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Curricular Development for a Desert Learning Center

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Curricular Development

for a Desert Learning Center




U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

PUBLIC LANDS INSTITUTE
UNIVERSITY OF NEVADA, LAS VEGAS

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"In the end, we will conserve only what we love.
We will love only what we understand.
We will understand only what we are taught."

Baba Dioum, Senegalese Conservationist

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Project Introduction

The Red Rock Desert Learning Center, formerly known as Oliver Ranch, is a 300-acre parcel acquired by the Bureau of Land Management (BLM) in 1993 and incorporated into the Red Rock Canyon National Conservation Area. The Desert Learning Center is being designed to teach participants about the natural world through inquiry-based experiential and interdisciplinary methods in a residential outdoor setting in Red Rock Canyon National Conservation Area, located outside metropolitan Las Vegas, Nevada. The intent is for students, teachers, and researchers to gain an appreciation of desert ecosystems and to begin to apply and connect their knowledge to world ecological systems.

The project was initiated by the BLM in response to research indicating that regular contact with and play in the natural world as a child is critical to establishing an ethic of environmental stewardship as an adult (Bunting, 1985; Schultz et al., 2004; and many other studies)[1]. As Sobel (1996, p. 10)[2] observes:

> "What's important is that children have an opportunity to bond with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its wounds. John Burroughs remarked that 'Knowledge without love will not stick. But if love comes first, knowledge is soon to follow.' Our problem is that we are trying to invoke knowledge, and responsibility, before we have allowed a loving relationship to flourish."

The Red Rock Desert Learning Center campus will incorporate many "green building" systems in its design and operation, and those systems will be an active part of the school's curriculum. The curriculum is designed to be involving, flexible, and experiential, with programming that may be adjusted to span anywhere from one to four days—although the preferred model is a multi-day, intensive experience. While the primary focus of the curriculum will be the life and physical sciences, students will also participate in activities related to the cultural history of the area, astronomy, technology, art, and literacy.

[1] Bunting, T.E. & Cousins, L.R. (1985). "Environmental dispositions, among school-age children," *Environment and Behavior*, 17(6), 725-768 Schultz, P. et al. (2004) "Implicit connections with nature," *Journal of Environmental Psychology*, 24(1), 31-42.

[2] Sobel, David, (1996). *Beyond Ecophobia*: *Reclaiming the Heart of Nature Education*, Great Barrington, MA: The Orion Society.

The Bureau of Land Management was guided in its development of the desert learning center by a community core group, comprising more than 40 interested stakeholders who began meeting in 2003 on a monthly basis. Initial ecosystems science curriculum work was funded by a federal grant and developed by an Educational Programs Committee of local schoolteachers and scientific research faculty. This effort was coordinated by Dr. Paul Buck, a faculty member at the Desert Research Institute. The committee created the lesson plan framework that guided the development of eight essential questions and related activities in the life and physical sciences.

Subsequently, the Public Lands Institute at the University of Nevada, Las Vegas, entered into a cooperative agreement with the Bureau of Land Management in June 2004 to coordinate and design the core curriculum for the desert learning center. The university developed a curriculum design rationale and process that guided community discussions on five desired core topics (in addition to Ecosystems Science) that all students at the desert learning center would experience:

- Cultural Connections
- Green Building Technology
- Historical Figures
- Night Sky
- Wild Horse and Burro

Under the direction of the Public Lands Institute, core curriculum development in these five topical areas commenced in 2005 through the formulation of work groups comprised of community stakeholders and local schoolteachers. Each work group used the essential questions model and adopted the lesson plan framework initially created for the ecosystems science curriculum. As lessons were drafted by each work group, an American Indian work group reviewed the drafts and incorporated specific cultural perspectives across the curriculum as a whole.

Finally, portions of the core curriculum were then piloted with Southern Nevada teachers in Spring 2006 to implement and assess the effectiveness of the lesson plans

with a key audience. The teacher workshops provided a baseline of knowledge from which to incorporate and integrate teaching strategies that support student learning in an outdoor setting.

This booklet assembles together the process, methods, and products that resulted from the curriculum development coordinated by the Public Lands Institute in collaboration with the Bureau of Land Management. It is intended not only as a record of the proposed Red Rock Desert Learning Center core curriculum but also as a foundation for other educators who may be considering the development of an outdoor learning center.

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Overview of the Conservation Education and Interpretation Strategy

The four federal land management agencies in Southern Nevada[1] support a diverse and relatively strong array of conservation education and interpretation programs that include visitor centers and wayside exhibits, formal and informal education efforts, and community education partnerships. Improvement of these services hinges on providing community leadership, a strategic focus, being able to connect with diverse audiences, and measuring success with well-articulated standards of quality.

An interagency Conservation Initiative project, titled Education in the Environment, was funded through the Southern Nevada Public Land Management Act and initiated in 2004. The intent of the project was to develop a strategic approach to Conservation Education and Interpretation in Southern Nevada through a five-year strategy and work plan. The strategy was completed in 2006 while planning for the Red Rock Desert Learning Center was underway. The Conservation Education and Interpretation Strategy identifies the following goals:

1. Foster and increase environmental stewardship in southern Nevada.
    a. Common messages used by cooperating agencies and area-wide educators and trainers.

   b. Collaborative planning and projects, with shared audiences and shared themes.

   c. New and more targeted programs attracting larger audiences.

   d. Better programming using best practices and avoiding duplication.

2. Maintain and increase a trained workforce with exemplary skills and knowledge.

3. Develop and implement assessment and evaluation of program effectiveness.

4. Coordinate education and interpretation resources among agencies.

5. Enhance communication and networking among education and interpretation professionals.

The Red Rock Desert Learning Center exemplifies the goals of this strategy, and the curriculum was designed to meet its objectives.

The need for conservation education is particularly acute in Clark County. The Las Vegas metropolitan area has been the fastest growing urban area in the country for the past decade, with a resident population now exceeding 1.6 million and a tourist population of more than 36 million per year. Unfortunately, many Las Vegas residents do not have an understanding of the natural environment that surrounds their city or a sense of responsibility for its condition. Coordinated conservation education efforts can result in residents and visitors engaging in valuable stewardship behaviors and having a greater understanding and appreciation of southern Nevada's environment.

Research demonstrates that conservation education and interpretation in outdoor learning situations can have a positive impact on formal education. For example, Gerber et al. (2001)[2] documented that informal learning environments positively impacted students' scientific reasoning abilities. The same study showed that students involved with inquiry-based learning experiences (as used in the Red Rock Desert Learning Center curriculum) showed higher scientific reasoning abilities compared to those in non-inquiry science classrooms. Additionally, since 1997 an educational research organization called the State Education and Environment Roundtable has found that environment-based education improves academic performance and learning across the board. It also results in decreased discipline

problems, increased problem-solving abilities, increased science knowledge, and increased levels of engagement.

Matthews and Riley (1995)[3] also found that the educational experiences most likely to change student behavior involve concrete, environmentally positive, action-oriented experiences. Importantly, the most successful programs are held in a relevant setting, implying the need for informal education experiences that take place on local public lands. Louv (2006)[4] cites several studies that support the claim that exposure to nature, among other benefits, reduces symptoms of Attention Deficit Disorder and improves cognitive abilities and resistance to negative stresses and depression.

[1] Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and U.S. Forest Service.

[2] Gerber et al. (2001) "Relationships among informal learning environments, teaching procedures and scientific reasoning ability" *International Journal of Science Education,* Vol. 23 No. 5.

[3] Matthews, B. E., and Riley, C. K. (1995) "Teaching and evaluating outdoor ethics education programs." Vienna, VA: National Wildlife Federation. (ERIC Document Reproduction Service No. ED 401 097).

[4] Louv, R. (2006) *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder.* Chapel Hill, NC: Algonquin Books.

Core Curriculum Development Process

1. Identified Structural Overview of an Integrated Curriculum (see figure 1, page 7)
2. Developed Curriculum Design Rationale
3. Correlated Common Experiences to BLM Mission
4. Created Tentative Daily Schedules to Inventory Curricular Gaps
5. Created Work Groups to Develop Core Curriculum Strands
6. Correlated Lesson Plans to BLM Mission
7. Correlated Lesson Plans to American Indian Cultural Perspective
8. Finalized Core Curriculum Lesson Plans
9. Piloted Selected Lesson Plans with Pre-service and In-service Teachers

Core Curriculum Design Rationale

The curricular design described herein is a framework to unify and align programmatic curricula among a variety of educational projects and facilities on federal public lands (Red Rock Desert Learning Center, Forever Earth Science Laboratory, Discover Mojave Outdoor World, Wild Horse and Burro Facility, etc.),

thus offering a solid foundation for future environmental programs and projects developed and coordinated by the Southern Nevada Conservation Education Strategy.

The framework organizes the development of the curriculum in a consistent and integrated manner while allowing for autonomous creativity within each of the individual programs and facilities. It ensures national, state, and local educational standards are consistently addressed and adhered to, thus providing validity and replication of the programs nationwide. Further, the curricular design is intended to address key aspects of the missions and goals of individual organizations involved in developing the desert learning center concept.

SHORT TERM GOALS

Students as stewards:

- will experience the natural world through inquiry-based experiential and interdisciplinary methods;
- will gain an appreciation of desert ecosystems; and
- will develop conclusions about how environmental stewardship fosters the sustainability of local resources.

Teachers as partners:

- will be able to provide input into curricular development through piloting to meet educational needs;
- will be able to provide students opportunities to develop scientific and environmental concepts; and
- will be able to meet the required curricular goals and standards while utilizing inquiry-based and interactive methods.

LONG-TERM GOALS

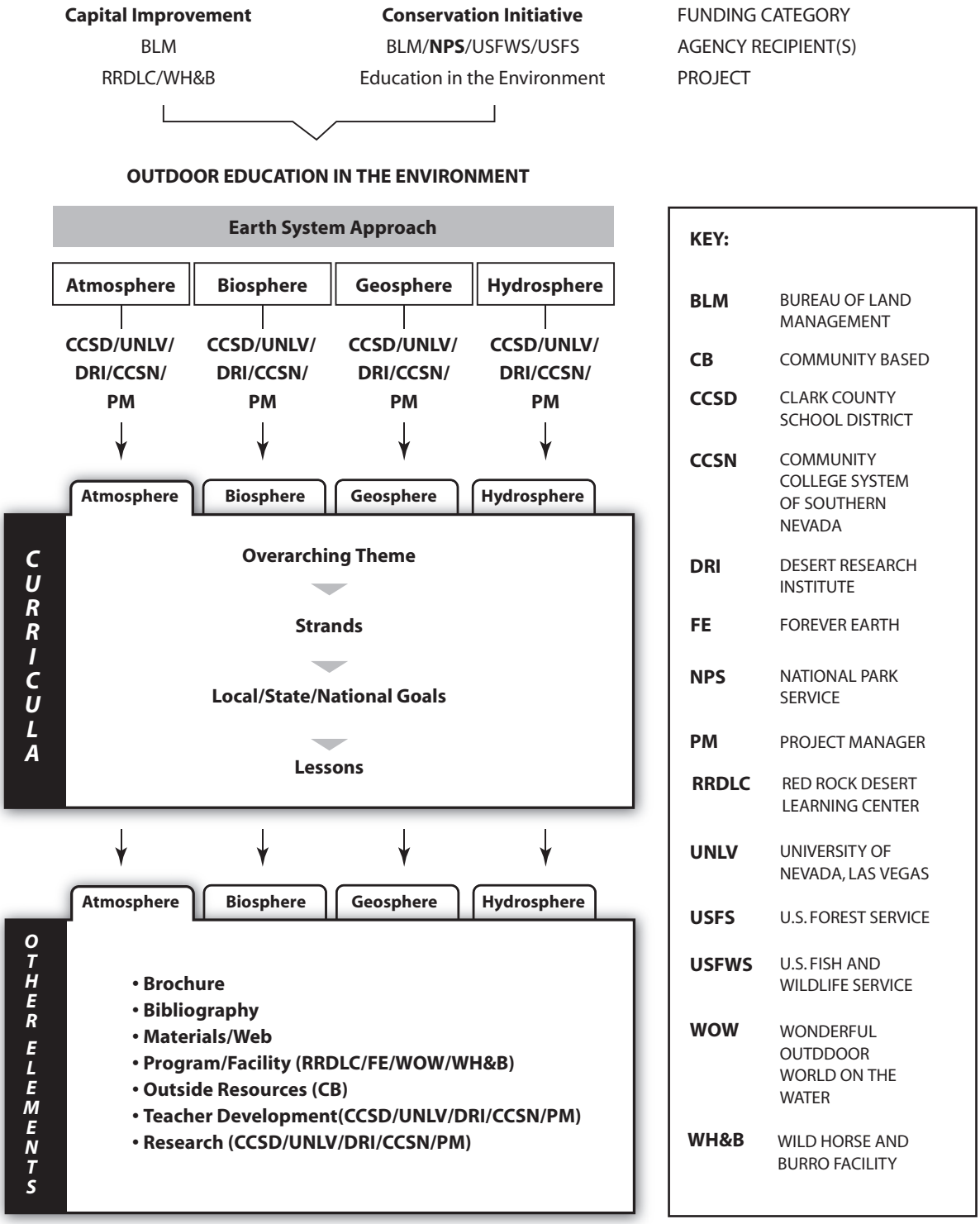
Students as stewards:

- will apply and connect their knowledge to world ecological systems; and
- will develop conclusions about how environmental stewardship fosters the continued existence of the natural world.

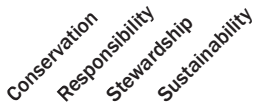
Teachers as partners:

- will assist students in meeting ethical challenges of responsible citizenship; and
- will develop increased knowledge and awareness as stewards of the environment.

Structural Overview of Integrated Curriculum (Earth System Approach)



Common Experiences: Aligned to BLM Mission and Prioritized by Core Group



UNDERSTANDING ECOSYSTEMS

- Developing a Sense of Place–understanding the desert
- Importance of water in an arid environment
- Close, extended observations of nature and recording of findings
- Connection with nature and desert ecology
- Biodiversity and productivity of ecosystems
- Use of local plants by wildlife and wild horses and burros
- Characteristics of an ecosystem
- Migrant and resident fauna and flora/ native-migrated
- Local and global patterns of the ecosystem
- Desert ecosystem–macro and micro
- Correct usage of native plant materials
- Identify all plant related materials (soils/insects/animal/life/weather)

SUSTAINING HEALTHY ECOSYSTEMS

- Apply ecosystem concepts to understand and solve environmental issues
- Water conservation
- Reduce-recycle-reuse
- Resource management–participate directly in the management of water and energy
- Flora and fauna adaptation to the desert environment
- Responsibility for the well-being of the environment
- Greenhouse to show students how to germinate/propagate from seeds/cuttings
- Junior master gardener program
- Spring restoration and ecology
- Desert landscape appreciation
- Long term establishment of revitalization of natural state
- Long term establishment of a garden to grow vegetables

GREEN BUILDING TECHNOLOGY

- Food/water waste
- Living in the desert–creating comfort in the desert environment
- Developing a sense of place–understanding the desert
- Leave No Trace techniques for arid land environments

NIGHT SKY

- Viewing the night sky
- Night hiking with sensory awareness
- Night camp fire experience
- Weather and climate

GEOLOGY

- Evolution of land forms
- Viewing Red Rock Canyon–distant cliffs
- Erosion
- Water cycle
- Faults/Earth movements

WILD HORSE AND BURRO

- Responsibility for the well-being of the environment
- Importance of water in an arid environment
- Use of local plants by wildlife and wild horses and burros
- Ecology of horses

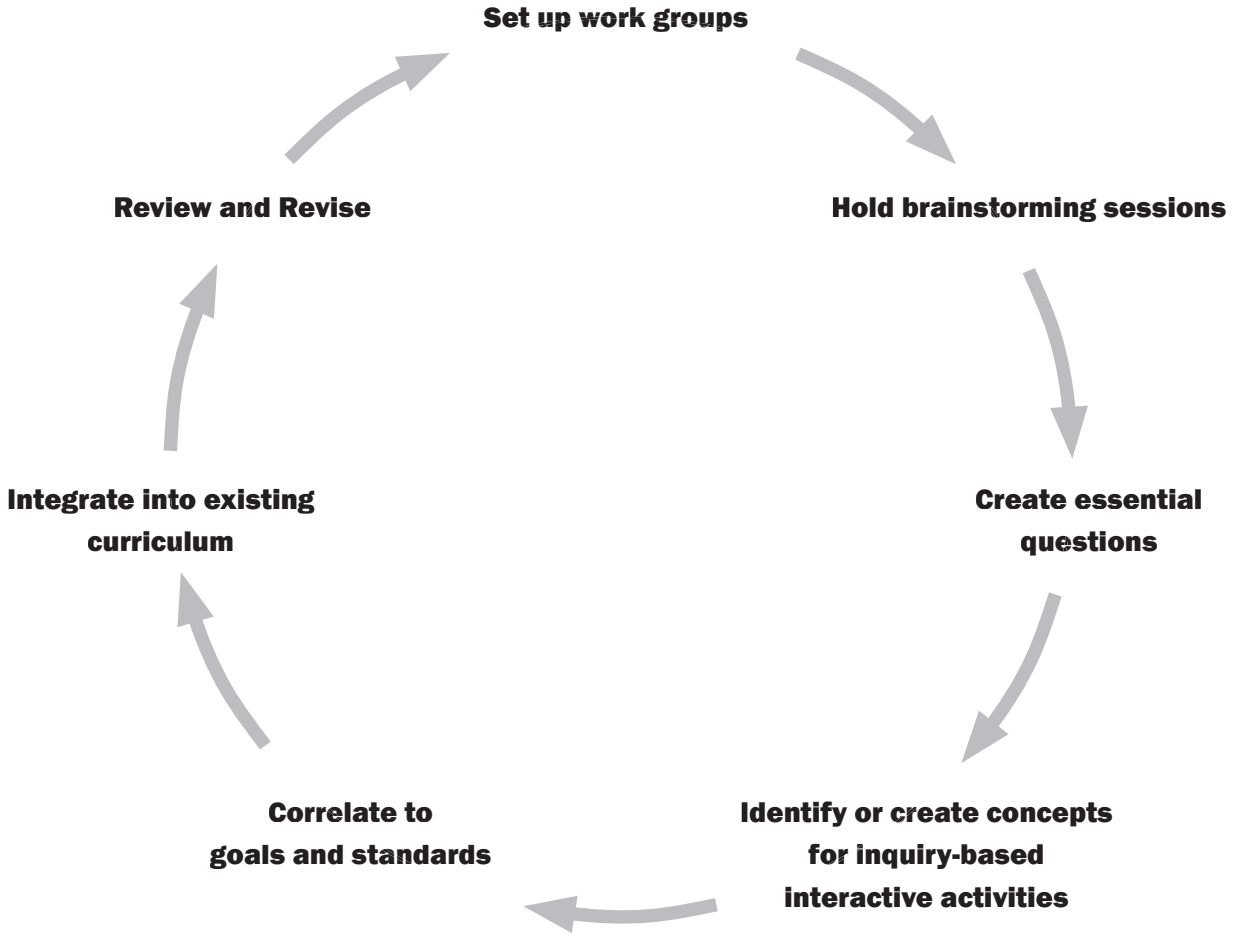
HISTORICAL FIGURES & CULTURAL CONNECTIONS

- Pioneer history/history of Oliver Ranch
- Sense of Place–connection to the history of the Red Rock Canyon area
- Historical figures in conservation
- Participate in the 100-year "legacy" science project design
- Historical figures and themes in stewardship

Architectural Response Required for Core Curriculum

Common Experience	Learning Environment	Indoor Facilities and Equipment Needed	Outdoor Venues Needed
Cultural Connections	• Hands-on • Inquiry-based • Large Group • Small Group	• Boxes of Artifacts • Dining Hall • Flex-labs • Materials for Crafts	• *Footprints* of the former Oliver Ranch Buildings • Interpretive Shaded Structures • Trails • Springs
Ecosystems Science	• Collaborative • Computation • Hands-on • Inquiry-based • Small Group	• Compost Pile • Computers • Digital Cameras • Flex-labs • FOSS Kits/Rock Kits • GPS Units • Maps/Compasses • Plants • Telescopes/Binoculars • Trails	• Cistern Ridge Geology • Composting Area • Greenhouse/Garden Area • Limestone Bluff Trail • Lysimeter • Restoration Area • Spring Sites • Topographic Mapping Hill
Green Building Technology	• Computation • Hands-on • Interactive • Group-based	• Dining Hall • Dormitory	• Composting Area • Waste Digester • Wastewater Treatment Plant • Wild Horse & Burro Facility
Historical Figures	• Inquiry-based • Large Group • Small Group	• Dining Hall • Flex-labs	• *Footprints* of the former Oliver Ranch Buildings • Interpretive Shaded Structures • Springs • Trails
Night Sky	• Collaborative • Computation • Inquiry-based • Interactive	• Computers • Flex-labs • Observational Platform • Telescopes • Ultraviolet Lights	• Block Building • Observatory • Outside Pathway (red lights)
Wild Horse and Burro	• Inquiry-based • Large Group • Observational	• Tables/Picnic tables	• Interpretive Shaded Structures • Wild Horse & Burro Facility (Arena, Research Area)

Strand Development Process



Core Curriculum Development Timeline

2004	August	
	September	
	November	**Ecosystems Science**
	December	
2005	January	
	February	**Wild Horse and Burro**
	March	
	April	
	May	**Historical Figures**
	June	
	July	
	August	
	September	**Cultural Connections**
	October	**Night Sky**
	November	
	December	**Green Building Technology**
2006	January	**Revisions and Review**
	February	
	March	**American Indian Correlations**
	April	**Teacher Piloting**
	May	
	June	
	July	

A Typical Visit to a Desert Learning Center

Day 1

Morning Programming

INTRODUCTION AND ORIENTATION
Students arrive at Friendship Circle, get group assignments, go to dormitories, and unpack.

GREEN BUILDING TECHNOLOGY
How can technology reduce a building's impact on the environment? Students learn about technology and human choices that reduce a building's ecological footprint.

Lunch

Afternoon Programming

WILD HORSES AND BURROS
How do wild horse and burro populations affect plant growth in their environment? Students observe on-site habitat at the Wild Horse and Burro Facility. They discover differences in types and number of plant species inside and outside of the habitat.

Break

ECOSYSTEMS SCIENCE (Plants: Part I)
How does disturbing the desert impact plant and animal communities? Students conduct surveys to compare types and number of species in disturbed and undisturbed upland areas.

Dinner

Evening Programming

CULTURAL AND HISTORICAL CONNECTIONS
Who has used this land before us? How did they use it? What were their lives like? Invited guests and storytellers relate various Nevada stories to the students.

Day 2

Breakfast

Morning Programming

ECOSYSTEMS SCIENCE (Plants: Part II)
How does disturbing the desert impact plant and animal communities? Students conduct surveys to compare types and number of species in disturbed and undisturbed riparian areas.

ECOSYSTEMS SCIENCE (Plants: Part III)
How does the physical environment control where and when plants and animals grow? Students take a short hike to examine selected desert plants and participate in an activity that teaches desert plant adaptations.

Lunch

ECOSYSTEMS SCIENCE (Geology: Part I)
Where should we live to avoid geologic hazards in Las Vegas? Students construct an artificial stream and observe erosion and soil deposits. Students examine deposits in a dry stream bed.

