by the teacher. The teacher takes this opportunity to make resources available, provide support, assess prior knowledge, and encourage new learning. Students will be engaged in individual or group experimentation, investigation, observation, and discussion with the teacher as the guide.

During this learning process, students need to practice new skills and interact with their peers. The third component of a constructivist lesson is the importance of productive group interaction during the learning process (Klein & Merritt, 1994, p. 15). Working with groups enables students to share ideas and
hear other perspectives. Students also improve their ability to communicate and cooperate with others to accomplish tasks and reach goals (Lane & Rossow, 1993, p. 227).

The final component of a successful constructivist lesson is authentic assessment and demonstration of student progress. Authentic assessments should be created to measure the learning that occurred during the lesson. Lauterback and Ochs (1991-1992, pp. 9-10, 22) stated that authentic assessments should determine whether students can use concepts, knowledge, and skills they have learned to complete a task or create a project. These tasks should stimulate real-world challenges, allow students the opportunity to develop alternative solutions, provide group experiences, and should include skills focused on attitudes and values. Authentic assessment can also allow students to actively participate in the evaluation process by developing an assessment portfolio. Klein and Merritt (1994, p. 16) stated that, "Authentic assessment, in a constructivist's learning environment, pairs the student and teacher as a team that examines the new knowledge and habits of mind."

Constructivist teaching is a model in which environmental education can easily be infused into any curricular area by making learning active, enjoyable,
and real. Developing an arena for students to investigate, observe, take action, and fall back on their prior knowledge, attitudes, and values is what is necessary in any educational atmosphere (Volk, 1993, pp. 60-63). She stated that goals for environmental education are hierarchical in nature and they should be incorporated into the curriculum in stages. In kindergarten through third grade, the emphasis should be on environmental sensitivity and ecological foundations. In the upper grades, fourth through sixth grade, the emphasis should be on issues and values, while continuing to revisit the sensitivity element. As the students move through junior high and high school, the environmental emphasis moves into investigations, evaluations, and action skills. In order for students to be environmentally literate, education must start at an early age.

Four areas to be addressed or changed for environmentally responsible behavior to develop are knowledge, attitude, sense of responsibility, and locus of control (Newhouse, 1990, p. 31). Newhouse stated that knowledge is the basic requirement one must possess in order to understand what he/she is able to do to protect the environment. This knowledge influences attitude, which is defined by Newhouse as a continuous positive or negative belief or feeling about
people, objects, or issues. It also affects behavior. In order to encourage a change in attitude, direct experience is necessary. Newhouse concluded that: "The job of the educator is to ensure that everyone has all the tools necessary to make responsible environmental decisions" (1990, p. 31). Real-life experiences, modeling, direct contact, and knowledge are the tools needed in order to give students the chance to make educated, moral decisions about their environment.

Newhouse (1990) explained that an individual's locus of control is the ability to cause change in one's environment through one's behavior. People that believe that change occurs by chance, or by means out of their control, have an external locus of control. Others believe that their actions are likely to cause change, thus having an internal locus of control. Those who have an internal locus of control have been reported more likely to participate in environmental action projects because they have confidence in their ability to make a difference in their community, neighborhood, and world.

Fostering and nurturing an individual's internal locus of control by allowing them to make their own decisions, share their feelings, and discuss their differences of opinions can be done at home and at school. These strategies are also common techniques
used when teaching environmental education in a constructivist approach to learning (Newhouse, 1990, p. 31).

According to Disinger (1993, p. 35), the purpose of environmental education "is the promotion of responsible individual and societal environmental behavior." People need encouragement and guidance through the awakening process of becoming more aware, knowledgeable, and motivated to support and make positive environmental changes and decisions. "A concern for the land and its resources is basic to our survival, both as individuals and as a nation, for we cannot live apart from our planetary home. Environmental quality and human health and well-being are interdependent" (Project WILD, 1992, viii).
CHAPTER THREE
DESIGN OF PROJECT

In order to develop this project, I visited the Big Morongo Canyon Preserve, spoke with docents and the Preserve manager, participated in nature walks, and conducted a survey at six of the schools in the area that would most likely take their students on a field trip to the Preserve.

The purpose of the survey was to re-introduce the Preserve to the teachers in the area. The survey asked teachers if they have ever taken their students on a field trip to the Preserve and whether or not they would be interested in doing so. The survey listed the tours and activities offered by the Preserve. The teachers were to rank the activities in order of what they felt as important using a scale from one to five, with five being the most important area of interest. There was also space provided for teachers to write down additional topics of interest that they would like the Preserve to incorporate into their program. (See Appendix E.)