Break

ECOSYSTEMS SCIENCE (Geology: Part II)
Where should we live to avoid geologic hazards in Las Vegas? Students construct a topographic map of Red Rock Hill.

Dinner

Evening Programming

NIGHT SKY
Students use handheld telescopes to observe stars and planets.

Day 3

Breakfast

Morning Programming

ECOSYSTEMS SCIENCE (Geology: Part III)
What happens to water in the desert soil? Students measure water content and temperature of soils from varying depths. Students study plant roots for clues to water behavior in desert soils.

ECOSYSTEMS SCIENCE (Air Quality: Part I)
What causes air pollution in Las Vegas? Students set up an air quality monitoring experiment and discuss gases and particles that contribute to pollution in the area.

Lunch

ECOSYSTEMS SCIENCE (Air Quality: Part II)
What causes air pollution in Las Vegas? Students collect data from their monitoring experiment. Students investigate and measure solar radiation.

Break

ECOSYSTEMS SCIENCE (Air Quality: Part III)
What causes air pollution in Las Vegas? Students measure visibility and digitally analyze their results. Students compare their results with past measures.

Dinner

Evening Programming

NIGHT-TIME ANIMAL ACTIVITY
Students have the opportunity to view nocturnal land-dwelling and aquatic species.

Day 4

Breakfast

Morning Programming

ECOSYSTEMS SCIENCE (Air Quality: Part IV)
What causes air pollution in Las Vegas? Students construct wind vanes and measure wind direction. Students discuss how wind affects air pollution. Students prepare presentations on air quality.

STUDENT PRESENTATIONS

Closing Ceremony at Friendship Circle

Other Schedule Types:

Sampler Schedule (4 day/3 night)

- Grade 5
- Provides an overview of entire core curriculum

Teacher's Choice Schedule (3 day/2 night)

- Grade 5
- Teacher selects from a menu of specific curricular themes

Focus Schedule (2 day/1 night)

- Grade 5
- Focuses on one or two selected curricular themes

Excursion Schedule (1 day)

- Grades 1 through 4
- Focuses on one specific curricular theme

Ecosystems Science Curriculum

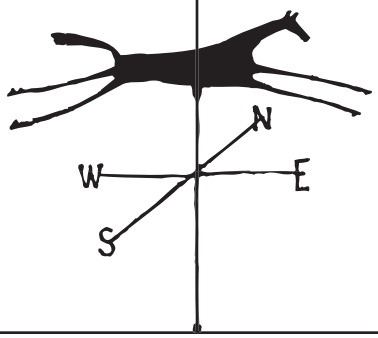
Ecosystems Science Core Curriculum Rationale

The Red Rock Desert Learning Center will foster an appreciation of desert ecosystems and allow students to apply this knowledge to world ecology. The goal of the science curriculum is to provide hands-on exploration of ecological questions. The subject matter will be correlated to local, state, and national standards, helping teachers continue the lessons in their own classrooms.

As scientists, students will have an opportunity to explore and investigate topics such as plants, geology, air quality, and water by conducting observations, discussing hypotheses, collecting and recording data, performing analyses, and discussing conclusions. In addition, the dormitory design will require students to understand green building concepts and control their living environment by regulating room temperatures and monitoring water usage. Students will inquire into the following questions:

- Where should we live to avoid geologic hazards in Las Vegas?
- What causes air pollution?
- What happens to water in the desert soils?
- How do desert plants and animals adapt to their homes?
- How does disturbing the desert change plant and animal communities?

Ecosystems Science Core Curriculum	
Essential Question #1: What is the weather and climate at Red Rock Desert Learning Center?	
Goal	Familiarize students with concepts of meteorological measurements and the instruments used by scientists.
Objectives	Students will: • understand the relationship between weather and climate; • learn to measure wind speed and determine wind direction; • learn to quantify humidity and understand that there is a limit to the amount of water vapor that air can hold; • measure barometric pressure and understand that an increase or decrease indicates an upcoming change in the weather; • learn that air has weight; • understand the sun is a major source of energy at Earth's surface; and • measure and describe the diurnal and seasonal motion of the sun across the sky.
Curriculum Essentials Framework Correlation	Mixtures and Solutions, Energy and Matter, Cycles of Matter, Solar System, Water, Nature and History of Science, Technology and Tools, Technological Design, Careers.

Ecosystems Science Core Curriculum (Essential Question #1 continued)	
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	**Unifying Concept: Structure and Properties of Energy** • Students understand that heat, light, and electricity are different forms of energy. • Students understand the relationship between heat and temperature. **Unifying Concept: Atmospheric Processes and the Water Cycle** • Students understand that weather changes often involve water changing from one state to another. • Students understand processes of the water cycle, including the role of the sun. • Students understand the composition of Earth's atmosphere, emphasizing the role of the atmosphere in Earth's weather and climate. • Students understand that weather and climate result from uneven heating of the planet. • Students understand the role of the atmosphere in Earth's greenhouse effect. **Unifying Concept: The Solar System and the Universe** • Students understand that objects in the sky display patterns in how they look, where they are located, and how they move. **Unifying Concept: Science Inquiry** • Students understand that science is an active process of systematically examining the natural world.
National Science Correlation	**Unifying Concepts: Systems, Order, and Organization; Evidence, Models, and Explanation, Change, Constancy, and Measurement** • Science as Inquiry: Abilities necessary to do scientific inquiry • Earth and Space Science: Structure of the Earth system • Physical Science: Properties and changes of properties in matter; transfer of energy • Science and Technology: Abilities of technological design • Science in Personal and Social Perspectives: Natural hazards; science and technology in society • History and Nature of Science: Science as a human endeavor
FOSS Kit Correlation	**Modules:** • Air and Weather • Environments • Mixtures and Solutions • Water
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Understanding of and the ability to measure air temperature, wind, solar energy, and humidity • Basic understanding of the concept of measurement uncertainty • Understanding of clouds 

Ecosystems Science Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will participate in a demonstration of instrumentation used on meteorological towers, including anemometers (wind speed), wind vane, relative humidity sensor, and solar radiation sensor.	Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Air quality monitoring station	30 minutes
Meteorological tower demonstration will be followed by viewing meteorological data on the Western Regional Climate Center web site or from CEMP for one or more 24-hour periods to illustrate the concepts of day/night changes in temperature, humidity, and solar radiation. Students observe how weather conditions vary from place to place and at different elevations.	Flex-labs with access to computer stations	Computer stations Access to data from the remote station on Blue Diamond Hill	30 minutes
Students will construct anemometers and measure wind speed.	Flex-labs and Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Air quality monitoring equipment	10 minutes to construct; 5 minutes daily to check and record data while at site
Students will construct wind vanes and measure wind direction.	Flex-labs and Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Air quality monitoring equipment	10 minutes to construct; 5 minutes daily to check and record data while at site
Students will construct barometers and measure air pressure.	Flex-labs and various outdoor locations (monitoring could be combined with a hike)	Liquid barometer materials	30 minutes to construct; 5 minutes daily to check and record data while at site within one hour of local solar noon
Students will measure relative humidity using sling psychrometers.	Various outdoor locations (monitoring could be combined with a hike)	Sling psychrometer	5 minutes daily while at site
Students will construct a hair hygrometer and measure relative humidity.	Flex-labs and various outdoor locations (monitoring could be combined with a hike)	Hair hygrometer materials	35 minutes to construct; 5 minutes daily to check and record data while at site

Ecosystems Science Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will use a permanent sundial constructed on-site to measure the length of shadows cast at intervals throughout the day.	Constructed at any outdoor venue in conjunction with insolation measurement tool, or at Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Permanent sundial	5 minutes at prescribed intervals during the day
Students will investigate solar radiation at the surface by measuring how much ground surface is illuminated by a one square foot beam of sunlight (insolation).	Any outdoor venue in conjunction with sundial, or at Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Insolation measurement tool Solar cells and meter	5 minutes at prescribed intervals during the day
Notebook	Students document and describe investigations in a science notebook for all activities taking place during the length of their visit at the site.		
Presentations of Findings	Oral presentation, poster, skit, poem, other.		
Follow-up Suggestions	• Students upload data from sundial and insolation measurements to a database-backed website so that others can compare the correlation for greatest insolation at local noon on the summer solstice and least insolation at local noon on the winter solstice. • Students construct and conduct similar investigations at their home schools and post their data to a web-based data bank. • Students construct a sundial and an insolation measurement tool at their home schools.		
Resources	• http://aom.giss.nasa.gov/solar.html • www.physicalgeography.net		
Multicultural/Historical/Social Connections	Question(s): • What effect did weather and climate conditions in the area have on the indigenous peoples of Nevada? Compare/ contrast the adaptations made by American Indians of the area with our own. What evidence is there that the weather and climate conditions have changed over time?		
GLOBE Protocols www.globe.gov	GLOBE Protocols within "Atmosphere/Climate" — Aerosols, Water Vapor, Barometric Pressure, Temperature, and Relative Humidity		

Ecosystems Science Core Curriculum	
Essential Question #2: What causes air pollution at Red Rock Desert Learning Center?	
Goal	Introduce students to the concepts of air quality and impacts of air pollution on visibility at Red Rock Desert Learning Center and the Las Vegas valley.
Objectives	Students will: • understand the atmosphere is composed of different gases and aerosols; • understand the concept that not all of the sun's light reaches Earth's surface; • understand aerosols decrease the amount of solar energy reaching Earth's surface; • investigate the amount of aerosols in the atmosphere; and • understand that aerosols increase haze, decrease visibility, and affect air quality.
Curriculum Essentials Framework Correlation	Mixtures and Solutions, Cycles of Matter, Nature and History of Science, Technology and Tools, Technological Design, Careers.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	**Unifying Concept: Atmospheric Processes and the Water Cycle.** • Students understand the composition of Earth's atmosphere, emphasizing the role of the atmosphere in Earth's weather and climate. • Students understand the role of the atmosphere in Earth's greenhouse effect. Unifying Concept: Science Inquiry. • Students understand that science is an active process of systematically examining the natural world.
National Science Correlation	**Unifying Concepts: Systems, Order, and Organization; Evidence, Models, and Explanation, Change, Constancy, and Measurement.** • Science as Inquiry: Abilities Necessary to Do Scientific Inquiry • Earth and Space Science: Structure of the Earth System • Physical Science: Properties and Changes of Properties in Matter • Science and Technology: Abilities of Technological Design • Science in Personal and Social Perspectives: Personal Health, Risks and Benefits, Science and Technology in Society • History and Nature of Science: Science as a Human Endeavor
FOSS Kit Correlation	**Modules:** • Air and Weather • Environments • Mixtures and Solutions
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Understanding of and the ability to measure air temperature, wind, solar energy, and humidity • Understanding of clouds, gases, and aerosols

Ecosystems Science Core Curriculum (Essential Question #2 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will discuss the gases and particles that make up the atmosphere, including a basic review of what is meant by air quality and air pollution. Include discussion on the relative newness of air pollution in this area (i.e., accompanied the growth in population in the Las Vegas valley over the last 100 years). Discuss the concept of gases and particles that are too small to see but that can have an effect on human health.	Mormon Green Springs (or any other outdoor venue with appropriate shade)	Outdoor teaching displays and storage shed	30 minutes
Students will survey air quality using student-constructed device. Students will place cardboard prepped with petroleum jelly at various locations around site for retrieval after 2-3 days.	Flex-labs (for preparation) Various outdoor locations (to place air pollution collection devices)	Cardboard sheets Petroleum jelly Place to put and protect coated cards	10 minutes for construction Note: Placement of collection cards could be incorporated with another activity such as a walk to another venue or a hike
Students will participate in a more specific review of how particles can affect visibility, including a demonstration of a visibility instrument's response to "clean air," ambient air, and very dirty air (perhaps particles generated by lighting a match).	Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Demonstration instruments and storage shed	30 minutes
The instructor will use a laser to show particles in a smoke-filled tube.	Flex-labs	Laser and photometer	15 minutes
Targets will be placed on high points around the valley to monitor haze. A radio controlled digital camera, permanently mounted at elevation (suggestion: Blue Diamond Hill), will take photos at prescribed intervals (15 minutes) of the targets. The images will be downloaded to a computer database for visibility analysis by students.	Blue Diamond Hill (at highest elevation permitted) Flex-labs	Radio controlled digital camera Computer station	30 minutes
Students will complete hands-on measurement of visibility with digital camera and software. Students will take wide-angle digital photos at various locations of the sky at horizon level.	Acid Rain Monitoring Station (Meteorological Tower/Haze Monitoring)	Digital camera	This could be incorporated into a hike

Ecosystems Science Core Curriculum (Essential Question #2 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will download the photos and interpret and analyze the visibility. Students will compare/contrast the visibility photos from the previous week and submit the data to a web site.	Flex-labs	Digital camera Computer station Access to remote visibility camera station	45 minutes
Students will investigate solar radiation at the surface by measuring the amount of sunlight on a square meter of Earth.	Any outdoor venue or Air Quality Monitoring Station (Meteorological Tower/Haze Monitoring)	Photometer or solar cells and meter	10 minutes at intervals during the day
Students will retrieve cardboard prepped with petroleum jelly at various locations around site.	Various outdoor locations where air pollution collection devices had been placed		Retrieval of prepared collection cards can be incorporated with another activity, such as a walk from another venue or a hike
Students will analyze air pollution collection cards using magnifying glasses and microscopes.	Flex-labs	Microscopes Video microscope	30 minutes
Students will view the sky/stars at night-time and discuss how visibility affects viewing and what other factors are restrictions for night-time viewing. Students will discuss light pollution and ways that light pollution can be minimized.	Observatory	Telescope Binoculars Photometer	1.5 hours (Incorporated with other scheduled Observatory activities)
Notebook	Students document and describe investigations in a science notebook for all activities taking place during the length of their visit at the site.		
Presentation of Findings	Oral presentation; poster; skit; poem; other		
Follow-up Suggestions	Learning Center forms a connection with a local meteorologist who would be willing to summarize new data as part of the evening news broadcast.		
Resources	• www.epa.gov/airnow/ • www.tnrcc.state.tx.us • www.arl.noaa.gov/ready/aq.html		
Multicultural/Historical/Social Connections	Question(s): • What are the environmental, human health, and societal implications of air quality issues? Compare/contrast what the daytime and night-time sky looks like now and what it may have looked like before the visibility issues present today.		
GLOBE Protocols www.globe.gov	GLOBE Protocols within "Atmosphere/Climate" — Aerosols, Clouds.		

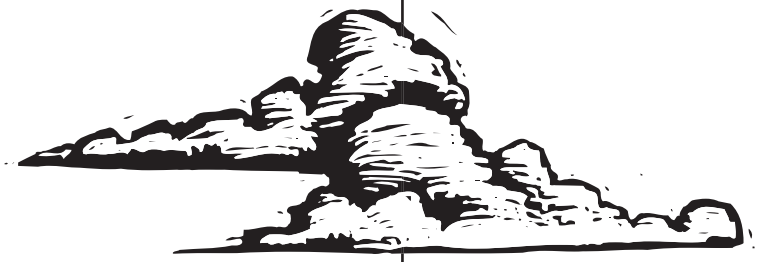
Ecosystems Science Core Curriculum	
Essential Question #3: Where should we live to avoid geological hazards in Las Vegas?	
Goal	Familiarize students with the Earth processes that have shaped our region and the associated hazards, and introduce students to Earthquake measurement instruments used by scientists.
Objectives	Students will: • investigate the role of Earth movement in shaping Red Rock Canyon and the Las Vegas valley; • understand the seismic hazards of living in southern Nevada; • understand how earthquakes work and why they occur; • understand the significance of designing structures that will withstand the effects of earthquakes and enforcing construction standards in earthquake prone regions; • understand that moving water causes erosion and deposition. • understand the water cycle; • understand the effects of ground water pumping on landscapes; • understand that wind causes erosion and deposition and can create fossil sand dunes; • learn that long sequences of deposition result over time in sedimentary rock; • learn that desert soils absorb water slowly; • learn to distinguish different types of rock and that the rocks are composed of minerals; • learn that faulting is common in the Las Vegas valley; and • learn that 3-dimensional models of the Earth's surface may be created in several ways.
Curriculum Essentials Framework Correlation	General: Rocks and Soils, Landforms, Cycles of Matter, Forces and Motion Specific: (grade 3) 3.1 Investigate and describe how the Earth is composed of different kids of materials (i.e., rocks and soil, etc.). 3.3 Investigate and describe how the surface of the Earth has a varied topography. 3.7 Explain how many things can be represented by two dimensional maps and 3 d models. 3.2 Investigate and describe how erosion and deposition rates can be affected by the slope of the land and human activities. 3.11 Investigate and describe various meteorological phenomena (e.g. Flooding, thunderstorms). 4.11 Explain that changes in environments can be natural events.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	**Unifying Concepts: Relationships among Organisms and their Physical Environments; Biological Evolution and Diversity of Life; Earth's Composition and Structure; Science Inquiry; Science, Technology and Society.** • Investigate, compare, and contrast the properties of rocks and minerals. Investigate and describe how rocks are composed of different combinations of minerals. • Investigate and describe how erosion and deposition rates can be affected by the slope of the land and by human activities. • Investigate and describe how the surface of the Earth, including the ocean floor has a varied topography. 

Ecosystems Science Core Curriculum (Essential Question #3 continued)	
National Science Standards Correlation	**Unifying Concepts: Evidence, Models, and Explanation; Evolution and Equilibrium.** • Earth and Space Science: Structure of the Earth System; Earth's History • History and Nature of Science: Science as a human endeavor, Nature of Science • Life Science: Populations and Ecosystems; Diversity and Adaptations of Organisms • Physical Science: Motions and Forces; Transfer of Energy • Science and Technology: Abilities of Technological Design • Science as Inquiry: Abilities Necessary to Do Scientific Inquiry • Science in Personal and Social Perspectives: Natural Hazards; Risks and Benefits
FOSS Kit Correlation	**Modules:** • Earth Materials • Pebbles, Sand, and Silt • Landforms • Water
Prerequisite Classroom Experiences	**Prior Knowledge and/or Background Activities:** • Understanding of and the ability to measure air temperature, wind, solar energy, and humidity • An understanding of: the Earth's plates and their movement over time; rocks and minerals; and stream flow and stream tables

Activities	**Site(s)**	**Equipment**	**Time**
Students will examine different types of rocks and minerals.	Flex-labs	Hand lens Rock and mineral reference collection	1.5 hours
Students will construct an artificial stream and observe processes of erosion and deposition.	Outdoor stream table (Outdoor Flex-labs)	Stream table	1.5 hours
Students will examine deposits of an ephemeral stream channel.	Mormon Green Springs Wash		1.5 hours
Students will construct a topographic map of Red Rock Hill.	Red Rock Hill topographic feature	Red Rock Hill topographic map	2 hours
Students will visit site and learn about the geology of the area. Various faults and formations and geologic time of the region will be discussed. Instructor will make the connection between landforms/geology and environment for living organisms (i.e., fossil trilobites found in strata, which are among the oldest animals on Earth). Students will examine how the animal life has changed over hundreds of millions of years.	Cistern Ridge Geology		30 minutes (may be combined with a hike)
Students will visit Keystone Thrust Fault and learn about the geology of the area. The Red Spring Fault could be discussed or a trip to the area could also take place.	Red Rock Canyon Keystone Thrust Fault/Red Spring Thrust Fault/Gateway Canyon		2 hours

Ecosystems Science Core Curriculum (Essential Question #3 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will examine simulations of different types of faults and mountain building, with discussion or hike highlighting examples in the local region.	Outdoor Flex-labs combined with hike	Simulations	2 hours
Students will experience a simulated demonstration of the Earth's structures undergoing varying magnitudes of motion, including the effect of liquefaction on structures.	Outdoor Flex-labs	Simulations	30 minutes
The desert learning center could be a site for the Nevada Seismological Lab: "Real-Time" K-12 Educational Seismic Network, integrating active earthquake research mission with Nevada science classrooms. Students would collect data from a local digitizer and upload data via the internet to the Nevada Seismological Laboratory. The real-time data from the school is fully integrated with regional seismic network operations in Nevada (i.e., used in automatic locations, magnitude estimates, and to measure ground accelerations).	Seismograph site Flex-labs	Seismograph Computer stations with internet access	30 minutes
Students will use web sites to track earthquakes around the world, the southwest, and Nevada. A world map and a Nevada map located permanently on the wall would be used by students to locate earthquakes, using push-pins to indicate epicenters.	Flex-labs	Computer stations with internet access	30 minutes daily while at site
Students will construct a seismograph and use it to record ground motion.	Outdoor Flex-labs		2 hours
Notebook	Students will record observations and data using words, numbers, and drawings to document and describe investigations in a science notebook for all activities taking place during the length of their visit at the site.		
Presentation of Findings	Oral presentation; poster; skit; poem; other		
Follow-up Suggestions	• Students research and/or visit Red Spring Thrust Fault. • Students discuss and/or visit to the Great Unconformity Interpretive Site, located on Frenchman Mountain. • Class takes a post-field trip visit to areas of subsidence and faulting in Las Vegas valley (see Purkey et. al. 1994, next page).		

Ecosystems Science Core Curriculum (Essential Question #3 continued)	
Resources	• Kump, L.R. et al. (1999) *The Earth System* Upper Saddle River, NJ: Prentice Hall • Purkey, B.W. et al. (1994) *Geologic Tours in the Las Vegas Area* Reno, NV: University of Nevada Press • Las Vegas Valley Seismic Response Project (http://geoscience.unlv.edu/pub/snelson/LVSRP/) • Nevada Seismological Laboratory (www.seismo.unr.edu/) • http://eqhazmaps.usgs.gov/ • http://geoscience.unlv.edu/pub/snelson/LVSRP/ • http://gldss7.cr.usgs.gov/ • http://school.discovery.com/lessonplans • www.k12science.org/curriculum • www.localhikes.com • www.nationalgeographic.com/xpeditions/lessons • www.seismo.unr.edu/ • www.seismo.unr.edu/k12network/
Multicultural/Historical/Social Connections	Question(s): • How do prehistoric organisms (preserved as fossil evidence) that lived in the region compare/contrast organisms living here now? • How have changes in the region over geologic time impacted living organisms? • How did American Indians in the region make use of the geology of Red Rock (caves, higher elevations, etc.)? How did American Indians in the region explain the area's geology?
GLOBE Protocols www.globe.gov	GLOBE Protocols within "Atmosphere/Climate" — Aerosols, Clouds



Ecosystems Science Core Curriculum	
Essential Question #4: What happens to water in the desert soil?	
Goal	Familiarize students with concepts of soil water flow, how to measure it, why it's important to plant life at Oliver Ranch, in Las Vegas, and in the desert.
Objectives	Students will: • understand water circulating through soil differs as soil properties change; • understand soils consist of decomposed organic material, minerals, and water; • understand soils support the growth of many types of plants; • be able to collect soil samples and measure the soil moisture; • be able to measure water infiltration into soil; • understand that the infiltration rate of water into soil changes depending upon the level of soil saturation; • understand evapotranspiration; and • understand that water, which is not stored in the ground, evaporates or becomes run-off and may pool on the surface for a time.
Curriculum Essentials Framework Correlation	Water, Cycles of Matter, Natural Resources, Ecosystems, Nature and History of Science, Technology and Tools, Technological Design, Careers
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	**Unifying Concept: Structure and Properties of Matter.** • Students understand that matter has observable properties. **Unifying Concept: Structure and Properties of Energy.** • Students understand the relationship between heat and temperature. **Unifying Concept: Earth's Composition and Structure.** • Students understand that features on the Earth's surface are constantly changed by a combination of slow and rapid processes. **Unifying Concept: Science as Inquiry.** • Students understand that a variety of models can be used to describe or predict things and events.
National Science Correlation	**Unifying Concepts: Systems, order, and organization; Evidence, Models, and Explanation, Change, Constancy, and Measurement.** • Science as Inquiry: Abilities Necessary to Do Scientific Inquiry • Physical Science: Properties and Changes in Properties in Matter, Transfer of Energy • Earth and Space Science: Structure of the Earth system • Science and Technology: Abilities of Technological Design • Science in Personal and Social Perspectives: Populations, Resources, and Environments • History and Nature of Science: Science as a Human Endeavor
FOSS Kit Correlation	**Modules:** • Earth Materials • Landforms • Pebbles, Sand, and Silt • Environment • Mixtures and Solutions • Water
Prerequisite Classroom Experiences	**Prior Knowledge and/or Background Activities:** • Basic conceptual understanding of water, soils, and use of water by plants • Understanding of basic measurement methods • Understanding of and ability to measure air temperature

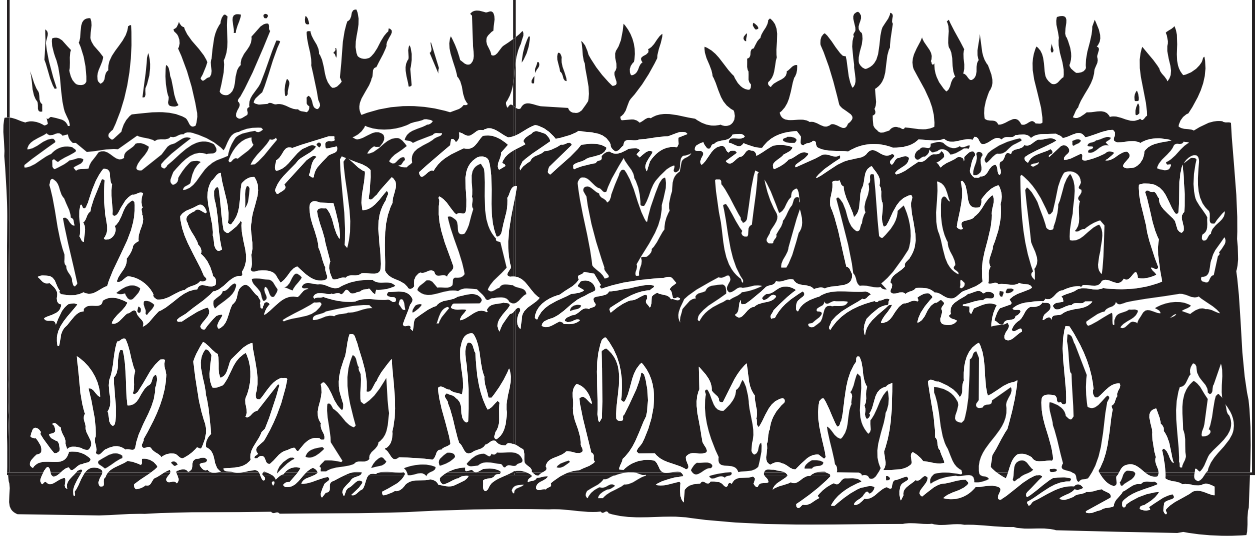
Ecosystems Science Core Curriculum (Essential Question #4 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will experience a laboratory (indoor) demonstration of columns filled with soil of different textures (sand, silt, clay), with water pumped through the columns. Students will investigate why different textures result in different flow rates by measuring the rates themselves and then discussing the differences. [Note: it may be possible for students to construct their own columns of soil, which can be stockpiled nearby, and then measure the flow rate of water through their columns.]	Flex-labs (or outdoor lab with collapsible walls)	Section of the laboratory wall with rack for mounting soil columns	45 minutes
Teams of students will construct small-scale lysimeters on the first day of investigations, place the lysimeters at a prepared location, and monitor their own lysimeters.	Outdoor venue in close proximity to lysimeter		1 hour
Students will collect soil samples with a trowel or auger and weigh them, dry them, and then weigh them again. The soil water content is determined by calculating the difference between the wet sample mass and the dry sample mass.	Outdoor venue in an area of previously disturbed land Outdoor Lab with collapsible walls	Drying oven (in outdoor lab)	30 minutes to collect samples; 10 minutes to weigh wet samples; 10 minutes to weigh dry samples (samples dry overnight)
Students will visit the walkthrough lysimeter area where irrigation treatments are being done at the surface to different plants. Students will take measurements of water content in the soil using sensors that terminate at ground surface and record them in the logbook. Students will also measure and record soil temperature and record in the logbook.	Lysimeter	Walk-through lysimeter with lexan sheeting	30 minutes
Students will walk through the underground portion of the site, where they will be able to view the soil profile through lexan sheeting and observe differences between profiles with supplemental water and soil with just natural rainfall. Students take measurements using instruments installed in the soil.	Lysimeter	Walk-through lysimeter with lexan sheeting	1.5 hours
Students will view the minirhizotron at the walk-through lysimeter and take digital images of plant roots.	Lysimeter	Minirhizotron Digital camera	occurs with lysimeter walk-through

Ecosystems Science Core Curriculum (Essential Question #4 continued)	
Notebook	Students will document and describe investigations in a science notebook during the length of their visit at the site.
Presentations of Findings	Oral presentation, poster, skit, poem, other.
Follow-up Suggestions	Students may study water usage by plants during winter and summer periods and evaluate whether the irrigation rates are appropriately set (optimal/best conditions). Data will be part of long-term data collection and management of the irrigation system. Data from these measurements can be uploaded to a web site and then used to evaluate the amount of water that percolates below the root zone of plants and toward the water table. Students should monitor soil temperature data for seasonal comparison and analysis.
Resources	• www.for.nau.edu/hartlab • www.soilmoisture.com
Multicultural/Historical/Social Connections	Question(s): • How did American Indians in the area (i.e., Southern Paiutes) traditionally use the land? How do they use the land today? What were the water/soil (irrigation) uses and issues when the area was a working ranch? How did those uses and issues compare/contrast with the way the American Indians traditionally used the land? How will better information about how water flows in the soils and the environment impact us?
GLOBE Protocols www.globe.com	GLOBE Protocols within "Soils" — Soil Characterization, Particle Size Distribution, Soil Moisture Sensor, Soil Temperature, Optional Infiltration, Bulk Density.

Ecosystems Science Core Curriculum	
Essential Question #5: How does water control the abundance and distribution of plants and animals in our desert?	
Goal	Students will understand the relationship between the environment and the abundance and distribution of plants and animals.
Objectives	Students will understand the relationships between plants, animals, and water.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	E5A2 Students know the processes of the water cycle, including the role of the sun. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems.
FOSS Kit Correlation	**Modules:** Environments (Investigations 1, 3, and 4)
Prerequisite Classroom Experiences	**Prior Knowledge and/or Background Activities:** Completion of the Environments FOSS Kit

Activities	Site(s)	Equipment	Time
Students will compare/contrast percent plant coverage in riparian and upland systems.	Ecological study plots: Transects through riparian and upland systems	Measuring tape Sample quadrants	1—2 hours
Students will compare/contrast species richness (the number of species found) in upland and aquatic systems.	Ecological study plots: Transects through riparian and upland systems	Field guide to plants and animals Measuring tape	1—2 hours
Students will compare/contrast growth of upland and riparian plants in “alternative” regimes of water availability.	Greenhouse	Greenhouse Piezometer Plants, pots, soil,	30 minutes
Students will understand how groundwater controls the abundance and distribution of plant species.	Shallow wells Walk-through lysimeter	Measuring “dip stick” for depth to water table Measuring tape	2 hours
Students will measure distance of plants to water, percent plant coverage over soil, and plant height in relation to soil moisture.	Ecological study plots in riparian and upland systems	Measuring tape Piezometer Sample quadrants	1—2 hours

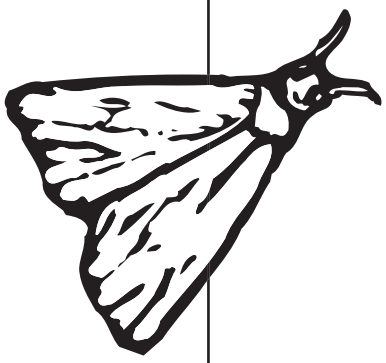
Ecosystems Science Core Curriculum (Essential Question #5 continued)	
Notebook	Students document and describe investigations in a science notebook for all activities taking place during the length of their visit to the site.
Presentations of Findings	Oral presentation; poster; skit; poem; other.
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their schools. • Students link to other public land websites through the Red Rock Canyon National Conservation Area website.
Resources	
Multicultural/Historical/Social Connections:	Question(s): • How did American Indians in the area (i.e., Southern Paiutes) exist with the animals, plants, and water resources in the area both pre-European contact and today? How has the presence of water influenced human use of the desert learning center site? How has settlement of the Las Vegas valley influenced the availability of surface water and ground water for human use?
GLOBE Protocols www.globe.com	



Ecosystems Science Core Curriculum	
Essential Question #6: How do aspects of the physical environment control where and when plants and animals grow?	
Goal	Students will understand the relationship between the environment and the abundance and distribution of plants and animals.
Objectives	Students will understand the relationships between the environment and the spatial and temporal variation in plant and animal communities.
Curriculum Essentials Framework Correlation	(5) 2.6 Investigate and describe how some environmental conditions are more favorable than others to living things. (5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	E5A5 Students know the role of water in many phenomena related to weather (e.g., drought, thunderstorms, flood). E5C3 Students know that landforms may result from slow processes (e.g., erosion and deposition) and fast processes (e.g., volcanoes, Earthquakes, landslides, flood, and human activity). E5C5 Students know that soil varies from place to place and has both biological and mineral components. L5C2 Students know that organisms interact with each other and with the non-living parts of their ecosystem.
FOSS Kit Correlation	**Modules:** • Environments (Investigation 2, 3, and 4)
Prerequisite Classroom Experiences:	**Prior Knowledge and/or Background Activities:** • Completion of the Environments FOSS Kit

Activities	Site(s)	Equipment	Time
Students will compare/contrast abundance and density of plant species in at least three unique systems during each season over a period of several years.	Upland and riparian systems, desert wash, horse corral, gardens, trails, roadsides, etc.	Sample quadrants Tape measure	1—2 hours
Students will compare/contrast abundance and density of aquatic life in spring-fed wetlands during each season over a period of several years.	Springs	Wet laboratory Microscope Sample grids	1—2 hours
Students will understand that different soil and moisture properties control the growth and abundance of plants.	Field: Walk-through lysimeter Lab: terrarium in a bottle	Lysimeter Terrarium	2 hours
Students will identify and count the animal tracks recorded, both day and night, in smoothed sand study plots in different physiographic settings.	Ecological study plots	Field guide to animal tracks	2 hours

Ecosystems Science Core Curriculum (Essential Question #6 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will identify and count insects collected on insect sticky traps left overnight in several different physiographic setting in the same plant community.	Ecological study plots	Insect sticky traps Field guide to insects	1—2 hours
Students will document spatial and temporal variation in plant communities using photo points where pictures are taken during each season over a period of several years.	Repeat photo stations: Upland and riparian systems, desert wash, horse corral, gardens, trails, roadsides, etc.	Digital camera	1 hour
Notebook	Students will record observations and data using words, numbers, and drawings to document and describe investigations in a science notebook for all activities taking place during the length of their visit to the site.		
Presentation of Findings	Oral presentation; poster; skit; poem; other		
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their schools. • Students link to other public land websites through the Red Rock Canyon National Conservation Area website.		
Resources			
Multicultural/Historical/Social Connections	American Indian horticulture in Las Vegas valley (i.e., Southern Paiute) depended on surface water and or/ shallow groundwater. Gardens of the Southern Paiutes.		
GLOBE Protocols **www.globe.com**	GLOBE Protocols within "Soils" — Soil Characterization, Soil Temperature, Soil Moisture.		



Ecosystems Science Core Curriculum	
Essential Question #7: How does disturbing the desert change plant and animal communities?	
Goal	Students will understand the relationship between the environment and the abundance and distribution of plants and animals.
Objectives	Students will understand the effect of disturbance on functional characteristics of plant and animal communities.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats. (5) 4.11 Explain that changes in environment can be natural events or influenced by human activities, including technology. (5) 4.2 Investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all. (5) 2.3 Investigate and describe how plants and animals have features that help them live in different environments.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	E5A5 Students know the role of water in many phenomena related to weather (e.g., drought, thunderstorms, flood). E5C3 Students know that landforms may result from slow processes (e.g., erosion and deposition) and fast processes (e.g., volcanoes, Earthquakes, landslides, flood, and human activity). L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems.
FOSS Kit Correlation	**Modules:** • Environments (Investigations 3 and 4)
Prerequisite Classroom Experiences:	**Prior Knowledge and/or Background Activities:** • Completion of the Environments FOSS Kit • Development of a definition of disturbance • Ability to use a calculator to quantify area and percentages • Working knowledge of using a compass

Activities	Site(s)	Equipment	Time
Students will investigate human disturbance and the kinds of disturbances found in nature, including those used by floods, rock slides, drought, volcanic eruptions, etc.	Field: erosional sites, flood locations Flex-labs	Maps Aerial photos Computer (in lab)	1—2 hours
Students will compare/contrast plant density in disturbed and undisturbed settings in at least three unique systems during each season over a period of several years in both riparian and upland systems.	Upland and riparian communities, trails, parking lots, horse corrals, roadsides, etc.	Tape measures Sample quadrants	1—2 hours
Students will compare/contrast plant density in disturbed and undisturbed aquatic systems.	Springs Flex-labs	Sample nets Sorting trays/wet lab	1—2 hours

Ecosystems Science Core Curriculum (Essential Question #7 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will compare/contrast temporal changes in plant communities in disturbed and undisturbed upland and riparian systems.	Upland and riparian communities, trails, parking lots, horse corrals, roadsides, etc.	Digital camera (photo points) Video recorders	1—2 hours
Notebook	Students document and describe investigations in a science notebook for all activities taking place during the length of their visit to the site.		
Presentation of Findings	Oral presentation; poster; skit; poem; other.		
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their schools. • Students link to other public land websites through the Red Rock Canyon National Conservation Area website.		
Resources			
Multicultural/Historical/Social Connections	American Indian interactions with plant and animal communities in the past and presently. Students will examine the beneficial and detrimental effects of introduced domestic animals on the natural ecosystem in the past.		
GLOBE Protocols **www.globe.com**	Land cover mapping protocol.		

Ecosystems Science Core Curriculum	
Essential Question #8: How are desert plants and animals adapted to their homes?	
Goal	Students will understand the relationship between the environment and the abundance and distribution of plants and animals.
Objectives	Students will understand the ways plants and animals have adapted to their environment.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats. (5) 4.2 Investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all. (5) 2.3 Investigate and describe how plants and animals have features that help them live in different environments. (5) 2.12 Investigate and describe how environmental changes allow some plants and animals to survive and reproduce but others may die.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems. L5D1 Students know animals and plants can be classified according to their observable characteristics. L5D2 Students know that fossils are evidence of past life. L5D3 Students know that differences among individuals within a given species give them advantages and/or disadvantages in surviving and reproducing.
FOSS Kit Correlation	**Modules:** • Environments (Investigations 1–6)
Prerequisite Classroom Experiences	**Prior Knowledge and/or Background Activities:** • Completion of the Environments FOSS Kit

Activities	Site(s)	Equipment	Time
Students will investigate insect adaptations to flowing and pond environments by examining aquatic insects both in the field and as preserved specimens.	Springs	Hand lens Sample trays Field guide to insects Preserved insect specimens	1—2 hours
Students will examine selected Mojave desert plants and their adaptations (i.e., soils, reproduction mechanisms, dispersal mechanisms, salt tolerance).	Field: Riparian areas, upland areas, alluvial fan, wash bottom Flex-labs	Hand lens Soil moisture probe Compass Inclinometer (to measure slope) Dissecting microscope (use specimens grown in greenhouse)	2 hours

Ecosystems Science Core Curriculum (Essential Question #8 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will examine locations and variations of animal homes such as burrows, nests, galls, aquatic structures, etc.	Upland areas, riparian areas, trees	Notebook Digital camera	1—2 hours
Students will observe different breathing mechanisms in aquatic and terrestrial animals taken from a "living tank" in lab. Students will compare/contrast physiological adaptations in aquatic and upland species.	Flex-labs	Dissecting microscope Field guides	1—2 hours
Students will examine fossil plants and animals from southern Nevada and learn how organisms have evolved through time.	Flex-labs	Hand lens Lab collection of fossil invertebrates, insects, and mammals	1—2 hours
Students will compare/contrast daytime and night-time animal activity in riparian and upland systems.	Riparian and upland areas, individual plants, e.g., cactus, mesquite, willow, etc., and compare different plant communities	Digital camera	1—2 hours
Students will compare/contrast daytime and night-time animal activity in aquatic systems.	On-site springs	Dissecting microscope Drift net Field guides Sample trays	1—2 hours
Notebook	Students document and describe investigations in a science notebook for all activities taking place during the length of their visit to the site.		
Presentation of Findings	Oral presentation; poster; skit; poem; other		
Follow-up Suggestions	• students follow up and post science notebook entries online • students share what they have learned with others at their schools • students link to other public land websites through the Red Rock Canyon National Conservation Area website		
Resources			
Multicultural/Historical/Social Connections	American Indian stories (especially those of the Southern Paiute–Las Vegas and Moapa) explaining plants and animals in the area. How did American Indians and early settlers use Mojave plants?		
GLOBE Protocols www.globe.com			

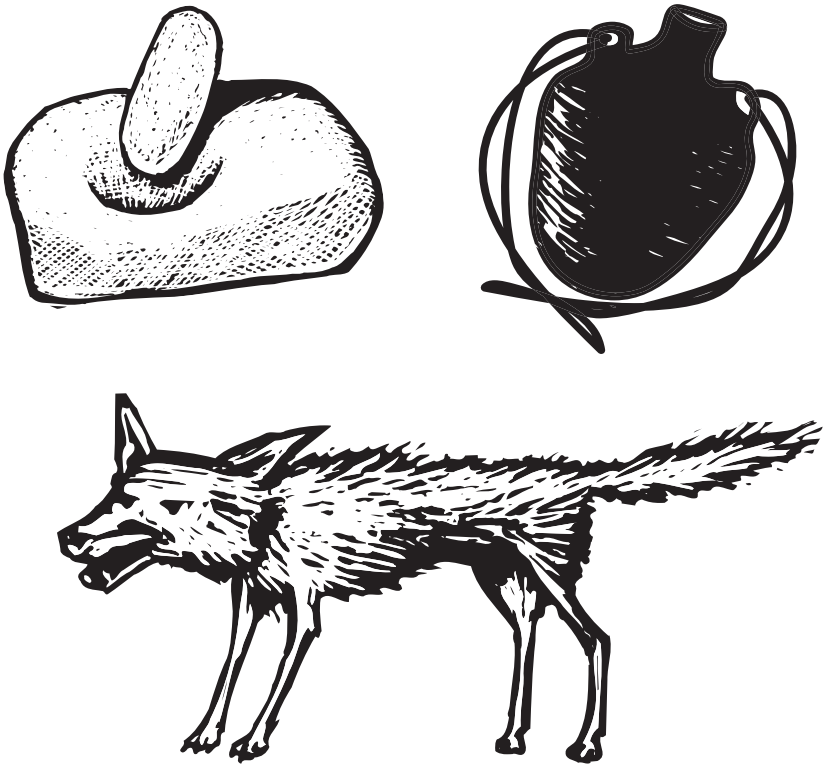
Ecosystems Science Curriculum Correlation to BLM Mission

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#1 What is the weather and climate at Red Rock Desert Learning Center? • Students working in groups use fire/ weather data kits to determine weather/ climate/predictions of fire to points. • Students correlate energy use to sustainable living (e.g., Dorms/ Dining Hall). If energy exists students construct a place to build solar power/ wind station, providing rationale.	• Solar radiation and energy • Weather and climate	• Prediction of fire/preparation of recreational experiences • Providing opportunities for the use of land for various energy resources • Solar radiation and energy
#2 What causes air pollution at Red Rock Desert Learning Center and in Las Vegas? • Students will participate in an inquiry-based culminating discussion of air quality and visibility data results. • Students read and interpret data collected from Acid Rain Monitoring Station–possibly graph and chart.	• Air quality • Visibility	• Health factors—air quality • Visual impact of particulates • Visual Resource Management (e.g., off road use)
#3 Where should we live to avoid geological hazards in Las Vegas? **#4 What happens to water in the desert soil?** • Students view and then construct gabions within their own created artificial streams. • Students use inquiry-based discovery. Where is water going to flow? Where is the safest place to be? • Students build exclosure for plants. Inquiry-based activity through which students explore water and soil. • Students weigh vegetation to determine moisture in the soil (e-fieldtrip for interactive website activity). • Students discuss Red Rock being on a major fault "olgulian fault." • Student discuss geological maps. • Inquiry-based discussion of the seismology lab.	• Deposition • Earthquakes • Ecology • Erosion • Fossils • Geological time • Soil moisture • Topographical mapping • Water flow	• Assessment of oil and gas leasing/claims to maintain the land • Correlate data to Fire/ Weather Station • Management for energy (e.g., oil/gas) • Management for fire control (e.g., determination of moisture in the soil and surrounding vegetation) • Management of hydrology and habitats • Management of sites for scientific research and study • Management of water flow/erosion (e.g., gabions) • Plant manipulation versus hydrological or other types of manipulation • Safety in relation to the purpose of a map

Ecosystems Science Curriculum Correlation to BLM Mission

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#5 How does water control the abundance and distribution of plants and animals in our desert? **#6 How do aspects of the physical environment control where and when plants and animals grow?** **#7 How does disturbing the desert change plant and animal communities?** • Student inquiry used to explore plant diversity and identification, discuss the importance of a collection policy and the use of marked trails.	• Desert plants	• Management of threatened and endangered species - providing stable environments and eliminating change
#8 How are desert plants and animals adapted to their homes? • Students are introduced to riparian environments assessment through a demonstration. Students are given a typical riparian environmental (question/problem) scenario. • Students view "gap map" and then visit the area to determine if the site exists and correlate to possible animal habitats. • Students conduct a "random transect" study (e.g., hoola hoop activity). Students toss the hoop and then study within the circumference. Students use both methods of study and start from a fixed area.	• Adaptations of aquatic environments • Density and diversity and change over time • Locations and variations of animal homes	• Density/Diversity of change over time (e.g., plant/cultural resources/animals) • Habitat Mapping "GAP Mapping" (e.g., computer models/satellite images to determine plants in the area then researchers visit the site) • Methods of monitoring riparian environments (e.g., assessing changes in temperature/ oxygen/minerals) • Microcosmic view of the "health of the land"

Cultural Connections Core Curriculum



Cultural Connections Core Curriculum Rationale

Students will have an opportunity to develop an appreciation of Southern Nevada culture, in particular Nevada land and natural resources in addition to an historical view of community life for various Nevadan cultures. The goal of the cultural curriculum is to help students understand the relevance of local culture in addition to documenting and understanding events of the past. The activities might include student exploration of a "mystery grab bag" of artifacts representing what brought people to Nevada at a particular time, or students will visit the interpretive ranch house on site and explore the living space of the ranchers to develop an understanding of the ranching culture in Nevada.