This unit was developed for kindergarten through sixth grades. It is divided into two sections, pre-field trip activities and post-field trip activities.
Each section focuses around a field trip to the Big Morongo Canyon Preserve.

The first portion provides background information and activities to be completed, in order, before the trip to the Preserve. Students will be introduced to components of deserts, wetlands, and how the two environments come together at the Preserve. These lessons follow the constructivist approach to teaching by drawing on prior knowledge, expanding knowledge base, working individually and with peers, and encouraging further investigation. The lessons are correlated to the appropriate California State Content Standards (State Board of Education, 2000, pp. 1-21). (See Appendix B.)

The second portion of this unit consists of activities that enable the students to reflect upon what they have learned on their trip to the Big Morongo Canyon Preserve.
CHAPTER FOUR

RESULTS

In the survey, teachers were asked if they had ever been to the Big Morongo Canyon Preserve. Out of seventy-five educators, just thirty-one had taken their students on a field trip to the Preserve. Teachers were also asked if they would like to take their students to the Preserve on a field trip, and seventy-five out of seventy-five teachers said they would.

From the survey conducted at the six school sites, a common interest base was found among seventy-five kindergarten through sixth grade educators.

Teachers were asked to rate the following tours provided by the Big Morongo Canyon Preserve in order of importance based on what they were interested in:

- Importance of protecting the wetlands
- Homes for flora and fauna
- Native American uses of plants in the preserve
- Adaptations of plants and animals to climatic changes
- Desert ecology

From this, the kindergarten through third grade responses were averaged, as were the fourth through sixth grade responses. This enabled lessons to be
developed that targeted the highest rated tours for the primary (K-3) and intermediate (4-6) grades.

The research showed that, in grades K-3, teachers were most interested in learning and teaching lessons about protecting the wetlands, plant and animal adaptations, and desert ecology. Coincidentally, the 4-6 grade teachers were most interested in the same three areas. (See Appendix D.)

To meet the needs of these areas of interest, pre and post field trip lessons and activities were designed that focused on familiarizing students with wetlands, deserts, and plant and animal adaptations.
APPENDIX A:
INTRODUCTION TO THE BIG MORONGO CANYON PRESERVE, PRE-TRIP ACTIVITIES, AND BIBLIOGRAPHY
In this learning unit, lessons and activities have been designed to introduce the Big Morongo Canyon Preserve to students. They will learn about the components of desert and wetland environments, use their observational skills to learn about plant and animal adaptations, examine a map of the Preserve to familiarize themselves with the location of their field trip, and complete activities to enhance their knowledge base.

The lessons are supported by the constructivist theory that ideas are constructed or made meaningful when children integrate them into their existing structure of knowledge (Clements & Battista, 1990, p. 34). In each lesson, the students are encouraged to access their prior knowledge, learn new information, and reflect upon their learning.

Teachers will need to collect a variety of books for research activities within the lessons. In order to engage the students, fiction and non-fiction materials should be made available. A list of helpful books is provided in the bibliography.

The following information is provided as an introduction to the Preserve:

Located in the San Bernardino and Riverside counties in California, the Big Morongo Canyon Preserve is a wildlife refuge. The 29,000 acres of the Preserve
begin one-half mile southeast of the town of Morongo Valley and continue into Big Morongo Canyon.

The Preserve's desert climate consists of dry, hot summers and moderate winters. Morongo Creek originates from the mountains northwest of Morongo Valley, and flows sporadically across the Morongo Basin, seeping into its sandy soil. As it enters big Morongo Canyon, the creek comes to alternating sandy and cemented rock. These harder layers pull the water to the surface, creating longstanding streams and a wetland in the desert.

Despite the desert climate, a high water table in the canyon has made the growth of tall trees possible. Among the brown sand and cacti, the lush vegetation of the canyon sets the canyon apart from its surroundings.

The Preserve is located in an area where two climatic environments combine. From the east, desert conditions come in to mix with coastal conditions from the west. In this area, desert scrub vegetation and coastal sage scrub meet which enables animals and plants from both habitats to live together. Big Morongo Canyon lies at the transition between the low, hot Colorado Desert to the south and the higher, cooler Mojave Desert to the north. Again, this allows plants and animals from each region to coexist.
As a wildlife refuge, the Big Morongo Canyon Preserve offers food, shelter, and water to many types of animals, including bighorn sheep, raccoons, coyotes, and rodents such as kangaroo rats. Many reptile species can also be found here, including rosy boas, gopher snakes, red diamond rattlesnakes, California king snakes, common whiptail lizards, coast horned lizards, chuckwallas, and California tree frogs. In addition to this, it is one of the few remaining desert wetlands on the Pacific Migration Flyway, the bird migratory path between the tropics and the arctic.

Plants:

The plants in the Preserve are much different from the surrounding desert vegetation. Due to a high water table in the canyon, tall trees are able to thrive in the hot desert temperatures. The Preserve is full of lush vegetation. The surrounding area consists of low creosote shrub in the lower elevations and pinon-juniper woodlands in the higher elevations.

Examples of plants found along Preserve Trails:
- alkali goldenbush
- mesquite
- desert catalpas
- evergreen yerba santa
- wild tarragon
- cottonwood
- creosote bush
- Mojave yucca
- squaw tree
- cacti
- moss
- grassy fields
- red willows
- cattails
- bulrushes
- wirerushes
- watercress
- vines
- scrub oaks
- white alder
- dwarf willow
- goldenrods, water parsnip
- watercress

Wildlife
This unique desert/oasis environment is home to many different types of animals.

Examples of animals found at the Preserve:

Birds: Summer Tanager, Lucy's Warbler, Vermilion Flycatcher, Brown-crested Flycatcher, and many more!

Mammals: bighorn sheep, mule deer, mountain lion, gray fox, kit fox, raccoon, bobcat, coyote, kangaroo rat and other rodents

Reptiles: gopher snakes, California king snakes, common whiptail lizards, chuckwallas, horned lizards, Pacific tree frogs

Insects: butterflies, spiders, dragonflies, water striders

To inquire about the Big Morongo Canyon Preserve and to make field trip reservations call (760) 363-7190.
Pre-Activity

Lesson 1

What is a Desert?

Objective: Students will access prior knowledge of deserts, be introduced to characteristics of desert environments, and link the information to their field trip to the Big Morongo Canyon Preserve.

Materials: Desert read aloud and research books
Chart paper
Paper
Pencil
KWL chart prepared before lesson

Desert Facts

- Deserts are dry environments that receive less than 10 inches of rain, precipitation, per year.
- Deserts are dry, arid, because of surrounding mountains. Tall mountain ranges keep rain clouds from passing to the other side. The rain falls on one side of the mountain range, while the other side stays dry. This is called the rainshadow effect.
• The temperature in the desert can range from freezing to over 100 degrees Fahrenheit.
• Not all deserts are hot. When wind blows over cold water, it becomes and stays cold. When the cold wind reaches land, it makes the land cold and dry.
• Most deserts are found between the Tropic of Cancer and The Tropic of Capricorn. The deserts of North America, North Africa, and Asia are found along the Tropic of Cancer. Deserts of South America, Australia, and South Africa are along the Tropic of Capricorn.
• North America has four deserts: The Great Basin, Mojave, Sonoran, and Chihuahuan Deserts.
• Water is scarce and limited in desert locations
• Some deserts have streams and rivers that run through them, but they usually dry up.
• There is water that is actually trapped in the layers of rock underneath the earth's surface. Water collects in rocks that have tiny holes and cracks (like a sponge). These rocks are called aquifers. When it rains some of the water sinks into the aquifers and is stored there. At times, the water seeps back up to the earth's surface.
creating an oasis in the desert. The land near an oasis is green and full of plant and animal life.

• The desert has a variety of plant and animal life that adapt to the harsh living conditions.

• Examples of some of the plants and animals found in the local desert:

<table>
<thead>
<tr>
<th>Animals</th>
<th>Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>scorpion</td>
<td>Joshua tree</td>
</tr>
<tr>
<td>tarantula</td>
<td>juniper</td>
</tr>
<tr>
<td>variety of snakes</td>
<td>wild flowers</td>
</tr>
<tr>
<td>bighorn sheep</td>
<td>creosote bush</td>
</tr>
<tr>
<td>coyote</td>
<td>yerba mansa</td>
</tr>
<tr>
<td>white-tailed deer</td>
<td>mesquite</td>
</tr>
<tr>
<td>quail</td>
<td>yucca plant</td>
</tr>
<tr>
<td>eagle</td>
<td>cholla cactus</td>
</tr>
<tr>
<td>roadrunner</td>
<td>evergreen tree</td>
</tr>
<tr>
<td>lizard</td>
<td></td>
</tr>
<tr>
<td>bat</td>
<td></td>
</tr>
<tr>
<td>jackrabbit/cotton tail rabbit</td>
<td></td>
</tr>
<tr>
<td>kangaroo rat</td>
<td></td>
</tr>
<tr>
<td>prairie dog</td>
<td></td>
</tr>
</tbody>
</table>
Primary Activity (K-3):

1. Write on the board: What is a desert?
2. Create a KWL chart: what they know, what they want to know, and what they learned. See KWL chart.
3. Ask students what they know about the desert and chart answers.
4. Ask students what they want to know about deserts and chart questions.
5. Read several books aloud to the students, or share the background information.
6. Ask students what they learned and chart their answers.
7. Have students write a sentence about the most interesting fact they learned about the desert and illustrate it.
8. Put all the pictures and sentences into a class book for the library.