Students will inquire into the following questions:

- How has the use of Southern Nevada land changed over time?
- How has the use of Southern Nevada's natural resources changed over time?
- How do we take care of the land and its resources?
- How do we document and capture what happened in the past?
- Throughout history what was community life like for the various cultures?
- What does Red Rock mean to people? How has that meaning changed over time?

Cultural Connections Core Curriculum	
Essential Question #1: How has the use of Southern Nevada land changed over time?	
Goal	Students will explore immigration to Southern Nevada and various land usage among cultures over time.
Objectives	Students will: • explore and understand how Southern Paiutes view their relationship with the land; • understand and learn how the various mountains have special meaning to the Southern Paiutes and how the land is used and regarded today; • understand why people chose to come to Southern Nevada; • explore the use of land for food resource(s); • discuss and explore the development of trails. Students will understand how trail development fostered connections and how it has impacted accessibility to sacred areas for Southern Paiutes; and • be able to jigsaw and learn about 5–10 present day citizens who have had an impact on the land use in Nevada and how it has impacted their tribe(s).

Cultural Connections Core Curriculum (Essential Question #1 continued)	
Curriculum Essentials Framework Correlation	(5) 4.2 Record and interpret events on a graphic organizer, such as a calendar or time line. (5) 4.3 Ask a historical question and identify resources to be used in research. (5) 4.5 Define hunter-gatherer. (5) 4.7 Describe Native North American life prior to European contact (e.g., clothing, communication, family, food, shelter, transportation, tools). (5)3.18 Identify the parts of different ecosystems, including soil, climate, plant life, and animal life. (5) 4.9 Identify and describe the reasons for early exploration of the New World. (5) 3.35 describe how the physical setting influenced an event in the past.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Experience with timelines • General knowledge of Southern Nevada history • Discussion of terms: *Native American*, *American Indian*, and *Indigenous Peoples*

Activities	**Site(s)**	**Equipment**	**Time**
Students will listen to a Southern Paiute creation story. In groups, students will create a historical timeline for Southern Paiutes, with each group selecting one of the periods listed below, researching, creating appropriate visuals, and then assembling resulting artwork into a large, stacking "visual timeline." a. B.E.C. (before European Contact) b. A.E.C. (after European Contact) c. Present-day Paiutes.		Special guest and/or slide show or video Paper, pencil, crayons, markers, colored pencils, and/or clay or covered boxes	1 hour
Students will listen to a story that explains the significance of the different areas to the Southern Paiute people.	Dining Hall	Special guest–same as above. Incorporate information from this activity into timeline from activity #1, above.	30 minutes
Students are given a grab bag of artifacts representative of the incentives that drew people to Nevada (e.g., gold, silver, land, railroad employment, etc.) Students choose an item and describe it. Students discuss what the artifacts mean to them. Students then discuss what the artifacts mean collectively. Students assemble an "artifact timeline."		Various artifacts representative of Nevada: poker chips (gambling); sand (land); willows (baskets); airplane (Nellis Airforce Base); pine nuts (American Indians); fake fur (hunting); bonnet (pioneers); and others as appropriate.	30 minutes

Cultural Connections Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will explore the land usage for food. Students will be asked, "If you did not have a grocery store where would you get your food?" Students will identify edible plant foods that American Indians used and discuss how and if those resources are still available. Students will be given a fact sheet on the different plants, and they will make a plant key to identify plants on trails. Students will explore other ways that plants were used. Students will present their plant information to the whole group.	Dining Hall Trails	Plant fact sheet Book: *Uses of Native Plants by Nevada Indians*	1-2 hours
Students will explore other important aspects of the land. Students will tour the site and explore various geological and hydrological resources as well as open land/grasses and climate. Students will hike various trails and sketch resources and landscapes. Students will display their drawings in a mock museum.	Dining Hall Trails	Sketch pad	1 hour
Students will discuss 4—5 present-day American Indians who have made a difference regarding land use (e.g., cattle, casinos, housing, etc.) and impacted their tribe(s). Students will present their findings through song, drawing, poem, rap, or other appropriate method.		Short biographies of local Southern Paiutes	30 minutes
Notebook/Vocabulary	artifact; calendar; hydrology; timeline		
Presentation of Findings	artifact timeline; plant exploration; sketches in the student museum; drawings; speeches; debates; poems		
Follow-up Suggestions	3.14 Describe how the community and Nevada have changed over time [NS 2.5.6]		
Resources	• Indian Education • Las Vegas Paiute Tribal Seniors • Reed, Flo. (1962, 1971) *Uses of Native Plants by Nevada Indians*. Carson City, NV: Nevada State Department of Education, • Southern Paiute Creation Story, Mountain Story, Noah Story [recorded or told by guest] • www.clan.lib.nv.us • www.native-languages.org • www.pbs.org/wgbh/amex/lasvegas/peopleevents • www.unr.edu/nnap/NT/st-30.htm • www.unr.edu/nnap/NT/st-32.htm		
Multicultural/Historical/Social Connections	Integrated into lessons.		

Cultural Connections Core Curriculum	
Essential Question #2: How has the use of Southern Nevada's natural resources changed over time? How do we take care of the land and its resources?	
Goal	Students explore the use and care of Southern Nevada's natural resources and land.
Objectives	Students will: • discover the ways food, shelter, and clothing were provided for the various cultures of Southern Nevada, especially Southern Paiute; • explore the use of natural resources and how these resources were viewed by various cultures; • discuss materials used to build shelters and what those shelters looked like; • compare building materials of the past to building materials uses today; • investigate the source and distribution of water over time; and • understand the water rights of Southern Paiutes and how these rights have affected the tribe(s) and their present-day culture in terms of housing, money, and status.
Curriculum Essentials Framework Correlation	(5) 3.4 Construct maps, charts, tables, and graphs to display information about human and physical features in the United States. (5 2.17 Identify the resources needed for production in households, schools, and community groups. (5) 3.14 Describe how the community and Nevada have changed over time. (5) 3.30 Describe ways in which changes in the physical environment affect humans. (5) 3.32 Explore the impact of human modification of the physical environment on the people who live in that location. (5) 3.35 Describe how the physical setting influenced an event in the past.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Experience reading charts and timelines • General knowledge of Southern Nevada history

Activities	Site(s)	Equipment	Time
Students will be introduced to a land use comparative chart and timeline. Students will build upon and complete the chart by collecting data cards representing land resources and land usage and positioning these cards on the chart. Students will be asked to discuss the chart and draw conclusions about land use. The data cards are representative of the type of food items the Southern Paiutes, miners, and pioneers ate (e.g., pine nuts, grasses, yucca, berries, rabbits, roots, insects, etc.) and what nutrients they gained from each item. Students will record facts and illustrate their journals, comparing past foods with foods from today that fulfill the same nutritional values. Students will compare/contrast Southern Paiute diets to that of the miners and pioneers	Dorm	Data cards Chart 	1 hour

Cultural Connections Core Curriculum (Essential Question #2 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will explore various shelters, including the interpretive ranch house on-site. Students will listen to a story about Southern Paiutes and the house(s) they lived in. Students will build a miniature house (*wikkiup*) from natural materials after learning how the Southern Paiute built their homes and factors that contributed to their particular style. Students will compare/contrast the wikkiup to homes used by other cultures (e.g., miners, pioneers, etc.) Students will then create a model of the ideal shelter for the area. Students will take into consideration materials available, shelter size, climate, and conditions. Students will display their models in the museum.	Interpretive Ranch Site Dining Hall	Plants Twigs Rocks	1 hour
Students will be asked where water comes from. The instructors will present information about Tule Springs and how the Southern Paiutes perceive water. Students will examine the site for water usage and asked to map the source of the water and how the water is stored. Students correlate land/water use to the needs of people. The instructor introduces the "ecological footprint" concept. Students will determine how some activities (e.g., grazing/mining) impact the size of a footprint more than others. Students will construct models to restore specific conditions, providing rationale.	Dining Hall Trails	Information sheet on Southern Paiutes and Tule Spring Materials to sketch wetlands restoration model	30 minutes
Students will hike to the campground by the springs. Students will use materials there to build a shelter based on their models for an overnight camp experience. Students compare/contrast these dwellings with today's buildings, in terms of resources and footprint.	Springs camp area Trails	Overnight camp kits	1 hour
Notebook/Vocabulary	ecological footprint; environment; model; natural resources; nutrients; shelter; Tule Springs; Wikkiup		
Presentation of Findings	Venn Diagram; chart; map; student-built shelter		
Follow-up Suggestions			
Resources	Las Vegas Paiute Tribal Seniors		
Multicultural/Historical/Social Connections	Integrated into lessons.		

Cultural Connections Core Curriculum	
Essential Question #3: How do we document and capture what happened in the past?	
Goal	Students explore documentation of past events.
Objectives	Students will: • discuss artifacts and what artifacts tell about a culture; • be able to detect where artifacts belong in history; • explore the idea of preservation; • examine the ways sites of cultural significance are documented; • discuss the ideas of farming vs. hunting and gathering and farming vs. gardening; • discuss the idea of stock raising and mining; • understand the Native American Graves Protection and Repatriation Act (NAGPRA) and how it has impacted museums, private ownership, and auctions; • debate the pros and cons of digging up a site (American Indian and pioneer); and • discuss selected *Time Magazine* article (March 13, 2006 Vol. 167 No. 11).
Curriculum Essentials Framework Correlation	(5) 4.4 Organize historical information from a variety of sources. (5) 3.42 Investigate and interpret information from a variety of geographic resources. (5) 3.43 Draw a conclusion by presenting geographic information in an oral or written report accompanied by maps or graphics. (5) 4.2 Record and interpret events on a graphic organizer, such as a calendar or timeline.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • General knowledge of Southern Nevada history

Activities	Site(s)	Equipment	Time
Students will participate in a simulated archaeological dig. Planted artifacts will serve as the clues needed to solve a mystery. Students will study the clues they uncover and hypothesize how the site was formed and why certain objects survived in the archaeological record. Students will discover that a collection of artifacts only tells part of the story of the site and its inhabitants (i.e., that interpretations differ depending upon which artifacts survive or are found and the stratigraphic level at which an artifact is found). Topics addressed will include: general archaeology; differential preservation; natural forces of erosion; spatial context; stratigraphy; and others. Laws protecting cultural resources will also be addressed. Students will participate in a mock debate involving the Native American Graves Protection and Repatriation Act.	Trails Simulated dig sites Flex-labs	Data cards Chart	1 hour

Cultural Connections Core Curriculum (Essential Question #3 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will conduct an archaeological survey of the planted artifacts (clues; see above) and will conduct a mock excavation of the site. Students will clean the artifacts, take photos, and use a provided key to identify the artifacts. At the Interpretive Ranch Site, students will examine additional artifacts, reproductions, and photographs. Students will use this information and study other mock digs to incorporate more information into or better interpret their own survey.	Dining Hall Trails Simulated dig sites Flex-labs Interpretive Ranch Site	Archaeological survey tools Digital cameras Artifact key	1 hour
Students will correlate their artifacts to a timeline of events. Students will determine the purpose of each artifact and draw conclusions about the site and times. Students will compare/contrast the artifact to similar tools and objects in use today.	Flex-labs	Historical timeline	30 minutes
Students will map the archaeological site, attributing the area to a particular culture. Based upon the archaeological evidence, students will formulate a hypothesis about the culture. Students will present their findings to the whole group.	Trails Simulated dig site Dining Hall	Map-making materials	30 minutes
Students will read and discuss: Time Magazine article, "Who Should Own the Bones?" on NAGPRA and Kennewick Man and the on-line article "Can You Dig It?" by Sharman Apt Russell.	Dining Hall	"Who Were the First Americans?" "Can You Dig It?"	15 minutes
Notebook/Vocabulary	archaeology; artifact; culture; dig; excavation; history; mock; Native American Graves Protection and Repatriation Act (NAGPRA); preservation; resources; simulation; survey		
Presentation of Findings	map, discussion		
Follow-up Suggestions			
Resources	• Lemonick, M. D. and Dorman, A. (2006) "Who Were the First Americans?" *Time Magazine,* 13 March 2006: Vol. 167, No. 11. • www.1st100.com/part3/mitre.html • www.greatbasinweb.com • www.cr.nps.gov/nagpra • www.native-languages.org/iaq8.htm#17 • www.pbs.org/wgbh/amex/lasvegas/peopleevents		
Multicultural/Historical/Social Connections	Integrated into lessons.		

Cultural Connections Core Curriculum	
Essential Question #4: What was community life like for various cultures?	
Goal	Students explore community life of various cultures.
Objectives	Students will: • examine the social structure of various cultures including American Indians of Nevada and settlers of Nevada; • discuss communication between and among American Indians and settlers in the past and explore different forms of communication; • compare/contrast communications between American Indians and settlers in the past and currently; • examine the influences of communication; • explore family life and compare/contrast their lives with the lives of children from various cultures in early Nevada; and • discuss the idea of customs explore various American Indian and settler-era customs.
Curriculum Essentials Framework Correlation	(5) 4.3 Ask a historical question and identify resources to be used in research. (5) 4.2 Record and interpret events on a graphic organizer, such as a calendar or time line. (5) 4.4 Organize historical information from a variety of sources. (5) 4.7 Describe Native North American life prior to European contact.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Basic understanding of genealogy and family trees • Experience with timelines • General knowledge of Southern Nevada history

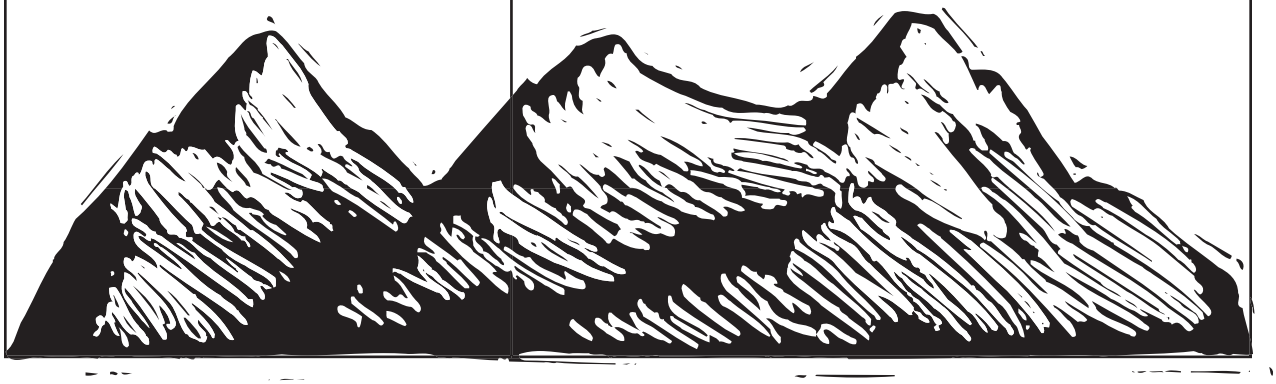
Activities	**Site(s)**	**Equipment**	**Time**
Students will study the Wheeler Camp Spring entries of the Fremont diaries; *Life Among the Paiutes* (S. Winnemucca); and other historic materials (e.g., newspapers, oral history reports, journals, etc). Students will examine the basic models of social structure among American Indian, ranching, mining, and other cultures of Nevada (as described in *Celebrating Nevada Indians*). Students will research roles and role play to better understand historical family dynamics in Southern Nevada. Student groups will develop questions and interview each other about his or her character's life. Students will document their findings.	Friendship Circle Trails	*Celebrating Nevada Indians* curriculum materials *Life Among the Paiutes* (S. Winnemucca) Fremont Diaries Historic documents	1 hour
Students will be given early Nevada communication forms (e.g., rock art, petroglyphs, and Paiute and English texts and/or recordings. Students will discuss communication between and among American Indian and settlers; develop a timeline of communication changes over time; and discuss its impact on residents of Southern Nevada.	Trails Simulated excavation sites Dorm	*Celebrating Nevada Indians* curriculum materials	30 minutes

Cultural Connections Core Curriculum (Essential Question #4 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will research various cultural customs existing over time in Southern Nevada. Students will create a display explaining a particular custom.	Dining Hall	*Celebrating Nevada Indians* curriculum materials	30 minutes
Students will be given old catalogs of clothing, shoes, and other household items. Students will pay special attention to the pricing and advertising style used for selected items. Students will create an original advertisement for a historical product. The advertisement must be appropriate to the timeframe in which the chosen product was used and must describe the item's price and use..	Art Pavilion Trails	Historical catalogs Art supplies	30 minutes
Notebook/Vocabulary	artifacts; culture; cultural customs; diaries; historical record; oral history; petroglyphs; rock art; role play; social structure		
Presentation of Findings	cultural customs timeline; cultural customs display; historical product advertisement		
Follow-up Suggestions			
Resources	• Antique catalogs • *Celebrating Nevada Indians* curriculum • Fremont diaries and other historical documents [need source] • Hopkins, Sara Winnemucca. *Life among the Paiutes: Their Wrongs and Claims* (reproduction) Reno: University of Nevada Press, 1994 • Petroglyph and rock art photos/sketches • Social Structure Models from *Celebrating Nevada Indians* • Southern Paiute dictionary • www.native-languages.org/iaq8.htm#17 • www.pbs.org/wgbh/amex/lasvegas/peopleevents		
Multicultural/Historical/Social Connections	Integrated into lessons.		

Cultural Connections Core Curriculum	
Essential Question #5: What does Red Rock Canyon mean to people? How has its meanings both changed and remained consistent over time?	
Goal	Students will explore the meanings of Red Rock Canyon.
Objectives	Students will: • uncover the differing significance of the Red Rock Canyon area to various peoples; • examine how the meanings of Red Rock Canyon has both changed and remained consistent over time; and • analyze the perspectives of those impacted by development and construct questions and arguments demonstrating knowledge of the various meanings of the area for a mock land-development debate.
Curriculum Essentials Framework Correlation	(5) 3.35 Describe how the physical setting influenced an event in the past. (5) 3.36 Use current events to ask and answer geographic questions. (5) 3.37 Discuss a geographic issue from more than one point of view. (5) 3.40 Locate and gather geographic information from a variety of sources. (5) 3.26 Investigate an economic issue by asking and answering geographic questions about location. (5) 3.29 Describe issues of cooperation and conflict within the United States. (5) 3.35 Describe how the physical setting influenced an event in the past.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • General knowledge of Southern Nevada history

Activities	Site(s)	Equipment	Time
Students will tour the ranch site and discuss its development over time; interpretive displays will aid the discussion. Students will learn what the area meant and still means to American Indians of Southern Nevada. Students will begin to identify various perspectives held by American Indians, developers, home owners, preservationists, etc.	Trails Interpretive ranch site	Southern Paiute Guest Speaker	45 minutes
Students will explore trails, theorize possible uses, and discuss historical forms of transportation. Students will learn some trails are viewed as historic artifacts. Students will adopt a trail and determine whether it should be protected, and, if so, how to protect it. Students will create interpretive signs about their trails. Students will compare disturbed and undisturbed terrain. Preservation and protection will be discussed (including relevant laws).	Trails Flex-labs	Art supplies Digital cameras Computers and printers	1 hour
Students will participate in a mock land-development debate that considers the perspectives of American Indians, developers, preservationists, etc..	Dorm	Interest group perspective cards	30 minutes

Cultural Connections Core Curriculum (Essential Question #5 continued)	
Notebook/Vocabulary	culture; customs; debate; development; impact; ownership; perspective; Preservation Act; value
Presentation of Findings	Mock debate
Follow-up Suggestions	
Resources	• Copies of relevant cultural resources management laws that the Bureau of Land Management cites in its management plans, including: the Antiquities Act of 1906; the National Historic Preservation Act of 1966; the National Environmental Policy Act of 1969; Executive Order 11593 of 1971; the Archaeological and Historical Preservation Act of 1974; the Federal Land Policy Management Act of 1976; the Archaeological Resources Preservation Act of 1979; and the Red Rock Canyon National Conservation Area Establishment Act of 1990. References to these laws may be found in the 2005 Resource Management Plan for Red Rock Canyon National Conservation Area or, in lieu of that document (effective September 21, 2005), in the 2000 Proposed General Management Plan/Final Environmental Impact Statement for Red Rock Canyon National Conservation Area (December 2000). • Southern Paiute guest speaker • Weissenstein, Michael (2001) "Moapa Paiute Indians: Deal near on power plant." *Review Journal* 27. • www.pbs.org/wgbh/amex/lasvegas/peopleevents
Multicultural/Historical/Social Connections	Integrated into lessons.



Cultural Connections Core Curriculum Selected Resources

Origin of the Great Basin People

Long ago in the beginning, there was a great body of water around the land of the coyote. One day as he was on one of his journeys, he saw some distant lands across the water. Since he could not swim across the water, he tricked the water bug into carrying him on his back. Waterbug was afraid of the Coyote but the Coyote knew if he did not behave, the waterbug would dump him in the middle of the water. Coyote made it safely across the water and began his journey.

Along the way he met some people and stayed with them. While he was there he acquired a bride, the daughter of one of the leaders. The leader did not trust Coyote and knew he was always up to mischief. The leader wanted him to leave, but knew Coyote would take his daughter with him. So he told Coyote that if he would leave he would give him a great gift to take with him in exchange for his daughter. Coyote, enticed by the thought that he would be given this gift, decided he could always find another bride and agreed to the trade. When he left the leader gave him a woven willow basket with a lid and told him that he was not to open the lid until he returned to his homeland.

Coyote was a very curious person and had little patience. As he was traveling, he could hear sounds and movements within the basket. The sounds sounded like singing and drums beating. Coyote thought it would not hurt to take a small peek once he returned to the other side of the body of water. So once he touched the land, which was far from his homeland, Coyote opened the basket. Immediately, the little people who were inside the basket, jumped out and began running in all directions. Stunned, he watched them run away. He quickly shut the lid on the basket, fearing that he would lose all of them.

When he returned home, he opened the basket again, finding only three little people left in the basket. These three people stayed in this area and became the Great Basin People. The others who got away from Coyote were all the other Native American tribes that populated the North and South American continents.

Retrieved from www.unr.edu/nnap/NT/st-30.htm

The First Encounter

As stories are handed down from one generation to the next, the Western Shoshone learned about their culture and past history. Here is a personal account of one family's first encounter with Europeans. This story has been handed down through five generations of their family. This story takes place near Battle Mountain, Nevada. At one time, the mountains were entirely covered with pinion-pine trees but a huge fire had wiped out the area and the trees never grew back.

At dusk, the family continued their harvesting of pine nuts, in the mountains west of the Battle Mountain area. The father was distracted as he worked, because earlier that morning, he saw a large cloud of dust down on the flats along the Humboldt. He watched it come closer and closer. Fearing that it may be a large war party, he was concerned for the safety of his family.