Intermediate Activity (4-6):

1. Write on the board: What is a desert?
2. Create a KWL chart: what they know, what they want to know and what they learned. See KWL chart. Ask students what they know about the desert and chart their answers.
4. Ask students what they want to know about the desert. Encourage them to come up with as many questions as possible. Chart their questions.

5. Separate students into groups of four or five. Have groups choose three questions, or assign groups specific questions from the class list.

6. Have groups research the question using research materials on deserts. Once they answer their questions they are to look for interesting facts about the desert. Encourage them to find facts they think no other group will find.

7. Bring the class back together to complete the KWL chart. Have each group report on their findings. As the information is reported, record on the chart. Each student can also take notes on their own chart as the class chart is being filled out.

8. Have students choose five facts they find the most interesting, or five new facts that they learned. With these facts they will create a travel brochure, or an advertisement, inviting people to visit the desert.
**KWL Chart**

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you know?</td>
<td>What do you want to know?</td>
<td>What did you learn?</td>
</tr>
</tbody>
</table>

What did you learn after the field trip?
Pre-Activity

Lesson 2

What is a Wetland?

Objective: Students will access prior knowledge of wetlands, be introduced to characteristics of wetland environments, and link the information to their field trip to the Big Morongo Canyon Preserve.

Materials: Wetland read aloud and research books

- KWL chart prepared before lesson
- paper
- pencils
- crayons/colored pencils

Wetland Facts

- A wetland is any area of land that is underwater for a part of a year. Water is at or near the surface of the ground.
- Water found in a wetland location can be from rain, melted snow, or underground water.
- Marshes are covered with water all of the time. The soil is wet and trees have a difficult time growing. The bottom of a marsh is muddy which allows plants such as cattails, reeds, lilies, and
grasses to take root. The Preserve is a marsh caused from underground water rising to the surface of the earth.

- Wetlands absorb water like a sponge.
- Water slowly drains out of a wetland, which prevents flooding.
- As water flows through a wetland, plants and bacteria remove dangerous chemicals from the water. The soil removes tiny pieces of broken rock from the water. The water that leaves a wetland is much cleaner than when it flowed in. This process filters out impurities in the water.
- Examples of some of the plants and animals found in a wetland:

<table>
<thead>
<tr>
<th>Animals</th>
<th>Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>variety of birds</td>
<td>trees</td>
</tr>
<tr>
<td>mosquitoes</td>
<td>bulrushes</td>
</tr>
<tr>
<td>water spiders</td>
<td>cattails/reeds</td>
</tr>
<tr>
<td>fish</td>
<td>water lilies</td>
</tr>
<tr>
<td>toads/tadpoles</td>
<td>grasses/vines</td>
</tr>
</tbody>
</table>

**Primary Activity (K-3):**

1. Write on the board: What is a wetland? Ask students what they think a wetland is. Encourage them to give you details about what a wetland environment would be like.

2. Ask students what they know about wetlands. Chart
their answers on the KWL chart: what they know, what they want to know, what they learned.

3. Ask students what they want to know about the wetland environment. Chart their questions.

4. Read the poem, "Waterland Mystery." Share read aloud and research books on wetlands; books can be read aloud, in groups, or silently.

5. After discussing what a wetland is, ask the students what they have learned about wetlands. Chart their answers on the KWL chart.

6. Have students make a list of questions they have about the Preserve. These questions can be taken on the field trip and be used as you finish the KWL chart after the trip.

7. As a culminating activity, have students act out any form of life found in the wetlands. Example: a water strider, or spider, gliding over the surface of the water. Students can be plants, animals, or the water. Play soft music with sounds of running water and allow students to move gracefully and silently through their wetland.

8. Another culminating activity: Have students memorize and act out the "Waterland Mystery" poem in front of another class.

Intermediate Activity (4-6):
1. Write on the board: What is a wetland? Have groups of four to five students work together to make a list of answers to this question.

2. Have one student from each group report out three of the ideas they came up with. Chart their responses on the KWL chart. See KWL chart.

3. With the same groups, ask the students what they want to know about the wetlands. Encourage them to come up with at least one question per group member.

4. Have group members come up to the KWL chart to write down their questions. Groups must pay close attention because no question can be repeated. If another group writes down a question they had, they must try to come up with a new question.

5. Put the students into groups of two or three. Divide the questions up evenly, or allow partners to choose a certain number of questions.

6. Allow students time to find the answers to the questions they have chosen. Make sure you have research materials available.

7. Once all the groups have answered their questions, they are to report the information out to the class. The teacher, or the group, can chart the answers on the KWL chart. A good way to keep class
focused is to have each student create their own KWL chart and fill it in as you go along.

8. Have students make a list of questions they have about the Preserve. These questions can be taken to the Preserve and used to complete the KWL chart after the trip.

9. Students are to compare and contrast the desert and wetland environments.

9. They will create Compare/Contrast charts to record the similarities and differences among the two environments. See Compare/Contrast chart.

10. Have them write a letter to the president (teacher, principal, parents, etc.) describing the similarities and differences of deserts and wetlands.

11. Culminating activities: (a) Create a diorama with one side depicting a desert scene and the other a wetland scene. (b) Have students memorize and act out the poem, "Waterland Mystery."
<table>
<thead>
<tr>
<th>K</th>
<th>What do you know?</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>What do you want to know?</td>
</tr>
<tr>
<td>L</td>
<td>What did you learn?</td>
</tr>
<tr>
<td>L</td>
<td>What did you learn after the field trip?</td>
</tr>
</tbody>
</table>
Compare/Contrast Chart

Desert

SIMILARITIES

Wetlands
Waterland Mystery
By Kira Richert

Water, plants, animals, and trees
You are familiar with all of these.
Sand, soil, mud, and muck,
To find these together, you are in luck.

The ground may be squishy under you feet,
You'll be surprised at what you will meet.
Like a sponge, the land soaks the water in,
Water logged at times, bursting with life from within.

Created from rivers, ponds, and lakes,
But also from rain, a wetland makes.
From deep underground, water can rise,
To create this wonderful wetland surprise.

So many animals adapting to survive,
Living in this water world in order to thrive
From snakes to birds and bugs to frogs,
Life is abundant in these marshes and bogs.

Tall trees along edges, short shrubs all around,
Plants growing on top and deep in the ground.
Moss spread on the surface, reeds shooting through,
Grasses swaying softly, lilies floating, too.

A place where land and water combine,
Explore the miracles of what you will find.
When you come across a place such as this,
Open your eyes wide, make sure you don't miss!
Pre-Activity Lesson 3
How Do Animals Survive?

Objective: Students will become familiar with the importance of animal adaptations in deserts and wetlands located in deserts.

Materials: resource books on deserts, wetlands, and animal adaptations pictures of desert and wetland animals

Background Information: Adaptation

The adaptations of animals allow them to live in particular environments. Some adaptations are physical and some are behavioral.

Desert Animals

• Desert temperatures and the lack of water become a survival dilemma for animals. Because animals receive heat directly by sun radiation, indirectly from the rocks and soil through conduction, and through convection from the air, animals are adapted to their environment.
• Animals in the desert adapt to the heat in many ways. For example, certain species of birds breed during the cooler spring season and leave the desert during the hotter summer months. Some birds breed late in the winter and leave the desert in the spring. Other birds are active at dawn and dusk, and stay in the shady areas during the day. Some birds are active throughout the entire day, but perch in the shade.

• Desert animals obtain most of the water they need through the food they eat. Birds conserve water efficiently because their waste is very dry. In order to cool their bodies down, birds pant, flutter the area around chin and throat, or hold out their wings to expose thinly feathered areas of their bodies. Owls and nighthawks flutter their throat areas while keeping their beaks open to allow water to evaporate.

• Dissipating the heat varies from animal to animal. Jackrabbits have enormous ears with many blood vessels which release heat when they rest in shady, cool locations. Desert animals are also paler than their relatives, which keeps them from taking in too much heat. Heat intensifies with
fat. Some desert animals store their fat in humps or tails rather than throughout their bodies.

- Retaining water is key to survival in the desert. All desert toads retain water by burrowing into moist soil during the day. Most animals get the water they need through the food they eat, but still need access to water.

- Many desert mammals and reptiles are completely nocturnal, only active during the cooler evening temperatures. They leave resting and sleeping to the warm daylight hours.

- In order to avoid the heat, smaller desert animals burrow below the surface of the sand to escape the heat. Some rodents go as far as plugging up the entrances to their burrows to keep the heat out.

- Some desert lizards remain active during the hottest times of the year. These lizards move very fast over hot surfaces and stop in cooler, shaded spots. Their legs are often longer so they absorb less heat from the hot surface as they run.

Wetland Animals

- Birds: Herons and egrets have long slender legs that enable them to wade in swamps and marshes. They use their beaks to spear their food. Many
birds migrate to southern wetlands throughout the year.

- **Amphibians:** Frogs, salamanders, turtles, and snakes lay their eggs in water or on the wet ground. They depend on the wetlands for food. Many amphibians live in the cool damp areas beneath the rocks, logs and leaves. Salamanders have bright coloring which warns enemies away.