Finally, he told his family that it was getting too dangerous to stay and work any longer. He needed to go see who was coming and if it was one of their enemies, then they needed to leave the area and head south, towards their main camp.

He took them and hid them in a small cave in the mountains and told them to stay there all day. If he didn't come back by nightfall, they were to leave the area and find their people in the south. He covered-up the opening with rocks, leaving a small breathing hole. He camouflaged the rocks by putting large bushes in front of them and erased any remaining traces. They listened as he ran down the mountainside.

The family waited all day, making no sounds. They could not hear or see.

Retrieved from www.unr.edu/nnap/NT/st-32.htm

NAGPRA

The Native American Graves Protection and Repatriation Act (NAGPRA)
A Federal law passed in 1990. NAGPRA provides a process for museums and Federal agencies to return certain Native American cultural items–human remains, funerary objects, sacred objects, and objects of cultural patrimony–to lineal descendants, culturally affiliated Indian tribes, and Native Hawaiian organizations.

The National NAGPRA Program
assists the Secretary of the Interior with some of the Secretary's responsibilities under NAGPRA, and focuses on NAGPRA implementation outside of the National Park System. Among its chief activities, National NAGPRA develops regulations and guidance for implementing NAGPRA; provides administrative and staff support for the Native American Graves Protection and Repatriation Review Committee; assists Indian tribes, Native Alaskan villages and corporations, Native Hawaiian organizations, museums, and Federal agencies with the NAGPRA process; maintains the Native American Consultation Database (NACD) and other online databases; provides training; manages a grants program; and makes program documents and publications available on the Web.

Retrieved from http://www.cr.nps.gov/nagpra/

Alfreda Mitre Quote

There was a water rights lawsuit with the Las Vegas Valley Water District, settled out of court in 1996, ending up with the Paiutes getting 2,000 acre-feet of water a year, enough to develop two of the four courses, a residential area, and a resort hotel. Two courses, designed by the renowned Pete Dye, are open. Mitre said the Paiute want to remain good neighbors to the growing city of Las Vegas.

"If you look at what has happened in other areas, when human remains are unearthed–under the American Indian Repatriation Act, a tribe can put a stop to almost any kind of development, if they choose. But we don't do that. We have the philosophy to take only what you need, no more, and no less."

Retrieved from www.1st100.com/part3/mitre.html

Setting the Record Straight about Native Peoples: Origins of American Indians

How did Indians get to the Americas?

Well, Native American tradition is that Indians were always here. Most of the scientific evidence is that Indian ancestors came from Asia in prehistoric times, when mammoths and other ancient animals did. This would have had to happen more than 20,000 years ago, when there was still a land bridge there. No human culture has good records of what it was doing 20,000 years ago, so perhaps we're both right. For a supplement about why the Bering Strait theory makes Indians so mad, [click link on website].

Is it possible Indians migrated to America much more recently than that, like 700 or 1000 years ago?

No. There are archaeological sites between five and ten thousand years old, and Native American oral histories–like oral histories in other parts of the world–go back thousands of years. Also, by the time of European contact 500 years ago, there were some forty million natives dispersed throughout the entire Western Hemisphere. It would have been impossible for a single group of migrants to accomplish that in 200 or 500 years.

Q: If Native Americans migrated from Asia, then they're not really 'Native' at all, right?

Even if Native Americans migrated from Asia, they have been here 20-30,000 years longer than Europeans. Whether or not you call that 'native' is up to you. But the Americas have been inhabited longer than England (12-15,000 years) or northern Europe (10,000 years).

By the way, is it *Native American*s, *American Indian*s, or what?

The languages are properly referred to as 'Amerindian'. As for the people, opinion is divided on that count. Most native people in the United States use 'Indian' or 'American Indian'. In Canada, 'First Nations' and 'aboriginal' are getting more popular. In Central America, many people use 'indigeno' or 'indigenous'. The truth is that any of these–or 'Native Americans', or 'native peoples', or anything else polite–is fine. It's a generic term, after all, like 'European'. Each of our nations has its own name and identity. So to the best of my experience, we don't have too much tied up in what we get called as a collective term, any more

than a Frenchman and an Englishman would argue over the word 'Europe'. On this website, we have used 'American Indian', 'Native American', and 'native peoples' more or less interchangeably. I've been a little worried that 'American Indians' may sound like we're referring only to Indians in the US, which is not our intent. We are just trying to use general terms which everyone will understand.

Retrieved from www.native-languages.org/iaq8.htm#17

Who Were the First Americans?

By: MICHAEL D. LEMONICK and ANDREA DORFMAN

It was clear from the moment Jim Chatters first saw the partial skeleton that no crime had been committed–none recent enough to be prosecutable, anyway. Chatters, a forensic anthropologist, had been called in by the coroner of Benton County, Wash., to consult on some bones found by two college students on the banks of the Columbia River, near the town of Kennewick. The bones were obviously old, and when the coroner asked for an opinion, Chatters' off-the-cuff guess, based on the skull's superficially Caucasoid features, was that they probably belonged to a settler from the late 1800s. Then a CT scan revealed a stone spear point embedded in the skeleton's pelvis, so Chatters sent a bit of finger bone off to the University of California at Riverside for radiocarbon dating. When the results came back, it was clear that his estimate was dramatically off the mark. The bones weren't 100 or even 1,000 years old. They belonged to a man who had walked the banks of the Columbia more than 9,000 years ago.

In short, the remains that came to be known as Kennewick Man were almost twice as old as the celebrated Iceman discovered in 1991 in an Alpine glacier, and among the oldest and most complete skeletons ever found in the Americas. Plenty of archaeological sites date back that far, or nearly so, but scientists have found only about 50 skeletons of such antiquity, most of them fragmentary. Any new find can thus add crucial insight into the ongoing mystery of who first colonized the New World–the last corner of the globe to be populated by humans. Kennewick Man could cast some much needed light on the murky questions of when that epochal migration took place, where the first Americans originally came from and how they got here.

U.S. government researchers examined the bones, but it would take almost a decade for independent scientists to get a good look at the skeleton. Although it was found in the summer of 1996, the local Umatilla Indians and four other Columbia Basin tribes almost immediately claimed it as ancestral remains under the Native American Graves Protection and Repatriation Act (see box), demanding that the skeleton be reburied without the desecration of scientific study. A group of researchers sued, starting a legal tug-of-war and negotiations that ended only last summer, with the scientists getting their first extensive access to the bones. And now, for the first time, we know the results of that examination.

WHAT THE BONES REVEALED

It was clearly worth the wait. The scientific team that examined the skeleton was led by forensic anthropologist Douglas Owsley of the Smithsonian Institution's National Museum of Natural History. He has worked with thousands of historic and prehistoric skeletons, including those of Jamestown colonists, Plains Indians and Civil War soldiers. He helped identify remains from the Branch Davidian compound in Texas, the 9/11 attack on the Pentagon and mass graves in Croatia.

In this case, Owsley and his team were able to nail down or make strong guesses about Kennewick Man's physical attributes. He stood about 5 ft. 9 in. tall and was fairly muscular. He was clearly right-handed: the bones of the right arm are markedly larger than those of the left. In fact, says Owsley, "the bones are so robust that they're bent," the result, he speculates, of muscles built up during a lifetime of hunting and spear fishing.

An examination of the joints showed that Kennewick Man had arthritis in the right elbow, both knees and several vertebrae but that it wasn't severe enough to be crippling. He had suffered plenty of trauma as well. "One rib was fractured and healed," says Owsley, "and there is a depression fracture on his forehead and a similar indentation on the left side of the head." None of those fractures were fatal, though, and neither was the spear jab. "The injury looks healed," says Owsley. "It wasn't a weeping abscess." Previous estimates had Kennewick Man's age as 45 to 55 when he died, but Owsley thinks he may have been as young as 38. Nothing in the bones reveals what caused his demise.

But that's just the beginning of an impressive catalog of information that the scientists have added to what was already known–all the more impressive given the limitations placed on the team by the U.S. Army Corps of Engineers, which is responsible for the skeleton because the Corps has jurisdiction over the federal land on which it was found. The researchers had to do nearly all their work at the University of Washington's Burke Museum, where Kennewick Man has been housed in a locked room since 1998, under the watchful eyes of representatives of both the Corps and the museum, and according to a strict schedule that had to be submitted in advance. "We only had 10 days to do everything we wanted to do," says Owsley. "It was like a choreographed dance."

Perhaps the most remarkable discovery: Kennewick Man had been buried deliberately. By looking at concentrations of calcium carbonate left behind as underground water collected on the underside of the bones and then evaporated, scientists can tell that he was lying on his back with his feet rolled slightly outward and his arms at his side, the palms facing down–a position that could hardly have come about by accident. And there was no evidence that animal scavengers had been at the body.

The researchers could also tell that Kennewick Man had been buried parallel to the Columbia, with his left side toward the water: the bones were abraded on that side by water that eroded the bank and eventually dumped him out. It

probably happened no more than six months before he was discovered, says team member Thomas Stafford, a research geochemist based in Lafayette, Colo. "It wouldn't have been as much as a year," he says. "The bones would have been more widely dispersed."

The deliberate burial makes it especially frustrating for scientists that the Corps in 1998 dumped hundreds of tons of boulders, dirt and sand on the discovery site–officially as part of a project to combat erosion along the Columbia River, although some scientists suspect it was also to avoid further conflict with the local tribes. Kennewick Man's actual burial pit had already been washed away by the time Stafford visited the site in December 1997, but a careful survey might have turned up artifacts that could have been buried with him. And if his was part of a larger burial plot, there's now no way for archaeologists to locate any contemporaries who might have been interred close by.

Still, the bones have more secrets to reveal. They were never fossilized, and a careful analysis of their carbon and nitrogen composition, yet to be performed, should reveal plenty about Kennewick Man's diet. Says Stafford: "We can tell if he ate nothing but plants, predominantly meat or a mixture of the two." The researchers may be able to determine whether he preferred meat or fish. It's even possible that DNA could be extracted and analyzed someday.

While the Corps insisted that most of the bones remain in the museum, it allowed the researchers to send the skull fragments and the right hip, along with its embedded spear point, to a lab in Lincolnshire, Ill., for ultrahigh-resolution CT scanning. The process produced virtual slices just 0.39 mm (about 0.02 in.) thick–"much more detailed than the ones made of King Tut's mummy," says Owsley. The slices were then digitally recombined into 3-D computer images that were used to make exact copies out of plastic. The replica of the skull has already enabled scientists to clear up a popular misconception that dates back to the initial reports of the discovery.

WAS KENNEWICK MAN CAUCASIAN?

Thanks to Chatters' mention of Caucasoid features back in 1996, the myth that Kennewick Man might have been European never quite died out. The reconstructed skull confirms that he was not–and Chatters never seriously thought otherwise. "I tried my damnedest to curtail that business about Caucasians in America early," he says. "I'm not talking about today's Caucasians. I'm saying they had 'Caucasoid-like' characteristics. There's a big difference." Says Owsley: "[Kennewick Man] is not North American looking, and he's not tied in to Siberian or Northeast Asian populations. He looks more Polynesian or more like the Ainu [an ethnic group that is now found only in northern Japan but in prehistoric times lived throughout coastal areas of eastern Asia] or southern Asians."

That assessment will be tested more rigorously when researchers compare Kennewick Man's skull with databases of several thousand other skulls, both modern and ancient. But provisionally, at least, the evidence fits in with a revolutionary

new picture that over the past decade has utterly transformed anthropologists' long-held theories about the colonization of the Americas.

WHO REALLY DISCOVERED AMERICA?

The conventional answer to that question dates to the early 1930s, when stone projectile points that were nearly identical began to turn up at sites across the American Southwest. They suggested a single cultural tradition that was christened Clovis, after an 11,000-year-old-plus site near Clovis, N.M. And because no older sites were known to exist in the Americas, scientists assumed that the Clovis people were the first to arrive. They came, according to the theory, no more than 12,000 years B.P. (before the present), walking across the dry land that connected modern Russia and Alaska at the end of the last ice age, when sea level was hundreds of feet lower than it is today. From there, the earliest immigrants would have made their way south through an ice-free corridor that geologists know cut through what are now the Yukon and Mackenzie river valleys, then along the eastern flank of the Canadian Rockies to the continental U.S. and on to Latin America.

That's the story textbooks told for decades–and it's almost certainly wrong. The first cracks in the theory began appearing in the 1980s, when archaeologists discovered sites in both North and South America that seemed to predate the Clovis culture. Then came genetic and linguistic analyses suggesting that Asian and Native American populations diverged not 12,000 years ago but closer to 30,000 years ago. Studies of ancient skulls hinted that the earliest Americans in South America had different ancestors from those in the North. Finally, it began to be clear that artifacts from Northeast Asia dating from just before the Clovis period and South American artifacts of comparable age didn't have much in common with Clovis artifacts.

Those discoveries led to all sorts of competing theories, but few archaeologists or anthropologists took them seriously until 1997. In that year, a blue-ribbon panel of researchers took a hard look at evidence presented by Tom Dillehay, then at the University of Kentucky, from a site he had been excavating in Monte Verde, Chile. After years of skepticism, the panel finally affirmed his claim that the site proved humans had lived there 12,500 years ago. "Monte Verde was the turning point," says David Meltzer, a professor of prehistory at Southern Methodist University in Dallas who was on the panel. "It broke the Clovis barrier."

Why? Because if people were living in southern Chile 12,500 years ago, they must have crossed over from Asia considerably earlier, and that means they couldn't have used the ice-free inland corridor; it didn't yet exist. "You could walk to Fairbanks," says Meltzer. "It was getting south from Fairbanks that was a problem." Instead, many scientists now believe, the earliest Americans traveled down the Pacific coast–possibly even using boats. The idea has been around for a long time, but few took it seriously before Monte Verde.

One who did was Jon Erlandson, an archaeologist at the University of Oregon, whose work in Daisy Cave on San Miguel Island in

California's Channel Island chain uncovered stone cutting tools that date to about 10,500 years B.P., proving that people were traveling across the water at least that early. More recently, researchers at the Santa Barbara Museum of Natural History redated the skeletal remains of an individual dubbed Arlington Springs Woman, found on another of the Channel Islands, pushing her age back to about 11,000 years B.P. Farther south, on Cedros Island off the coast of Baja California, U.C. at Riverside researchers found shell middens–heaps of kitchen waste, essentially–and other materials that date back to the same period as Daisy Cave. Down in the Andes, researchers have found coastal sites with shell middens dating to about 10,500 years B.P.

And in a discovery that offers a sharp contrast to the political hoopla over Kennewick Man, scientists and local Tlingit and Haida tribes cooperated so that researchers could study skeletal remains found in On Your Knees Cave on Prince of Wales Island in southern Alaska. "There's no controversy," says Erlandson, who has investigated cave sites in the same region. "It hardly ever hits the papers." Of about the same vintage as Kennewick Man and found at around the same time, the Alaskan bones, along with other artifacts in the area, lend strong support to the coastal-migration theory. "Isotopic analysis of the human remains," says James Dixon, the University of Colorado at Boulder anthropologist who found them, "demonstrates that the individual–a young male in his early 20s–was raised primarily on a diet of seafood."

CRUISING DOWN THE KELP HIGHWAY

Erlandson has found one more line of evidence that supports the migration theory. While working with a group of marine ecologists, he was startled to learn that there were nearly continuous kelp forests growing just offshore all the way from Japan in the western Pacific to Alaska and down the West Coast to Baja California, then (with a gap in the tropics) off the coast of South America. In a paper presented three weeks ago, he outlined the potential importance to the earliest Americans of what he calls the "kelp highway."

"Most of the early sites on the west coast are found adjacent to kelp forests, even in Peru and Chile," he says. "The thing about kelp forests is they're extremely productive." They not only provide abundant food, from fish, shellfish, seals and otters that thrive there, but they also reduce wave energy, making it easier to navigate offshore waters. By contrast, the inland route along the ice-free corridor would have presented travelers with enormous ecological variability, forcing them to adapt to new conditions and food sources as they traveled.

Unfortunately, the strongest evidence for the coastal theory lies offshore, where ancient settlements would have been submerged by rising seas over the past 10,000 years or so. "Artifacts have been found on the continental shelves," says Dixon, "so I'm quite confident there's material out there." But you need submersible craft to search, and, he says, that type of research is a very hard sell to the people who own and operate that kind of equipment. "The maritime community is

interested in shipwrecks and treasures. A little bit of charcoal and some rocks on the ocean floor is not very exciting to them."

MULTIPLE MIGRATIONS

Even if the earliest Americans traveled down the coast, that doesn't mean they couldn't have come through the interior as well. Could there have been multiple waves of migration along a variety of different routes? One way scientists have tried to get a handle on that question is through genetics. Their studies have focused on two different types of evidence extracted from the cells of modern Native Americans: mitochondrial DNA, which resides outside the nuclei of cells and is passed down only through the mother; and the Y chromosome, which is passed down only from father to son. Since DNA changes subtly over the generations, it serves as a sort of molecular clock, and by measuring differences between populations, you can gauge when they were part of the same group.

Or at least you can try. Those molecular clocks are still rather crude. "The mitochondrial DNA signals a migration up to 30,000 years ago," says research geneticist Michael Hammer of the University of Arizona. "But the Y suggests that it occurred within the last 20,000 years." That's quite a discrepancy. Nevertheless, Hammer believes that the evidence is consistent with a single pulse of migration.

Theodore Schurr, director of the University of Pennsylvania's Laboratory of Molecular Anthropology, thinks there could have been many migrations. "It looks like there may have been one primary migration, but certain genetic markers are more prevalent in North America than in South America," Schurr explains, suggesting secondary waves. At this point, there's no definitive proof of either idea, but the evidence and logic lean toward multiple migrations. "If one migration made it over," Dillehay, now at Vanderbilt University, asks rhetorically, "why not more?"

OUT OF SIBERIA?

Genetics also points to an original homeland for the first Americans–or at least it does to some researchers. "Skeletal remains are very rare, but the genetic evidence suggests they came from the Lake Baikal region" of Russia, says anthropologist Ted Goebel of the University of Nevada at Reno, who has worked extensively in that part of southern Siberia. "There is a rich archaeological record there," he says, "beginning about 40,000 years ago." Based on what he and Russian colleagues have found, Goebel speculates that there were two northward migratory pulses, the first between 28,000 and 20,000 years ago and a second sometime after 17,000 years ago. "Either one could have led to the peopling of the Americas," he says.

Like just about everything else about the first Americans, however, this idea is open to vigorous debate. The Clovis-first theory is pretty much dead, and the case for coastal migration appears to be getting stronger all the time. But in a field so recently liberated from a dogma that has kept it in an intellectual straitjacket since Franklin

Roosevelt was President, all sorts of ideas are suddenly on the table. Could prehistoric Asians, for example, have sailed directly across the Pacific to South America? That may seem far-fetched, but scientists know that people sailing from Southeast Asia reached Australia some 60,000 years ago. And in 1947 the explorer Thor Heyerdahl showed it was possible to travel across the Pacific by raft in the other direction.

At least a couple of archaeologists, including Dennis Stanford of the Smithsonian, even go so far as to suggest that the earliest Americans came from Europe, not Asia, pointing to similarities between Clovis spear points and blades from France and Spain dating to between 20,500 and 17,000 years B.P. (Meltzer, Goebel and another colleague recently published a paper calling this an "outrageous hypothesis," but Dillehay thinks it's possible.)

All this speculation is spurring a new burst of scholarship about locations all over the Americas. The Topper site in South Carolina, Cactus Hill in Virginia, Pennsylvania's Meadowcroft, the Taima-Taima waterhole in Venezuela and several rock shelters in Brazil all seem to be pre-Clovis. Dillehay has found several sites in Peru that date to between 10,000 and 11,000 years B.P. but have no apparent links to the Clovis culture. "They show a great deal of diversity," he says, "suggesting different early sources of cultural development in the highlands and along the coast."

It's only by studying those sites in detail and continuing to search for more evidence on land and offshore that these questions can be fully answered. And as always, the most valuable evidence will be the Earthly remains of the ancient people themselves. In one 10-day session, Kennewick Man has added immeasurably to anthropologists' store of knowledge, and the next round of study is already under way. If scientists treat those bones with respect and Native American groups acknowledge the importance of unlocking their secrets, the mystery of how and when the New World was populated may finally be laid to rest.

Coming To America

For decades, scientists thought the New World was populated by migrants from Asia who wandered down the center of the continent about 12,000 years ago. New discoveries are pushing that theory out to sea. Three views on how humans populated the Americas

- COASTAL Recent finds at Daisy Cave, Calif., and Monte Verde, Chile, point to bands of people moving down the Pacific coast of North and South America much earlier, perhaps 30,000 years ago
- OVERLAND Discoveries at Clovis, N.M., led to the theory that a single human culture moved into the Americas down the eastern side of the Rocky Mountains about 12,000 years ago
- ATLANTIC Artifacts found in South Carolina have led some archaeologists to speculate that early migrants might have arrived on the East Coast from Europe, although the evidence remains in dispute

- Other artifacts found-
  Ushki Lake RUSSIA 11,000 B.P.
- Human remains found-
  On Your Knees Cave ALASKA 9,818 B.P.
- Human remains found-
  Kennewick WASH. 9,400 B.P.
- Other artifacts found-
  Daisy Cave CALIF. 10,500 B.P.
- Other artifacts found-
  Cedros Island MEXICO 11,000 B.P.
- Other artifacts found-Folsom N.M. 10,490 B.P.
- Other artifacts found-Clovis N.M. 11,200 B.P.
- Dates in dispute-Meadowcroft PA. 14,250 B.P.
- Dates in dispute-Cactus Hill VA. 15,070 B.P.
- Dates in dispute-Topper S.C. 15,200 B.P.
- Dates in dispute Taima-
  Taima VENEZUELA 13,000 B.P.
- Other artifacts found-
  Pedra Furada BRAZIL 47,000 B.P.
- Other artifacts found-Lapa do Boquete
  BRAZIL Up to 12,070 B.P.
- Other artifacts found-Tibit
  COLOMBIA 11,740 B.P.
- Other artifacts found-Quebrada Jaguay
  PERU 10,500 B.P.
- Other artifacts found-Monte Verde
  CHILE 12,500 B.P.
- Human remains found-Palli Aike
  CHILE 8,640 B.P.

ARCHAEOLOGY

Skeletons like Kennewick Man are rare. More often scientists study and date other indications of human activity–remains of butchered animals, stone tools, spear points or even bits of burned charcoal. Unfortunately, such artifacts may never be found along coastal migration routes–they're now under water

GENETICS

Scientists use markers in DNA samples from indigenous peoples in North and South America to figure out when populations diverged from each other. DNA comparisons suggest the first Americans may have diverged from groups in the Lake Baikal area of what is now Russia as early as 26,000 years ago

LINGUISTICS

By studying native words and grammar, scientists can establish links and infer the amount of time required for different languages to evolve from a common origin. As of 1492, there were an estimated 1,000 languages in the Americas that may have developed from the original migrants

Migration milestones

- 30,000 B.P.* Beginning of last North American ice age. Mitochondrial-DNA studies indicate the earliest possible migration
- 25,000 Approximate opening of Bering land bridge between Asia and North America
- 20,000 Earliest migration date, according to Y-chromosome studies
- 15,000 Evidence of humans in South America Glacial melting floods Bering land bridge

- 10,000 End of last ice age in North America
  Kennewick Man lives in Pacific Northwest
- 5,000 Dawn of Central American cultures
  such as Olmec and Maya
- Present

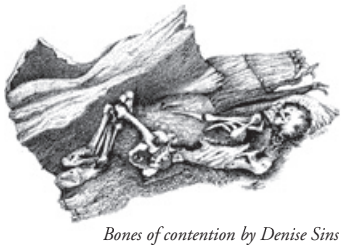
*Dates are in radiocarbon years "before the present," a scientific standard meaning "before 1950"

Lemonick, Michael D. and Dorman, Andrea. "Who Were the First Americans?" *Time Magazine,* 13 March 2006: Vol. 167, No. 11.
Retrieved from www.time.com/time/magazine/article/0,9171,1169905,00.html

Can you Dig it?

Archaeologists & Native Americans Seek Common Ground

By: SHARMAN APT RUSSELL



Bones of contention by Denise Sins

At the Nevada State Museum, a 9,400-year-old mummy was discovered in a storage box last year. Originally found on public land, the man had been wrapped in rare, finely-woven reed textiles. Archaeologists are eager to do DNA and radiocarbon testing before the mummy is reburied. Local Paiute Indians don't want any tests that require destructive analysis. The Bureau of Land Management must decide what to do.

In Kennewick, Wash., near the Columbia River, a 9,300-year-old skeleton was discovered last year on land administered by the Army Corps of Engineers. Amazingly, the skeleton showed Caucasian-like features. In Oregon, the Umatilla tribe demanded the material's immediate surrender and reburial, claiming that the "Kennewick Man" had been found on their ancestral lands. A group of prominent archaeologists went to court to stop the Army Corps from handing over the remains. In late February, the suit was decided in favor of the scientists–who are now asking for permission to study this unusual find.

Both of these cases involve material that is unusually old and important to archaeological research. In both cases, archaeologists doubt that the bones are closely related to any modern tribe. In both cases, people feel confused, angry, and betrayed.

This kind of cultural morass is what living in a multicultural society is all about. I believe that American archaeology has much to teach us about our multicultural world. But archaeology itself is in transition, and archaeologists are among those who feel confused.

The conflict between Native Americans and archaeologists reflects many different truths. Each side is expressing a genuine spiritual belief or world view.

In the Zuni tradition there are four stages of life. In this life, we are on the first stage. The people buried in ancient sites are continuing through the stages, which will not be over until their bones and grave goods are dissolved into the Earth. This is happening now, in the present. When we disturb these bones, we are disturbing someone's unique spiritual journey.

The Zunis are not the same as the Paiute or the Umatilla tribe. Still, within this century, there has developed a Pan-Indian belief that the bones of all Native Americans–regardless of their specific tribe–are sacred.

Archaeologist Larry Zimmerman became involved with reburial issues in South Dakota in the 1970s. There he listened to a range of views from "young, yelling militants" to "deeply traditional elders and holy people." He

went on to work closely with a group called American Indians Against Desecration and with tribes across the country. As Larry says, "Some archaeologists complain that Pan-Indian ideas are a recent invention. So? We are dealing with a contemporary religion. It's their belief now. As anthropologists, we should respect the fact that cultures change."

The practice of science also involves cultural ideas and a distinct world view. These ideas can also change. In college classes today–from physics to biology–students are being taught that all things on this Earth, and in this universe, are connected. All the parts make up the whole, and all the parts work together. Energy equals matter. Nothing disappears. More and more, science seems to be echoing traditional wisdom. An archaeologist's interest in bones and artifacts and the passing of time may "only" be an intellectual curiosity, but it is grounded in the sense that everything is important, that the lives of these ancient people are important, that we are all made of the same stuff.

When I first met Zimmerman he described the thrill he experienced on finding a Clovis point in a Dakota field. That thrill was connected to his feelings of kinship–with the land and with the hunter-gatherer who still lives in each of us.

Moreover, all the archaeologists I know truly celebrate the deep history of our American landscape. They celebrate its multicultural heritage, and they believe that their understanding of this heritage–their DNA tests and their bone analyses–is part of that celebration. It is a gift of knowledge to future as well as present generations.

But this controversy is also a power struggle. Some Native Americans believe that their control of archaeological remains reflects their control of other social and political issues. Since Native Americans remain one of the poorest minorities in the United States, this is important. From this perspective, the practice of archaeology is inseparable from the political struggles of Native Americans today.

Native American author Vine Deloria Jr. puts archaeological questions into a political framework. Deloria questions whether Native Americans immigrated over the Bering Strait–or evolved here. "By making us immigrants to North America," he writes in his book Red Earth, White Lies, "they are able to deny the fact that we were the full, complete, and total owners of this continent."

So this controversy is also about the colonization of indigenous America by Europeans. American archaeology was born during that era of manifest destiny, perhaps with Thomas Jefferson's first excavation of an Indian burial mound. At that time, the dominant Anglo culture was racist and sexist and so was archaeology. The archaeological record "revealed" Native Americans to be cruel, primitive, incapable of progress, and doomed to pass from this world. This made it easier to take their land.

By the mid-twentieth century, archaeology had evolved. Overtly racist views were abandoned–although certain stereotypes remained. A kind of

arrogance also unfortunately remained which allowed archaeologists to excavate Native American sites without permission and display material without respect. That arrogance, that humiliation, survives in the memories of living Native Americans.

In fact, reburial and repatriation laws are surprisingly recent. As late as 1986, a Kansas tourist attraction featured the skeletons of nearly 200 ancestral Pawnee, hand-shellacked and artfully arranged in an "Authentic Pre-historic Indian Burial Pit." (Imagine a similar Civil War exhibit.) Prodded by Indian activists, state legislators finally closed the business down in 1989. That year, a federal law forced the Smithsonian Institution to return its over 18,000 remains to appropriate tribes. The Native American Graves Protection and Repatriation Act did not pass until 1990. This law mandated the return of artifacts from national institutions and gave recognized tribes control over unmarked native graves and sacred areas on public land. State laws usually complement federal ones by protecting burials on private land.

But it's important to note, this kind of reform did not come from archaeologists. As Larry Zimmerman sighs, "It's too bad that we had to be dragged kicking and screaming to Congress to get a law shoved down our throats. It's about control. And archaeologists, certainly, have been afraid to lose the control they've previously enjoyed."

For some Native Americans, it's payback time. For some archaeologists, atonement doesn't come easily. Anger gets a lot of air time. But despite the sometimes acrimonious debate, the good news outweighs the bad.

In truth, there is a lot of common ground between most archaeologists and most Native Americans. And to their credit, American archaeologists are adapting astonishingly quickly to new laws–and new opportunities.

"This is all about change," says Zimmerman. "Working with Native Americans has made me understand things that are outside my normal scope of cultural perception. It's challenged my view of the world. And that's good! Yes, change means that we will lose some things. We will lose access to some remains, some bones, some collections. We will lose some opportunities for analysis. But we don't have to lose everything. It's not all or nothing. We have to work with Native Americans, case by case. In the end, what we gain is so much greater than what we lose."

Across the country, a dialogue between tribal elders, nontraditional Indians, and archaeologists has begun. When the Massachusetts Archaeological Society invited Native Americans to their board, they met around a campfire on the Wampanoag reservation and used the "Talking Stick" method for discussion. A field school in Connecticut is jointly offered by a local university and the Mohegan. The Pima and Makah adopt mainstream curation skills as they create cultural centers that redefine the nature of a museum. The Sioux hire archaeologists to substantiate land claims. A Hopi prophecy foresees a time when even the ashes of their ancestors will help the tribe: some Hopi link this to the flotation analysis of ancient hearths. In Alaska, another skeleton over

9,000 years old has been found. In this case, the Haida-Tlingit people are supportive of analysis and see themselves as part of the project.

In Nevada, too, archaeologists have long collaborated with the Southern Paiute and Western Shoshone on excavations at the Nevada Test Site. Tribal elders provide information on aboriginal land use, and archaeologists share their data with the tribe. This program has become a model for other federal agencies.

As for the 9,400-year-old mummy held at the Nevada State Museum, one compromise may be to bury the skeleton in a crypt jointly created by Indians and archaeologists in the 1980s, when a flood exposed hundreds of prehistoric burials. Conceivably the ancient skeleton could be re-excavated years in the future, after methods have advanced to more nondestructive analysis.

When important archaeological finds are reburied without study, we all lose whatever knowledge these ancient people had to offer–the loss of a nearly miraculous communication, thousands of years after a man's life and death. I personally think this knowledge could be helpful. I accept that this knowledge may be denied.

I think that Larry Zimmerman is right: what we gain is greater than what we lose. The future of American archaeology is being decided case by case, face to face. The questions that archaeologists ask themselves are becoming less academic and more practical–more personal. How does this woman feel about my project? What is this man thinking now? What am I feeling now? How can I show my respect? What do I not understand about these people? In our multicultural society, these are not bad questions to ask.

Sharman Apt Russell is author of *When the Land was Young: Reflections on American Archaeology* (Addison-Wesley, 1996). She lives in Silver City, N.M.

Retrieved from www.greatbasinweb.com/gb2-1/can_you_dig_it.htm

Moapa Paiute Indians: Deal near on power plant

By: MICHAEL WEISSENSTEIN © Las Vegas Review Journal

CLARIFICATION: The Moapa band of Paiute Indians is negotiating a settlement with the Las Vegas Valley Water District and other water users that would quantify the Paiutes' claim to Muddy River water at a fixed annual amount. This story incorrectly implied that the tribe would give up its entire claim to the river. (File updated 11/14/01)

After a year of negotiations, the Las Vegas Valley Water District and the Moapa band of Paiute Indians say they are about to strike a complex deal to bring a $600 million power plant to the Paiute reservation, remove a threat to Las Vegas' future water supply and assure new electric power for more than 140,000 Nevadans.

The deal could allow the Moapa Paiutes to sell water from beneath their reservation to cool a natural gas-fired plant on tribal homelands northeast of Las Vegas. The Paiutes in exchange would drop a long-standing claim to the waters of the Muddy River, which the water district wants to use to supply Las Vegas' urban expansion.

Tribal and water district officials say they expect to sign the arrangement within weeks. And San Jose, Calif.-based Calpine Corp. is confident plant construction will start by June, company officials said this week. The facility should begin operating by the summer of 2004, officials said.

"We have what we hope is a deal," water district deputy general manager David Donnelly said. "There's still a few details to work out, but we're very optimistic."

But federal agencies remain worried about the project's effect on local groundwater supplies and air quality. And Calpine officials cautioned that they are far from certain that their plant will provide any guaranteed output to Nevada users, as sought by the water district.

"It's under discussion with the water district. We haven't agreed to the terms and conditions of it yet," project development manager John Doyle said Thursday.

Tribal officials have said that the company has agreed to pay more than $200 million over the plant's expected 45-year life span to the tribe, which has been largely left out of Southern Nevada's economic boom. The tribe is known to most Las Vegans for its small fireworks and cigarette shop on Interstate 15.

Tribal attorney Steve Chestnut called the $200 million figure a "low projection," saying the "tribe will make significantly more than that."

"I think they've made a very good deal, and I think it would change in a favorable way the economic condition of the tribe," he said.

The money would be a payment for allowing the company to use reservation land close to interstate gas and electric transmission lines. Calpine also hopes to lease groundwater from the tribe–water for which the Paiutes have yet to secure the rights–to cool the plant.

Water-cooling would allow the facility to operate as much as 10 percent more efficiently than a competing air-cooled plant, particularly during the summer months of peak electricity demands.

But the pumping cannot begin before Nevada's state engineer grants the tribe rights to the water flowing beneath its reservation.

Nevada water is considered the property of the state. The engineer can grant the right to use it to any person or corporation that can put the water to an economically productive use. But the state engineer can deny water applications if it is proved that they would drawn down supplies in a way affecting those with existing water rights.

Applications for water are given precedence according to the date they were filed, with the earliest claim given first priority.

The Moapa Paiutes had applied for the right to annually extract 7,000 acre-feet of water, enough for roughly 35,000 people, from an aquifer beneath the reservation. The water district had objected, saying that the pumping could harm the agency's older claims to the same aquifer.

Under the pending agreement, the water district would turn over to the tribe more than 14,000 acre-feet of those older claims, presumably strengthening the Paiutes' chances of obtaining groundwater rights.

National Park Service hydrologists say they worry that pumping on the Paiute reservation could deplete springs that feed sensitive areas around Lake Mead.

If the water deal is signed, the tribe would back away from claims that might have won it the right to use most of the flow of the Muddy River.

The claims worried the water district, which has been buying rights to the river, which flows into Lake Mead. The district hopes to eventually use those Muddy River rights to extract additional lake water for use in Las Vegas.

The threat of a tribal suit over the Muddy River, "was kind of a big, old, dead rhinoceros in the middle of the floor. It was smelly and no one wanted to touch it," Donnelly said.

The water district also has requested that Calpine keep 25 percent of the 760-megawatt plant's production in Nevada under a separate agreement.

In an expansion of its traditional role, the district won similar concessions from three companies seeking water for new power plants in the Apex industrial park south of the Paiute reservation.

Chestnut said he expects the state engineer to conduct a hearing on the tribe's water rights early next year.

Water not needed for the plant could be used for development on the reservation, which encompasses more than 70,000 acres about a 30-minute drive from Las Vegas.

Retrieved from www.lvrj.com

Repatriation: A Clash of World Views

By: TAMARA BRAY, National Museum of Natural History

Introduction

Repatriation is a topic of unparalleled importance in the museum world today, particularly as museum personnel struggle to meet deadlines imposed by law. There is also concern about the loss of museum collections. In addition to museums, repatriation is an issue of extreme importance for Native Americans, archaeologists, and physical anthropologists. In Indian country, there has been a ground swell of interest in and commitment to seeing the mandate for repatriation carried out. In the professional community, repatriation has had a profound impact on the way archaeologists 'do business' in the United States.

The idea of repatriation represents a highly charged issue where different currents of history, science, and politics converge. It is a point at which the interests of museums, Native peoples, archaeologists, and physical anthropologists intersect, where old relationships are being shattered and new ones forged. Repatriation has frequently been characterized as a clash of world views, the outcome of a head-on collision between diametrically opposed belief systems. It bears note that the two belief systems involved are not of equal valence within contemporary society. One system pertains to a subordinate minority group within the United States, the other to the majority. It took an act of Congress to move the scientific community to address the concerns raised by Native peoples.

For both Native people and non-Native scientists, human remains possess meaning. For many, if not all, Indian peoples, ancestral bones hold spiritual significance and power. For the scientist, skeletal remains are meaningful as sources of information: as 'data' for biomedical research, for studies of the evolution of human disease, and for solving forensic cases. For the physical anthropologist, human remains have been depersonalized and de-sanctified, though they are still highly meaningful. The fundamental differences in these two approaches to human skeletal remains relate to differences in world view and values systems.

Embedded within the repatriation movement are a number of fundamental issues that challenge our views of Native American peoples, call into question the "absolute" values of science, and force us to take a critical look at the role of museums in Western society.

Repatriation may best be understood within the broader historical context of global decolonization. It parallels and is on a continuum

with other indigenous movements around the world in which Native rights are being asserted. Among the issues being pressed are the fight of control over one's own cultural heritage and the fight to the sanctity of the grave.

In addition to human remains, the categories of cultural items encompassed within the repatriation mandate include funerary articles, sacred objects, and items of cultural patrimony. Legally, these items are defined as follows:

Funerary objects are items believed to have been intentionally placed with an individual at the time of death as part of a death rite or cultural ceremony.

Sacred objects are defined as specific ceremonial articles that are needed by traditional Native American religious leaders for the practice of traditional Native American religions.

Cultural Patrimony is defined as communally owned cultural property that has an on-going historical, traditional, or cultural importance central to a Native American group. Such objects, by definition, cannot be alienated, appropriated or conveyed by any individual, regardless of whether or not that person is a member of a Native American tribe or Native Hawaiian organization.

History of the Repatriation Movement in the U.S.

The idea of repatriation is rooted in the historical context of the civil rights movements of the 1960s. During this period, Native Americans, like other minority groups within the United States, gained new-found political influence and recognition. It was during the activist climate of this era that some Native people began to express strong opposition to archaeological excavations, the public display of American Indian burials, and the permanent curation of Native American remains in museums.

The differential treatment of Native burials and the seeming disregard displayed by archaeologists toward them were seen as powerful symbols of oppression and the pervasiveness of racist practices for the Native community. In 1974, an activist group known as American Indians Against Desecration (AIAD) formed, with the explicit intent of bringing political pressure to bear on the question of the return and reburial of Native American remains. They argued that all Indians, past and present, are spiritually linked. As a result, modern Native peoples were responsible for the security of their ancestors' remains. They also argued that the removal and curation of human remains caused spiritual disturbance that could have a potential negative impact on the well-being of modern Native peoples.

Repatriation Legislation

Through the efforts of the AIAD and the widespread media attention it attracted, the repatriation issue slowly bubbled to the surface of public consciousness and eventually captured the attention of several sympathetic lawmakers. The first piece of legislation to treat this issue was the National Museum of the American Indian (NMAI) Act, which was passed by Congress in 1989. The principal functions of this Act were to authorize the transfer of the Heye Foundation's

Museum of the American Indian collections from New York to the Smithsonian Institution. This magnificent collection of Native American artifacts from all over the western hemisphere was to form the basis of the new National Museum of the American Indian. The NMAI Act also required the Smithsonian to inventory and assess the cultural origins of collections potentially affiliated with Native American and Native Hawaiian peoples. Human remains and funerary objects for which cultural affiliation could be established were to be offered for return the appropriate tribal group. The idea that there must be a demonstrable relationship of cultural affiliation between the remains or objects in question and the tribal group to whom they would be offered for return was the cornerstone of this repatriation legislation.

The Native American Graves Protection and Repatriation Act (NAGPRA) was passed the following year, in 1990. This law expanded the repatriation mandate beyond human remains and funerary objects to include the categories of sacred objects and cultural patrimony. It also extended the applicability of this mandate to all federally funded museums, institutions, and agencies. The Smithsonian was explicitly exempted from NAGPRA due to the fact that it was already covered by the NMAI Act.

NAGPRA Has Four Provisions

1. To increase protection for Native American graves and provide for the disposition of cultural remains inadvertently discovered on tribal and federal lands;
2. To prohibit traffic in Native American human remains;
3. To require federal museums and institutions to inventory their collections of Native American human remains and funerary objects within five years and repatriate them to culturally affiliated tribes upon request; and
4. To require museums to provide summaries of their collections of Native American sacred objects and cultural patrimony within three years and repatriate them if it is demonstrated that the museum does not have right of possession.

NAGPRA has been characterized as an important piece of human rights legislation for Native Americans. It also represents landmark legislation for museums in that it recognizes that scientific fights do not automatically take precedence over religious and cultural beliefs in the United States. NAGPRA has served to establish a new ethical outlook for museums in their relationships with Native peoples and other minority groups. It provides a framework within which museums and Native peoples can begin to develop new kinds of partnerships and collaborative relations. The passage of these laws represents the culmination of years of struggle for Native American groups. In essence, they legislate respect for the dead.

Issues in Repatriation

The central issue in the repatriation debate revolves around the question of whether Native American

interests in reburying ancestral skeletal remains take precedence over the interests of archaeologists and physical anthropologists in studying and preserving them. From the outset, repatriation was portrayed as a controversy between museums, archaeologists, and anthropologists on one side, and Native peoples on the other. Discussion between the various parties affected by the repatriation issue became very polarized and was often characterized as a debate between science and religion.

Portraying the repatriation issue in these terms had the effect of casting Native peoples as anti-science or anti-intellectual, playing upon and promoting stereotypes of Native peoples as "backwards" or "primitive." To escape this kind of simplistic analysis, it is more helpful to think of the controversy over repatriation as a dash between competing value systems rather than as one of science versus religion. This requires a recognition of the fact that science is legitimately subject to criticism on the level of values as well as facts. Anthropology and archaeology, and science in general, have their own agendas, their particular politics being a commitment to the story of progress.

To better understand the positions and world views of the protagonists in the repatriation debate, it is important to consider the arguments and issues from the different sides of the prism. From the perspective of Native Americans, the points at issue in repatriation revolve around the differential treatment of the dead, the lack of respect for Native beliefs and feelings, treatment of people as objects of study, and racism, as evidenced in disproportionate numbers of Native American remains given over to scientific study. From the professional community's point of view, the notion of repatriating collections for purposes of reburial is contrary to the most fundamental principles of preservation and conservation. The loss of collections is seen as an irreplaceable loss of data for scientific and educational purposes. The different issues embedded in these two world views are elaborated upon below.

Native Concerns

1) Many museums, the popular media, and public school texts present stereotypes of Indian peoples as foreign and vanishing members of a different race, distinct and apart from the rest of us. The generally held belief that Native cultures would become extinct in North America was one of the original justifications for the collecting practices of museums and the work of anthropologists in the 19th century. Reburial is an important political issue on the Indian rights agenda in pan because, by asserting their rights to protect the sanctity of their ancestors, Indian people assert that they have not vanished, and that their beliefs and feelings are entitled to the same respect as other Americans;
2) Native Americans view the collections of Indian human remains housed in museums as disrespectful, racist, and colonialist. To many, the collecting of their ancestors' bones by museums is a source of pain and humiliation, the last stage of a conquest that had already robbed them of their lands

and their way of life. They cite, as evidence, museums' institutionalized treatment of Native Americans as objects of natural history, in which elements of their traditional lifeways are collected as specimens, and the remains of their ancestors are collected like fossils. Native peoples ask what knowledge has been produced through the study of these remains that is of value to them. They also want to know why museums need so many skeletal remains to study;

3) There is a question of differential respect for the sanctity of the grave. Native peoples ask why Euro-American burials that are accidentally exposed or uncovered are rebuffed elsewhere, while Native American burials are sent to museums or universities for further study. Indian arguments for the sanctity of the grave tend to be based on beliefs in the sacred nature of burials, and a concern for the spiritual well-being of the deceased. Their concept of ancestry is a communal one that compels respect for the dead even in the absence of direct familial relations. The differences in attitudes between Euro-Americans and Native Americans may be seen to revolve around secular versus sacred constructs with respect to the sanctity of the grave and individual versus community responsibility to one's forebears; and
4) There is also the question of who controls the past; who has the right to interpret and write history. Native peoples have, for the most part, been denied the ability to interpret their own past. There has been a general refusal by scientists to admit to different ways of knowing, understanding, or interpreting the past. The past has been traditionally seen as the privileged domain of archaeologists. This is related to the elevation of Science as the supreme epistemology and the corresponding devaluation of other ways of 'knowing' the world, such as through oral history, legend, and myth. In the context of colonization, the past forms a critical locus in the struggle to reconstitute cultural identities and culture histories that have been severely impacted by the relentless drive and destructive policies of the State. The past forms the raw material for many and varied interests besides those of archaeologists, to be appropriated, preserved, exalted, or denied as required in the service of contemporary als and motivations.