- **Mammals:** Fish, insects, toads, and snakes live in wetland environments. They burrow in the muddy banks to build homes.

- **Tiny animals** that live in the water do not need special organs in order to breathe. They are so small that the little amount of oxygen they need can be absorbed through their skin.
Activity: Animal Adaptations

1. Ask students how they adapt to weather changes. What do they do in the summer time? In the winter time? Why do they do these particular things? As the students respond, write their ideas on the board or on chart paper.

2. Share animal adaptation information with students. This can be done through read aloud stories, lecture/note taking, and research skill activities.

3. Show students pictures of desert and wetland animals.

Primary (K-3)

1. Using picture cards, or pictures found in books and magazines, discuss with students how they think the different animals adapt to their surroundings.

2. Have students share with the class how they think particular animals adapt. When they are explaining, encourage them to explain the reasons why they think this particular way.

3. Have the students choose their favorite animal. Have them draw a picture of the animal in its natural environment.
Intermediate (4-6):

1. In groups of five or six, give students a picture of a desert or wetland animal.

2. Have students brainstorm with their group all the ways in which this animal may adapt to its environment. Have each group report out their ideas.

3. Allow each student time to look through the different pictures and have them pick an animal they would be interested in learning more about.

4. Each student will be responsible for researching an animal of their choice. Provide research materials and give each student a copy of the "Animal Adaptation" information sheet.

5. Extra culminating activity: Have students choose an animal from an extremely cold environment (penguin, polar bear, etc.). Have them design the animal with adaptations that would enable them to survive in a desert or wetland. They can even rename the animal.
Animal Adaptations

1. Name of animal:________________________________________

2. Physical description of animal: ____________________________

3. Natural habitat/environment: _____________________________

4. Special adaptations of the animal and how they enable the animal to survive: ____________________________

5. What would happen if the animal did not have these particular adaptations? What would the animal need to do? _____________________________________________

__________________________

__________________________
Pre-Activity

Lesson 4

Plant Adaptations

Objective: Students will become familiar with how plants adapt to their environment.

Materials: books on plants (desert/wetlands)

Desert Plant Facts

• In the harsh, dry environment of the desert, plants must be adapted in order to survive.

• The two main adaptations that desert plants have are their ability to collect and store water and specific features that reduce water loss.

• The desert is full of short grasses, sagebrush, creosote bushes, and cacti.

• Some desert plants have long taproots that go deep into the ground and tap into underground water sources. Other desert plants have wide horizontal root systems that are just below the surface and extend beyond the canopy of the plant. These roots collect water for the plant when it rains.

• Another unique desert plant adaptation is found on plants with leaves that grow upward. These leaves collect water when it rains. The water funnels
down along the center of the plant. The water travels to the ground near the trunk where the roots are.

- Desert plants can store water in their roots, stems, leaves, or fruit. These plants that store water are called succulents.

- Many desert plants store water to use during the hot times of the year. For example, cacti have enlarged succulent stems that store large quantities of water for use in the future. There are also desert lily plants that store water in underground bulbs.

- Small desert plants wait out the dry seasons as seeds under the surface of the ground. When it rains, they come to life.

Wetland Plant Facts

- Plants in wetland environments adapt to their living conditions.

- Some plants are rooted into the ground, but grow above the water.

- Water lilies have roots in the ground and pads that float on top of the water.
• Trees and bushes grow well on the edges of this soggy land and in swamps, because the soil is fertile and not too wet.
Primary and Intermediate Activity (K-6):

1. Take students outside to observe plants on campus.
3. Have students focus on a particular plant.
4. Guide students to plants in several different areas. For example, plants out in the sun with no shade, plants in shady areas, plants close to water sources, and plants farther away from water sources.
5. For primary students, guide them through this lesson as a whole group. Intermediate students can work in pairs, or individually.
6. As students are observing the plants, ask them the following questions:
   a. Does this plant have any structures that might protect it from weather conditions?
   b. Is this plant a native plant to this environment, or does it require maintenance from humans?
   c. Where is this plant located? Give a physical description of the location of the plant. Is it in the direct sunlight, in the shade, near a water source?
   d. What does the plant look like? Give a physical description of the plant.
e. You can have intermediate students write these questions down before they go outside to observe.

6. Once students are back in class, have them look through the books on desert and wetland environments. Discuss how different plants adapt to the wet conditions of the wetlands, and the hot, dry conditions of the desert. Discuss how plants in hot, wet conditions can survive.
Objective: Students will become familiar with the physical layout and location of the Big Morongo Canyon Preserve and predict what they may observe on site.