Museum/Scientific Concerns

1) For many in the museum world, the notion of repatriating collections for purposes of reburial runs contrary to the most fundamental principles of preservation and conservation. It is viewed as tantamount to the purposeful destruction of knowledge. Museums are seen, by those who value them, as storehouses of data for future research. Physical anthropologists argue that the materials now in the collections provide information on the history and descent of the people represented; new developments in the areas of DNA research, genetics, and chemical analysis in the past decade may hold the key to such questions as the peopling of

the New World, human origins, and the evolution of disease;

2) Scholars also make the argument that archaeological finds in this country constitute the 'national heritage' and don't belong to one 'special interest group.' Since all humans are members of a single species, and ancient skeletons are the remnants of non-duplicable evolutionary events, all living and future peoples have a fight to know about and study these human remains. That is, ancient human skeletons belong to everyone;
3) It was museums and anthropologists who were, in large part, responsible for the preservation of knowledge of Native American lifeways when Native cultures were on the wane or in the process of being systematically destroyed during the late 19th and early 20th centuries. Museum people note with no little irony that in cultural revitalization movements, Native peoples have often recovered information on their heritage and traditions from the very institutions they now oppose;
4) It has also been argued that it would be racist not to have collections of aboriginal remains in New World museums. Such a situation would imply a lack of interest in the history of Native peoples of this continent.

Positive Outcomes of Repatriation

While the passage of the recent legislation provides a partial answer to the question of 'Where do we go from here?' the laws do not fully settle the issues. The murky language employed by the authors of the federal Acts leaves a number of technical and philosophical questions unreconciled.

These may prove to be intractable unless we are able to understand the repatriation issue within the broader sociopolitical and historical context of global de-colonization. What we're witnessing with the repatriation movement is a struggle for self-determination and control over cultural heritage. This struggle represents an effort on the part of indigenous peoples to reconstitute a collective cultural identity, in the aftermath of colonialism.

While having a direct and profound impact on Native communities in this country, repatriation also can be construed as a step in the right direction toward improving relations among Native peoples, anthropologists, and museums. Repatriation legislation provides a framework within which to develop better lines of communication and foster greater understanding and dialogue between the different parties affected. The change in attitudes and values developing out of encounters based on the repatriation mandate has begun to lay a foundation for museums, anthropologists, and Native peoples to work together in a spirit of mutual cooperation and collaboration.

Repatriation Process at the National Museum of Natural History

The Smithsonian Institution's physical anthropology division in the National Museum of Natural History (NMNH) houses about 28,500 sets of skeletal remains. At one time, Native American remains numbered approximately 17,600 individuals; the remainder of the collection is made up of Euro- and African-Americans, and Europeans, Africans, and Asian peoples from various parts of the world. These collections were developed during the first half of this century, through the efforts of the Smithsonian Institution's first physical anthropologist, Ales Hrdlicka.

The repatriation mandate requires the Smithsonian to inventory and assess the cultural origins of collections potentially affiliated with contemporary Native American and Native Hawaiian peoples. Affected tribal groups are to be notified of the Museum's findings and consulted with regard to the disposition of culturally affiliated remains or objects. The Museum facilitates the return of the materials in question upon the request of the affiliated tribal group.

One of most sensitive collections in the NMNH is the Army Medical Museum collection of skeletal remains, which were transferred to the Smithsonian around the turn of the century. This collection contains about 2300 sets of remains, many of which date to historic periods and are explicitly identified with regard to cultural origins. The Army Medical Museum was rounded in 1862 to perform biomedical and pathological studies on the Civil War dead. At the close of this War, the emphasis of the Army Medical Museum shifted to the collection of Native American skeletal remains. With the outbreaks of the Spanish-American War and World War I, research funding was diverted away from the museum, and its collecting function ceased.

The repatriation legislation offers little in the way of technical guidelines for how to proceed with this effort. It was thus left to the Museum to set up a workable program, which involved the establishment of a formal Repatriation Office. To date, much attention has been focused on the historical remains, with the Army Medical Museum collections being the most sensitive. Museum personnel continue to work through these collections, documenting specific information relevant to cultural identification from each set of remains. In addition to responding to requests, the NMNH also takes a pro-active approach to the inventory process. Groups that have not contacted the Smithsonian Institution are notified if collections of potential interest to them are identified during the inventory process. In addition to the documentation of physical remains, the Repatriation Office of the NMNH is also producing summaries of the ethnographic collections.

From a core staff of four in September 1991, the office has grown to include 20 regular staff and six full-time contractors. The Museum has sponsored eleven Native American professionals, students, and interns to date, one of whom is now a permanent member of the staff The office currently has about 35 formal repatriation requests

on file. These are handled on a first come, first served basis. Fifteen separate repatriations have been completed to date by the NMNH, and twelve others are in progress.

Outreach

In addition to the inventory and documentation work of the Repatriation Office, outreach efforts to the Native American community are a high priority. Repatriation staff have travelled to the Pacific Northwest, the northern Plains, Oklahoma, the Southeast, the Southwest, and Alaska to meet with leaders of different tribal groups. The purpose of these visits is to provide information on the repatriation program at the NMNH and collections of potential interest to the tribes. Staff members have participated in a number of the regional consultations held by the National Museum of the American Indian in various parts of the country as well.

A standing committee made up of five independent, external individuals is in place to review any disputed cases. Three of the members of this committee were elected by the Native American community. To date, there have been no disputes for the committee to arbitrate.

It is important to remember that there is no Pan-Indian religion or single viewpoint on how to deal with the dead. Cultural protocols vary by tribe. Some Native groups feel that the housing of the dead in museums threatens the spiritual harmony and balance of the world; many say they personally feel the spiritual disquiet of their ancestors who are stored in museums. Another viewpoint is held by the Zuni tribe, which does not want skeletal remains returned to the Zuni reservation at this time. They feel the remains have been desecrated, and there is no method of dealing with them in any traditional Zuni way. The Zunis avoid the disturbance of grave sites when possible, but when a burial must be exposed (due to construction, for instance), the remains are excavated by an archaeologist, and basic information about the individual is determined by a physical anthropologist. The remains, along with all grave goods, are then reburied out of harm's way, as close to the original burial as possible.

The returns conducted to date have varied. The procedures have ranged from museum personnel boxing and shipping remains, to private ceremonies held in the museum by tribal representatives, to very public ceremonies.

Retrieved from http://www.mnh.si.edu/arctic/html/repattb.html

Green Building Technology Curriculum

Green Building Technology Core Curriculum Rationale

As good stewards of the land, students will have an opportunity to examine the idea of sustainable living while exploring environmental conservation. Students will be introduced to ways they can contribute to conservation in their own homes and the community. Ideas of how to reduce, reuse, recycle, and rethink will be explored as students examine the ways these ideas can be applied to their own lives.

Students will inquire into the following questions:

- What is meant by "ecological footprint"?
- What is meant by "green building"?
- Why is the conservation of water important?
- Why is indoor air quality important?
- What is meant by "reduce", "reuse", "recycle" and "rethink"?

Green Building Technology Core Curriculum	
Essential Question #1: What is meant by "ecological footprint"? What is meant by "green building"?	
Goal	Students will develop and overall understanding of "ecological footprint" and "green building" concepts.
Objectives	Students will: • understand and be able to define "ecological footprint;" • understand ways in which humans can reduce their ecological footprint; • understand the use of the term "green" to describe ecologically/environmentally friendly buildings, materials, and processes • articulate some of the characteristics of a green building; and • understand the relationship between green buildings and ecological footprints.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module

Green Building Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
What is an "ecological footprint" and why is it important? Student groups will go to a marked area with limited boundaries where they can trace their literal footprints in the soil. They will then be asked to do some simple physical activities (exercises) without stepping on any of the footprints. The activity is to be set up such that it is difficult to complete without disturbing the footprints. Students will be asked to draw connections between the activity and how humans use space and resources from the environment. Students will listen to a reading of Dr. Seuss' *The Lorax* and make further connections regarding ecological footprints.	Cleared and marked area where footprints can be traced	Sticks to trace footprints *The Lorax* by Dr. Seuss	30 minutes
How can we reduce our "ecological footprint?" Students will estimate, calculate, and record the capacity of one of the trash containers at the site. Students then use their data to calculate amount of trash held by all bins. Students will brainstorm ways to reduce the amount of trash (e.g., re-using, reducing, and/or recycling). To maintain awareness of waste, student groups will keep and post a daily tally of the number of bags of trash put into the container for pick-up.	Trash bins	Measuring tools Daily trash record display	30 minutes
What is a "green building?" How does the ecological footprint of a green building differ from the footprint of other buildings. Students will define "green buildings" as structures that help reduce our ecological footprints (see Resources), and will brainstorm ways green buildings might accomplish this. Students will then recycle objects that might otherwise be thrown into the trash to create a model of a green building to illustrate some aspect of the way it might reuse, recycle, or reduce waste. Students will display and explain how their buildings are "green."	Art Pavilion	Reusable materials Glue Scissors	1 hour

Green Building Core Curriculum (Essential Question #1 continued)	
Notebook/Vocabulary	conservation; ecological footprint; green building; recycle; reduce; reuse
Presentation of Findings	Green building sharing
Follow-up Suggestions	Students maintain and compile a daily trash log to compute long-term trash output. Data could then be posted on center's website.
Resources 	The design, construction, and maintenance of buildings have a tremendous impact on our environment and our natural resources. There are more than 76 million residential buildings and nearly 5 million commercial buildings in the U.S. today. These buildings together use one-third of all the energy consumed in the U.S. and two-thirds of all electricity. By the year 2010, another 38 million buildings are expected to be constructed. The challenge will be to build them smart, so they use a minimum of nonrenewable energy, produce a minimum of pollution, and cost a minimum of energy dollars, while increasing the comfort, health, and safety of the people who live and work in them. Further, buildings are a major source of the pollution that causes urban air quality problems and the pollutants that contribute to climate change. They account for 49 percent of sulfur dioxide emissions, 25 percent of nitrous oxide emissions, and 10 percent of particulate emissions, all of which damage urban air quality. Buildings produce 35 percent of the country's carbon dioxide emissions—the chief pollutant blamed for climate change. Green building practices offer an opportunity to create environmentally-sound and resource-efficient buildings by using an integrated approach to design. Green buildings promote resource conservation, including energy efficiency, renewable energy, and water conservation features; consider environmental impacts and waste minimization; create a healthy and comfortable environment; reduce operation and maintenance costs; and address issues such as historical preservation, access to public transportation and other community infrastructure systems. The entire life-cycle of the building and its components is considered, as well as the economic and environmental impact and performance. • www.smartcommunities.ncat.org/buildings/gbintro.shtml
Multicultural/Historical/Social Connections	

Green Building Technology Core Curriculum	
Essential Question #2: What is water conservation? Why is the conservation of water important? What are some ways to conserve water?	
Goal	Students will explore the concepts of water purification and conservation.
Objectives	Students will: • be able to define and discuss what is meant by waterless bathrooms; • define what is meant by low-flow toilets; • be able to explain what is meant by grey water and discuss grey water usage; • understand how is water purified and be able to discuss wastewater treatment; • be able to define what is meant by the "living machine;" • compare the water consumption of animals to people • understand how can water be conserved and define ways to conserve water; and • be able to discuss some basic water conservation messages.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module

Activities	Site(s)	Equipment	Time
How can water be conserved? Students brainstorm all the ways they use water (home, school, recreation, community) and write each use on a large index card. They will then sort the cards into two piles: "water needs" and "water wants." How do other desert animals conserve water? Students will brainstorm as many ways desert animals use water as they can think of and write each use on a large index card. Students research (e.g., books, video, Internet) to find information on water use by desert animals. They will then sort the cards into two piles: "water needs" and "water wants" (n.b., there may be only needs.) Students will compare animal cards with human cards. Students will then prioritize human "needs." They will discuss ways humans could use water as wisely as desert animals do.	Flex-labs	Computers with Internet access Assorted reference materials (articles, books, videos) on desert animals Index cards	1 hour

Green Building Technology Core Curriculum (Essential Question #2 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
How do plants conserve water and keep growing when there is no rain for days? Student groups will hike to an appropriate venue to observe and record a variety of desert plants. Students will work with a partner to choose one desert plant to observe and draw in detail. Students will consider how the chosen plant might be adapted to conserve water (e.g., color, leaf size/shape, root systems, etc.). Student pairs will share their drawings and observations with the rest of the groups and compare/ contrast use of water by plants to water use among humans and other desert animals.	Vegetated upland area	Notebooks Colored pencils Hand lenses Measuring tapes	1 hour
How can we conserve water? Students will brainstorm ways visitors to the center could conserve water. Students will tour the facility and identify areas (e.g., bathrooms, kitchen, etc.) on facility plans where water is or might be conserved. Students will be introduced to waterless bathrooms, low-flow toilets, and will observe how gray water is used at the facility. Following the tour, students will suggest additional ways to conserve water. Students will journal some of the ideas how they could conserve water at home. This could be followed by a presentation from Southern Nevada Water Authority (Deputy Drip) on water conservation.	Kitchen Bathrooms Flex-labs for follow-up	Simplified facility plans	1 hour—1.5 hours
How is water purified? What is waste water treatment? Students will hike to an area with standing water (if possible) where they will work with a partner to collect two small samples of water. Students will take their samples to the lab to purify it. Students will compare purified water to the non-purified sample. Students will observe a sample of both containers under a microscope. Partners will record their data in notebooks and share their findings with the group. Students will observe how large-scale water purification is done on-site. They will also consider how water might have been purified in the past by early settlers if they knew their water might be not suitable to drink.	Wetland area Flex-labs Water recycling center	Materials to filter water (gravel, cotton balls, sieves, cheesecloth, etc.) Microscopes	1.5 hours

Green Building Core Curriculum (Essential Question #2 continued)	
Notebook/Vocabulary	conservation; filtration; low-flow toilet Students record water conservation ideas, information about desert plants, animals, and notes on water filtration investigation.
Presentation of Findings	Student presentations on desert plants and animals, and water filtration results.
Follow-up Suggestions	
Resources	
Multicultural/Historical/Social Connections	Methods used by early human inhabitants and settlers to purify water.

Green Building Technology Core Curriculum	
Essential Question #3: What is meant by indoor air quality? Why is indoor air quality important?	
Goal	Students will explore the concept of air quality.
Objectives	Students will: • understand how to measure air quality; • explore what happens when something is burned; • discuss how air quality affects daylight; and • understand the difference in building materials when discussing air quality.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module

Activities	Site(s)	Equipment	Time
Where does bad indoor air quality come from? Why do we need to think about indoor air quality and how it can affect our lives? The instructor will burn some toast and then cover it with a beaker or a glass jar. Students can see what happens to the toast and what happens to the inside of the glass jar. Students can think about the glass jar being their lungs and their skin.	Kitchen	Glass jar or beaker Toaster and bread	30 minutes
Students will work in small groups to brainstorm what events (e.g., burning something in the toaster), inside practices (e.g., smoking, using pesticides), or environmental factors (e.g., pet dander, mold) might affect indoor air quality. Students will set up indoor air monitoring devices (index cards smeared with petroleum jelly or collectors with tape attached) in areas around the site that they predict might have activities or other factors that contribute to indoor air pollution.	Various indoor venues	Cards Petroleum jelly String Paper clips	45 minutes

Green Building Technology Core Curriculum (Essential Question #3 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will check their air quality monitoring devices and examine the pollutants stuck to the jelly with magnifiers. Students will identify the location in which the device was located and will brainstorm ways to reduce indoor air pollution at that site. Students will examine microscope slides of common pollutants (dust, mold, pollen, sand, skin flakes, and pet dandruff). Students will understand that these pollutants contribute allergies and asthma.	Flex-labs	Magnifying lenses Microscopes Prepared slides	45 minutes
Notebook/Vocabulary	asthma; indoor air quality; pollutant Students record air quality improvement ideas, information about effect on health, and notes on air quality monitoring investigation.		
Presentation of Findings	Student presentations on findings from air quality monitoring investigation.		
Follow-up Suggestions			
Resources	http://www.epa.gov/msw/reduce.htm		
Multicultural/Historical/Social Connections			

Green Building Technology Core Curriculum	
Essential Question #4: What is meant by "reduce"? What are some of the ways you can reduce?	
Goal	Students will explore the concept of reducing waste and will gain tools to implement it.
Objectives	Students will: • be able to define food waste and identify how food waste can be reduced; • be able to define light pollution and discuss ways to reduce light pollution; • explore why is it important to reduce the usage of cleaning supplies and identify ways in which cleaning supplies effect the environment; and • describe ways they can reduce in their own home and in their community.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module

Activities	Site(s)	Equipment	Time
Students will take the "Believe It or Not!" quiz. After students guess at waste amounts, the instructor gives the actual figures and facilitates discussion about the tremendous amount of waste generated in the U.S. each year. Students will brainstorm a list of common disposable household products (e.g., paper towels, plastic water bottles, aluminum foil, plastic bags, etc.) and will work in small groups to find ways in which their use/waste might be reduced.	Dining Hall	Quizzes (Believe It or Not!) Pencils	30 minutes
Following a meal in the hall, instructors will place all the wasted food out on a table. Students will watch as gloved instructors pull out all the wasted good food. Students will brainstorm and share ideas about how this waste may be reduced. Alternatively, an interpretive display could be used to show food waste from a typical restaurant with an explanation/activities demonstrating how the Learning Center reduces/eliminates food waste.	Dining Hall	Wasted food Gloves	30 minutes

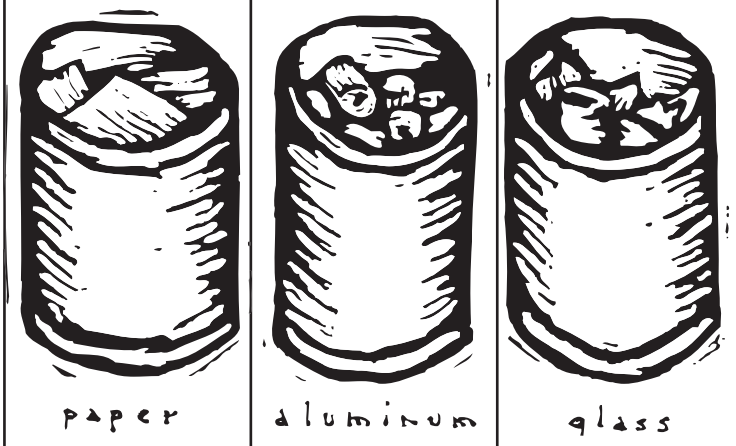
Green Building Technology Core Curriculum (Essential Question #4 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will hike to an elevated location to observe the night sky toward and away from Las Vegas. Students will compare the views and discuss factors that might restrict night-time viewing (air and light pollution). Students will discuss light pollution and ways that light pollution can be minimized. Students will listen to an American Indian star legend and then imagine how early people might explain the glow in the sky from city lights. Students will work in groups to create their own legend about light pollution and share those stories with the whole group.	Outside, elevated location	Star Legend	1 hour
Students (working in groups) will choose a common household cleaner. Students measure the pH of a cup (250 ml) of water. Students will then add a specified volume (e.g., 20 ml) of the chosen fluid to the water and stir. Students re-measure pH, noting the change. Students will discuss implications of their results (e.g., where does the water go when everyone on the block washes dishes after dinner? How is the water cleaned? How can the use of household cleaners be reduced?)	Flex-labs	Household cleaners Water Measuring tools Acid/base test strips 	45 minutes
Notebook/Vocabulary	acid; base; disposable; light pollution; reduce Students record ideas for reducing waste, information about effect of cleaners on water quality, and notes on light pollution.		
Presentation of Findings	Student presentations on ideas to reduce waste from brainstorming. Students share stories about light pollution.		
Follow-up Suggestions			
Resources	• Palmer, William (1946, 1978) *Why the North Star Stands Still: And Other Indian Legends.* Springdale, UT: Zion Natural History Association, Zion National Park • www.epa.gov/msw/reduce.htm		
Multicultural/Historical/Social Connections	Methods used by early settlers to reduce waste.		

Green Building Technology Core Curriculum

Essential Question #5: What is meant by "reuse"? What are some of the ways you can reuse?

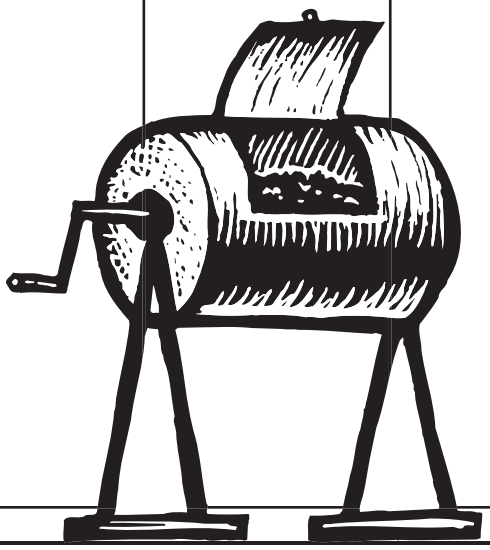
Goal	Students will understand the concept of reuse and will gain tools to implement it.
Objectives	Students will: • understand how materials can be reused to make things; • understand the benefits of reusing things; • identify everyday things they can reuse at home; and • identify things in their homes that can be reused by the community.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module

Activities	Site(s)	Equipment	Time
How can materials be reused to make things? Students will keep a list everything they threw away in one day (list is created prior to the start of the activity). Students will write individual items on sticky notes, and then group members will sort the types of waste into categories. To reduce waste, sticky notes might be kept and reused from group to group. Alternatively students can write with grease pencil on index card-size pieces of plastic, that can be wiped clean and reused. Students will graph group data to assess how much of each type of waste is generated and discuss results. Student pairs will choose one category of waste and brainstorm ways in which some item(s) in that category might be reused. Ideas will be presented to the group.	Flex-labs	Graph paper Colored pencils Sticky notes or Plastic pieces Grease pencils Student lists	1 hour



Green Building Technology Core Curriculum (Essential Question #5 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
How do communities reuse? Students identify ways in which materials are reused within their community (e.g., charities that gather clothing, old appliances, furniture, and used cars). Students identify benefits for reusing these materials. Students work in pairs to create radio, TV, or Internet commercials for organizations that reuse, and share them with the whole group.	Flex-labs	Notebooks Writing materials	45 minutes
Why is it important to reuse? Students observe effects of biodegradation on various materials. Students observe, draw, and describe properties of several common waste materials (e.g., an apple core, a leaf of lettuce, some plastic packaging, a Styrofoam cup) in their notebooks. Students will bury these items in the ground and mark the spots with labeled popsicle sticks. Students will also dig up materials that have already been buried for several weeks (3—4) and observe and record the differences in the degree of decomposition for each. Students will discuss the differences and why it may be important to reduce and reuse some of these materials.	Outside area (one that is already disturbed)	Apple cores Lettuce Markers Plastic packaging Popsicle sticks Styrofoam cups Shovels or trowels	1 hour
Notebook/Vocabulary	biodegradable; decomposition; reuse; waste Students record data on kinds of waste, information community resources to reuse, and notes on biodegradation of various materials.		
Presentation of Findings	Student presentations on ideas to reuse waste, mock commercials for reuse organizations, and findings about biodegradable waste.		
Follow-up Suggestions			
Resources	• www.epa.gov/msw/reduce.htm		
Multicultural/Historical/Social Connections	Methods used by early settlers to reduce waste by reusing materials.		