Materials: Big Morongo Canyon Preserve Map (class set)

Activity: Primary and Intermediate (K-6)

1. In pairs, have students look at the map of the Big Morongo Canyon Preserve.
2. Guide the students along each trail.
3. Have students choose a trail with their partner and come up with a list of the things they think they might see if they were to actually take this specific trail.
4. Suggest some things to get them started: (only a few)
   - a spider web
   - a bird flying over head
   - a cattail/different plants
   - flowering plant
- bird's nest
- animal tracks/human tracks
- mud
- water
- bees
- feathers
- fish
- tadpoles

5. Bring class back together to share their lists.

6. Make a class list of all the things they might see the Preserve.
BIG MORONGO CANYON PRESERVE
TRAIL SYSTEM

Canyon Trail - 5.5 mi
Old Barn Trail

Marsh Trail

Yucca Trail

Desert Willow Trail - 0.8 mi
Barn Trail - 0.1 mi

Mesquite Trail - 0.5 mi
Canyon Trail - 5.5 mi

Marsh Trail - 0.5 mi
Yucca Ridge Trail - 0.7 mi

Desert Willow Trail - 0.8 mi
Barn Trail - 0.1 mi

Mesquite Trail - 0.5 mi
Canyon Trail - 5.5 mi
BIBLIOGRAPHY


Lincolnwood, IL: Publications International, Ltd.
APPENDIX B:

CALIFORNIA SCIENCE CONTENT STANDARDS
The lessons in this unit are correlated to the California Science Content Standards. The following standards are addressed in the lessons:

**Kindergarten:**

2) Life Sciences: Different types of plants and animals inhabit the earth.
2a) Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals.
3) Earth Sciences: Earth is composed of land, air, and water.
3a) Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.
4) Investigation and Experimentation: Scientific progress is made by asking meaningful questions and conducting careful investigations.
4a) Students will observe common objects by using the five senses.
4b) Students will describe the properties of common objects.
4e) Students will communicate observations orally and through drawings.

**Grade One:**

2) Life Sciences: Plants and animals meet their needs
in different ways.

2a) Students will know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

3) Investigation and Experimentation: Scientific progress is made by asking meaningful questions and conducting careful investigations.

4a) Students will draw pictures that portray some features of the thing being described.

4b) Students will record observations and data with pictures, numbers, or written statements.

**Grade Two:**

2) Life Sciences: Plants and animals have predictable life cycles.

2e) Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.

3) Earth Sciences: Earth is made of materials that have distinct properties and provide resources for human activities.

3e) Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.
Grade Three:

3) Life Sciences: Adaptations in physical structure or behavior may improve an organism’s chance for survival.

3a) Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.

3b) Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3c) Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

Grade Four:

3) Life Sciences: Living organisms depend on one another and on their environment for survival.

3a) Students know ecosystems can be characterized by their living and nonliving components.

3b) Students know that in any particular environment, some kinds of plants and animals survive well, some survive less, and some cannot survive at all.

Grade Five:
3d) Students know that the amount of fresh water located in rivers, lakes, and underground sources is limited.

6) Investigation and Experimentation: Scientific progress is made by asking meaningful questions and conducting careful investigations.

6a) Students will classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.

**Grade Six:**

5) Ecology (Life Science): Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

5c) Students know populations of organisms can be categorized by functions they serve in an ecosystem.

5d) Students know different kinds of organisms may play similar ecological roles in similar biomes.

5e) Students know the number and types of organisms an ecosystem can support depends on the resources available.

7) Investigation and Experimentation: Scientific progress is made by asking meaningful questions and conducting careful investigations.
APPENDIX C:

POST-TRIP ACTIVITIES
Post-Activity

Lesson 1

Taking a Closer Look

Objective: Students will have the opportunity to reflect on their experience at the Big Morongo Canyon Preserve.

Activity:

• Guided Imagery: Ask students to close their eyes and think about the following questions:
  a. What did you observe at the Big Morongo Canyon Preserve?
  b. How many animals did you see? Did you see any animal tracks?
  c. How many plants did you see? Did you see plants in the water, in the desert?
  d. What did the Preserve smell like?
  e. What can you hear? Do you hear water running, birds chirping?
  f. What colors did you see? What color was the sky, the ground, the bushes, the trees?

Primary (K-3):

• Students will individually make a poster, or create a class mural, including all the plants and
animals they observed. They can also include any trails they went on. At the bottom of their poster or mural, have them write down what other things they want to know about the Preserve.

**Intermediate (4-6):**

- Have students write a poem about the Big Morongo Canyon Preserve. The poem should include information they learned about the Preserve. Encourage them to think about their guided imagery experience to guide their writing. Here are some styles of poetry that can be used:

  1. **Haiku:** A three-line, seventeen-syllable poem from the Japanese, which uses nature as its primary focus.

     5 syllables
     7 syllables
     5 syllables

     **Sample:**

     "Desert Oasis"

     Dry land and wet soil
     Come together to house life
     Two worlds, one purpose
2. Quatrains: A four lined poem, rhymed or unrhymed. When written as a rhyming poem, it follows a variety of patterns: aa bb, ab ab, aaaa, etc.

Sample:

"Follow the Signs"

Strolling along the recycled walk,
There are signs of life yearning to talk.
On the ground, in a bush, up high in the sky
Don't let a story pass you by.

By Kira Richert
Objective: Students will connect with their KWL charts to see what they learned.

Materials: desert and wetland KWL charts

**Primary and Intermediate (K-6):**

1. Review each section of the KWL charts.
2. Read through the "What do you know?" section. Remind them that this is information they already knew before their trip.
3. Re-read the questions/statements under the "What do you want to know?" section. Encourage them to think about everything they learned before their trip and during their trip.
4. Have students answer as many questions as they can, based on their experiences and the Big Morongo Canyon Preserve. Chart their answers on the "What did you learn?" sections of the KWL chart.
5. Expand:Ask the students what other questions they have about the Preserve and how they might go about finding the answers to their questions.
6. Have students pretend they are journalists and they are writing an important story for the local newspaper. They must include who, what, where, when, and why. This story can be made into a fictional or non-fictional piece.
Objective: Students will recall different animals and plants they observed at the Preserve and create animal/plant cards for one of the animals/plants they saw. If no animals were actually found, use evidence of animals. For example, if they saw tracks from a kangaroo rat, but no kangaroo rat, they can make an animal card about it.

Primary and Intermediate (K-6):
Use the following template for the animal note cards.

- Picture
  - Include:
    - Name of animal/plant
    - Habitat
    - Physical description

- It

69
**Primary:** Have students draw a picture of the animal or plant they observed and write a brief description.

**Intermediate:** Have students draw a picture of the animal they observed and write a detailed description of the animal as if they were the animal.

- Share cards with partners or whole class.
Post-Activity

Lesson 4

Scavenger Hunt

Objective: Students will reflect upon what they observed at the Big Morongo Canyon Preserve.

Primary and Intermediate (K-6):

Option 1:

1. Looking back on the list the students created in pre-activity Lesson 4 titled "Where Are You?" about what they thought they might see at the Preserve, have them design a scavenger hunt list.

2. After they have created their list, have them check off everything they saw. They can also add items as they go along.

Option 2:

1. Design a scavenger hunt list for the students based on their field trip. See sample scavenger hunt.
Scavenger Hunt

• Think about our field trip and all of the things you observed. Check off the things that you saw and if you saw something that is not on the list, add it.

  __ bird's nest  __ human foot prints
  __ spider        __ bighorn sheep
  __ water        __ bees
  __ spider web  __ trash
  __ animal tracks __ fish
  __ bird        __ lily pads
  __ flies       __ trash cans
  __ clouds      __ mud
  __ grass       __ trees
  __ gnats       __ people

• Can you add anything else???
APPENDIX D:
BIG MORONGO CANYON
PRESERVE SURVEY
Big Morongo Canyon Preserve Survey Oasis in the Desert

Grade(s): ______

1. Are you interested in taking your students to BMCP?
   Yes ________________ Total= _____
   No ________________ Total= _____

2. Have you taken your students to the BMCP on a fieldtrip?
   Yes ________________ Total= _____
   No ________________ Total= _____

   If yes, what types of tours did you attend?

3. The preserve offers tours and activities that can be integrated into the curriculum. What types of tours/activities would you be interested in?
   Rank in order of importance, 1 - 5, with 5 being the most important.

   • Importance of protecting wetlands ______
   • Homes for flora and fauna ______
   • Native American uses of plants in the preserve ______
   • Adaptations of plants and animals to climatic changes ______
   • Desert ecology ______

   *The preserve is also willing to address other topics of interest. Are there any topics that you would like to see BMCP incorporate? If so, please write a few of your ideas down here:

Kira Seacat: MA in Environmental Education
APPENDIX E:

RESULTS OF SURVEY
These graphs indicate the results from the Big Morongo Canyon Preserve survey, question number three: The preserve offers tours and activities that can be integrated into curriculum areas. What types of tours/activities would you be interested in? Rank the tours and activities in order of interest, with 5 being the most important. There were 49 kindergarten through third grade teachers and 26 fourth through sixth grade teachers who answered this question.

Activity Choices Based On Interest

[Bar chart showing activity choices based on interest]
Activity Choices Based On Interest

- 4-6 Average level of interest
REFERENCES