Green Building Technology Core Curriculum			
Essential Question #6: What is meant by "recycle"? What are some of the ways you can recycle?			
Goal	Students will understand the concept of reuse and will gain tools to implement it.		
Objectives	Students will: • review the concept of food waste; • explore the process of composting and its purpose in eliminating food waste; • identify how composting is related to flora and fauna; • understand that energy can be recycled and is recycled in nature; • explore how wind can contribute to the recycling of energy; • define photovoltaics and determine how photovoltaics contribute to the recycling of energy; • define "digester" and discuss how a digester contributes to the recycling of energy; • discuss the idea of recycled products and materials and be able to identify some of the products that are recycled and used in housing; and • determine how they can recycle in their homes and communities.		
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe interrelationships and interdependence of organisms with each other and with the nonliving parts of their habitats. (5) 4.4 Investigate and describe how technology can be used to extend resources. (5) 4.8 Explain that humans tend to use resources to meet more than their minimal needs for food, shelter, and warmth. (5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.		
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Study of environmental factors • FOSS Kit Environments module		
Activities		**Site(s)**	**Equipment**	**Time**
How does nature recycle? Students are introduced to the term "digesters" and "compost." Students will help to maintain an on-site composter by adding plant material and water and/or turning the matter. Students help to build (see below) or maintain a worm bin to recycle organic waste. Students will tour the site to see other examples of digesters. Students will listen to guest speaker (e.g., Cooperative Extension Service) to talk about the importance of compost and how students might compost at home or at school.		Site compost pile and/or Worm bin	Organic scraps Shovels or trowels	1 hour



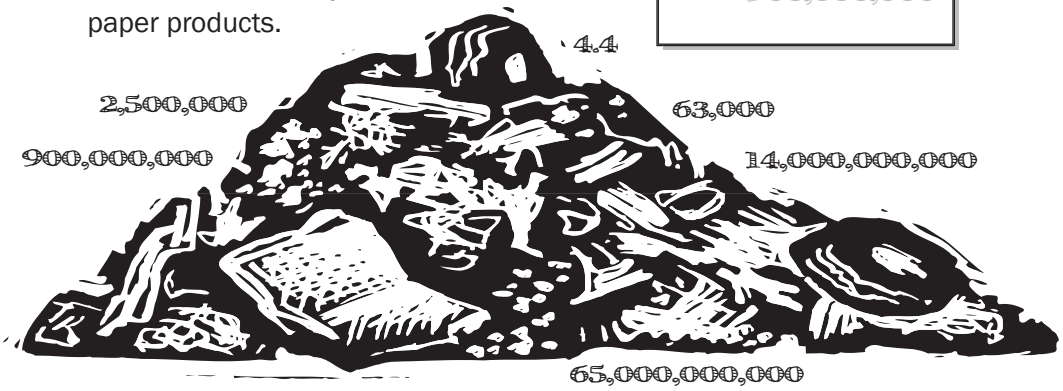
Green Building Technology Core Curriculum (Essential Question #6 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
What kinds of things can be recycled? Students observe recycling containers on site to identify commonly recycled materials (e.g., cans, paper, glass, etc.). Students will use old newspapers to create recycled paper they can use (see instructions below). Students identify advantages of recycling paper. Students may use recycled paper to write to local, state, and/or national leaders about the importance of reducing, reusing, and recycling.	Flex-labs	Blenders Old newspapers Water Pan Window screen Measuring cups Piece of wood	1 hour
Students will measure and record the average temperature outside in the sun and in the shade. Students will compare the temperature in the sun and in the shade, and share ideas about what (e.g., the sun) causes the difference in temperature .How can the sun's energy be recycled? Students will work in groups to construct a pizza-box solar oven, and use it to heat English muffin pizzas. While making and eating the pizzas, students will discuss how this concept can be used to heat water and buildings and reduce other types of energy use. Students will compare different types of energy in terms of expense and pollution. Students will then tour the site to find ways that its buildings use solar energy and how they control heat and light from the sun.	Outside Areas Dining Hall Kitchen	Pizza boxes Aluminum foil Heavy plastic wrap Black construction paper Straw English muffins Grated cheese Assorted pizza toppings (pepperoni pieces, olives, etc) Comparison charts of different types of energy use	1.5 hour
Notebook/Vocabulary	compost; digesters; pollution; recycle; solar energy; thermometer Students record information on composters and digesters on-site. Students record data on solar energy.		
Presentation of Findings	Student presentations on ideas to reuse waste, mock commercials for reuse organizations, and findings about biodegradable waste.		
Follow-up Suggestions			
Resources	• www.epa.gov/msw/reduce.htm		
Multicultural/Historical/Social Connections	Methods used by American Indians and early settlers to use solar energy; stories and legends about the Sun from early people.		

Green Building Technology
Core Curriculum
Selected Resources and Materials

Believe It or Not!

Do we really need to reduce our waste? Choose one of the numbers from the trash heap below to fill in the blanks in each statement.

1. The approximate number of pounds of garbage each person in the U.S. throws out every day. _____
2. The number of pounds of trash that are dumped into the ocean every year. _____
3. The number of aluminum soda cans that are used each year. _____
4. The number of garbage trucks that could be filled by all the trash people make in the U.S. each day. _____
5. The number of all the plastic bottles people in the U.S. use every hour. _____
6. The number of trees people in the U.S. cut down each year to make paper products. _____



Statistics retrieved from www.cleanair.org/Waste/wasteFacts.html

Making Recycled Paper

Materials:

- 2 ½ pages from a newspaper (for each student)
- whole section of newspaper (for each student)
- blenders (2 or 3 per group)
- water (1,180 ml or 5 cups for each student)
- big square pan at least 3" deep
- piece of window screen that fits inside the pan
- measuring cup
- flat piece of wood the size of a newspaper's front page
- hair dryers (2 or 3 per group)

Procedures:

1. Tear the 2 ½ pages of newspaper into tiny pieces.
2. Drop the pieces into the blender.
3. Cover the blender. Switch it on for a few seconds, until the paper becomes pulp.
4. Pour about 2.5 cm (1") of water into the pan.
5. Pour the blended paper (pulp) into a measuring cup.
6. Put the screen into the pan.
7. Pour 236 ml (1 cup) of blended paper pulp over the screen.
8. Spread the pulp evenly in the water with your fingers.
9. Lift the screen and let the water drain.
10. Place the screen with the pulp into the newspaper section. Close the newspaper.
11. Flip over the newspaper so the screen is on top of the pulp.
12. Place the board on top of the newspaper and press to squeeze out excess water.
13. Open the newspaper and take out the screen.
14. Leave the newspaper open and let the pulp dry, or use a hair dryer to help it dry.
15. Check to make sure the pulp paper is dry. If it is, carefully peel it off the newspaper.

Worm Composting

Materials:

- a rectangular wood or plastic bin (build or buy)
- cover for the bin (can be a plastic sheet)
- newspapers, leaves, and or shredded cardboard
- water
- moist dirt (a couple of handfuls per composter)
- 1–2 eggshells per composter
- worms (2 pounds per pound of food scraps)
- food scraps
- scale

Procedures:

1. Find a place where the temperature will stay between 55° and 77° Fahrenheit.
2. Drill holes into two sides and on the bottom of the bin.
3. Tear a newspaper into strips and fill the box with these strips, old leaves, and/or shredded cardboard. Moisten the newspaper with water.
4. Add a couple handfuls of moist dirt.
5. Sprinkle in 1 or 2 eggshells.
6. Place worms in the box. (Put in 2 pounds of worms for every pound of garbage. About 1000–1500 worms make a pound.)
7. Check to make sure that the bedding is moist, but not soggy. Bury about 250–500 grams of food scraps once a week, making sure to rotate the placement of food and to cover the garbage with bedding.
8. Change the worm bedding every 3–6 months. Remove newly made compost and replace it with newspaper strips.

Pizza Box Solar Oven

Materials:

- recycled pizza box
- black construction paper
- aluminum foil
- non-toxic glue, tape, scissors, ruler, magic marker
- wooden dowel or straw
- ingredients

Procedures:

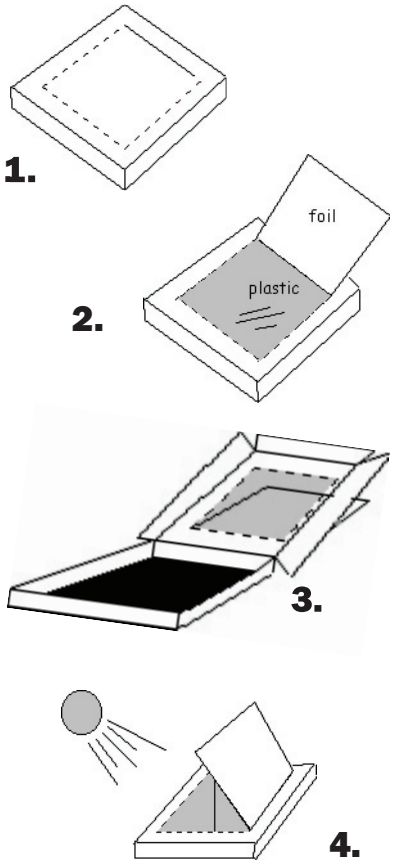
1. Draw a one inch border on all four sides of the top of the pizza box. Cut along three sides leaving the line along the back of the box uncut.

2. Form a flap by gently folding back along the uncut line to form a crease. Cut a piece of aluminum foil to fit on the inside of the flap. Smooth out any wrinkles and glue into place. Measure a piece of plastic to fit over the opening you created by forming the flap in your pizza box. The plastic should be cut larger than the opening so that it can be taped to the underside of the box top. Be sure the plastic becomes a tightly sealed window so that the air cannot escape from the oven interior.

3. Cut another piece of aluminum foil to line the bottom of the pizza box and carefully glue into place. Cover the aluminum foil with a piece of black construction paper and tape into place.

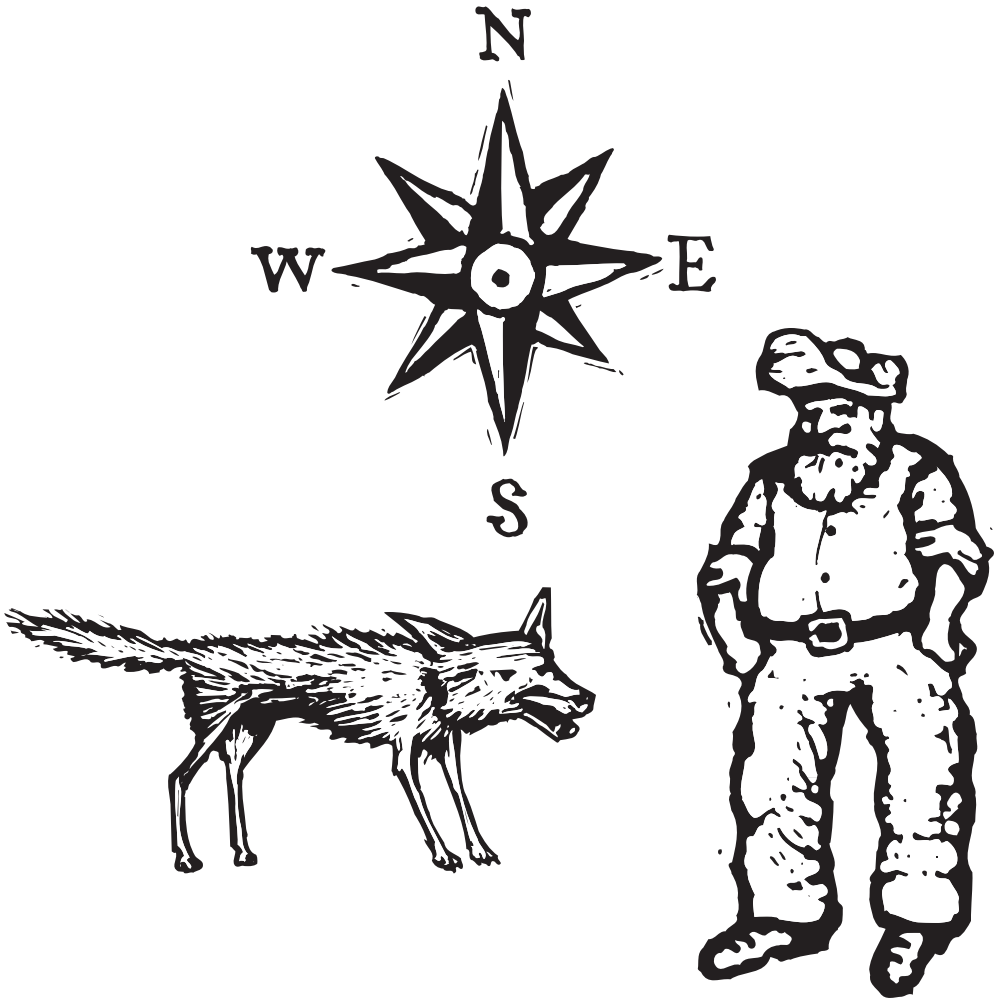
4. Close the pizza box top (window) and prop open the flap of the box with a wooden dowel, straw, or other device and face towards the sun. Adjust until the aluminum reflects the maximum sunlight through the window into the oven interior. Your oven is ready! You can try heating s'mores, English muffin pizzas, or hot dogs, or even try baking cookies or biscuits. Test how hot your oven can get using a simple oven thermometer!

Retrieved from www.solarnow.org/pizzabx.htm



The pizza box solar oven can reach temperatures of 275 degrees, hot enough to cook food and to kill germs in water. A general rule for cooking in a solar oven is to get the food in early and don't worry about overcooking. Solar cookers can be used for six months of the year in northern climates and year-round in tropical locations. Expect the cooking time to take about twice as long as conventional methods, and allow about one half hour to preheat.

Historical Figures Core Curriculum



Historical Figures Core Curriculum Rationale

Students will have an opportunity to develop an appreciation of Southern Nevada History, in particular the people and events that helped shape Nevada culture today. The goal of the history curriculum is to help students understand the relevance of local history to current issues facing Nevada. The activities included in the curriculum will help make history come alive. These activities might include learning about the artistry of Native Americans by basket weaving, reenacting trail blazing to understand the journey of early pioneers, or examining the impact of mining on Nevada's economy and environment.

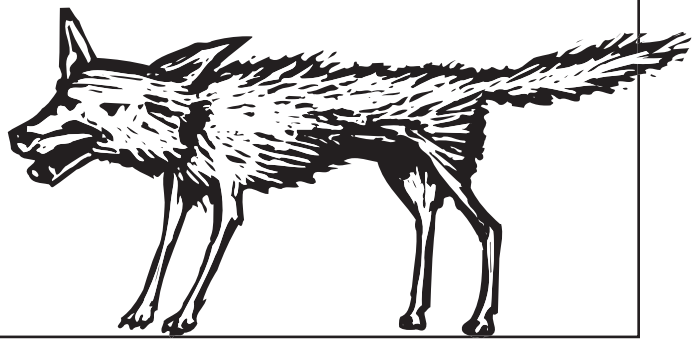
As historians students will inquire into the following questions:

- How has the West changed and developed and how have these changes and developments influenced Nevada culture and economics?
- What aspects of American Indian cultures are visible in Nevada?
- How has encroachment on Indigenous lands, in the form of ranching and mining, evolved historically, and what impact has it had on Nevada?
- How have explorers and historical figures influenced Nevada culture?
- What impact did mining have on Nevada?

Historical Figures Core Curriculum	
Essential Question #1: How has the West changed and developed and how have these changes and developments influenced Nevada culture and economics?	
Goal	Students will understand the relationship between the development of the West and current influences on Nevada.
Objectives	Students will be able to describe key events during the development of Nevada and how these key events have had an influence on the culture, economics, and environment in Nevada today.
Curriculum Essentials Framework Correlation	(5) 2.18 Demonstrate an understanding that an individual can be both a consumer and a producer [NS 6.5.2], read and derive geographic information from photographs, maps, graphs, and computer resources [NS 1.5.3]. (5) 3.14 Describe how the community and Nevada have changed over time [NS 2.5.6]. (5) 3.22 Identify the push-pull factors influencing human migration and settlement [NS 4.5.2], list examples of historical movements of people, goods, and ideas [NS 4.5.3]. (5) 3.24 Describe the differences among rural, suburban, and urban migration and settlement [NS 4.5.4]. (5) 4.28 Read, interpret, and analyze historical passages.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Lessons from Nevada historical literature • Discussion of terms: *Native American*, *American Indian*, and *Indigenous Peoples*

Historical Figures Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
The instructor will present a map of the U.S. and briefly show and explain where major groups of Indigenous Peoples live–then focus on Nevada. Students will research Indigenous Peoples of Nevada and present findings. Students will visit a cultural site (i.e., fire pit, petroglyphs). Lesson will compare/contrast Southern Paiute written and oral histories from various sources (i.e., Southern Paiute and white settlers). Students will examine the viewpoints of Indigenous Peoples in regard to how the U.S. government to acquired land from them. Students will imagine that a group of people come to visit their homes and decide to stay. The newcomers claim the larger part of the house, while the students and their families may keep only the bathroom. Students discuss what happened: Indigenous Peoples had to give their land to the settlers.	Cultural site	Southern Paiute guest speaker Writing materials *Celebrating Nevada Indians* curriculum materials: Sp 1–Sp 22	3 hours
Students will hike to the Old Spanish Trail to explore the migration of early settlers to the West, learning the origins of selected place names.	Trails Wheeler Camp		1 hour
Students will tour the Interpretive Ranch Site, stopping at interpretive venues to discuss the history of Oliver Ranch by observing artifacts (e.g., original foundation of the ranch buildings, original location of reservoir) reflective of the operation of the original ranch .	Interpretive Ranch Site		1 hour
Students will hike or be transported to Spring Mountain Ranch State Park to participate in a guided tour. Students will reflect in their journals how they would have felt in the position of the Southern Paiutes, whose land taken away and the significance of this event.	Spring Mountain Ranch State Park	Journals	3 hours
Notebook/Vocabulary	artifact; beliefs; chronology; community; context; cultural relativism; creation; culture; encroachment; federally recognized; hypothesis; indigenous; inference; land-based; lifestyle; migration; observation; Old Spanish Trail; petroglyphs; relocated; reservations; resources; restoration; sovereignty; timeline		

Historical Figures Core Curriculum (Essential Question #1 continued)	
Follow-up Suggestions	Visit other historic sites and area museums (e.g., Spring Mountain Visitor Center, Bonnie Springs, and Red Rock Visitor Center)
Resources	• Carlson, Helen S. (1985) *Nevada Place Names: A Geographical Dictionary.* Reno, NV: University of Nevada Press. • *Celebrating Nevada Indians* curriculum • Guest speakers • Artifacts • Historic diaries • Nevada brands • Maps and mapping resources
Multicultural/Historical/Social Connections	Students experience the evolutionary progression of settlement in the West. Question(s): How did the federal government come to own the land? How did historical events shape the Southern Nevada of today (e.g., Spring Mountain Ranch was a cattle ranch, a boy's camp, and a chinchilla farm; trails formed and evolved into transportation for economic purposes; gaming and tourism development; the locations of springs and wells and settlement around water)?



Historic Figures Core Curriculum	
Essential Question #2: What aspects of the American Indian cultures are visible in Nevada?	
Goal	Students will understand the historical and cultural aspects of the American Indian culture that are visible in Nevada today.
Objectives	Students will describe and define prominent American Indian cultures in Nevada and discuss the relationship and aspects of these cultures.
Curriculum Essentials Framework Correlation	(5) 1.21 Differentiate between facts and opinions. (5) 3.9 Describe physical and human features and cultural characteristics of places and regions in the United States [NS 2.5.1]. (5) 3.11 Identify examples in the community or region that reflect cultural identity [NS 2.5.2]. (5)3.13. Identify and describe the locations of selected historical events [NS 2.5.5]. (5) 3.14 Describe how the community and Nevada have changed over time [NS 2.5.6]. List examples of historical movements of people, goods, and ideas [NS 4.5.3]. (5) 4.28 Read, interpret, and analyze historical passages.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Lessons from historical literature provided • Discussion of terms: *Native American*, *American Indian*, and *Indigenous Peoples*

Activities	Site(s)	Equipment	Time
Students will visit a cultural site (e.g., fire pit, petroglyphs) as an introduction to early settlement in the Nevada. Students will identify Nevada's major Indigenous tribal characteristics (i.e., brief history, lifestyles, etc.). Students will draw a Venn diagram to compare/contrast similarities of the tribes. Students will brainstorm the resources accessible to the tribes and the use of the resources.	Cultural site	*Celebrating Nevada Indians* curriculum materials: Sp 1–Sp 22 Writing materials	2 hours
Students will be asked questions that stimulate discussion about the contributions of Indigenous Peoples to the modern world (e.g., sports, food, clothing, entertainment, etc.). Students will then use volumes of *American Indian Contributions to the World* (and other resources as appropriate) to find examples, which they will present to each other. Students will learn about basket weaving among Nevada's indigenous people from a guest expert. Students will have an introductory session on Dat So La Lee, a famous Washoe basket maker from Nevada, along with Southern Paiute basket makers. Students will learn about the process of making string from fiber and will create their own small baskets.	Art Pavilion	Southern Paiute and other tribal guest speakers *Encyclopedia of American Indian Contributions to the World* (5 volumes) Biographies of Dat So La Lee and others Basket-weaving supplies	3 hours

Historical Figures Core Curriculum (Essential Question #2 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will learn about pioneer and American Indian history and culture through storytelling. Guest speakers will tell traditional stories of their respective tribes (e.g., Navajo Constellation and Paiute Winter Stories etc.). Students will discuss ways to respect cultural practices.	Friendship Circle	Guest speakers	1 hour
Instructor reads a selected passage from *Indigenous Teaching* (see Selected Resources and Materials) to students.	Friendship Circle	*Indigenous Teaching*	15 minutes
Notebook/Vocabulary	Anasazi; archaic; archeology; artifacts; backboard; basket-weaving; constellation; cordage; desert; land-based; legend; lithics; mano; metate; midden; petroglyph; pictograph; Southern Paiute; potsherd; storytelling		
Presentation of Findings	Sharing Venn diagrams, student-made baskets, and Friendship Circle discussion.		
Follow-up Suggestions	Visit other historical sites and area museums (e.g., Valley of Fire, Spring Mountain Ranch, Bonnie Springs, Red Rock Canyon Visitor Center, Lost City Museum, Whispering Ben, Indian Ben Spring, Mormon Fort, and Native American Reservations)		
Resources	• *Celebrating Nevada Indians* curriculum • Guest speakers; a list of names of presenters and short bios are available through Clark County School District Indian Education Opportunities Program; also Julie Smith, Educator, Southern Paiute. • Photos and information on Mary Ann Pepo and Topsy Swain, Basket Makers • Porterfield, K. M. and Keoke, E. D. (2001) *Encyclopedia of American Indian Contributions to the World: 15,000 Years of Inventions and Innovations.* New York and Great Britain: Facts on File. • www.basketweaving.com/dat_so_la_lee.htm • www.governor.state.ut.us • www.tahoecountry.com/oldtimetahoe/dotsolalee.html • www.unm.edu/~abqteach		
Multicultural/Historical/Social Connections	American Indian art, storytelling, history. American Indian use of the springs/plants/resources. Historical accounts of American Indian families. Correlation of history to today (e.g., popularity of national parks/ cultural importance of places/place names). Ranch ownership and individual status of American Indians. Correlations to Spring Mountain Ranch and Bonnie Springs.		

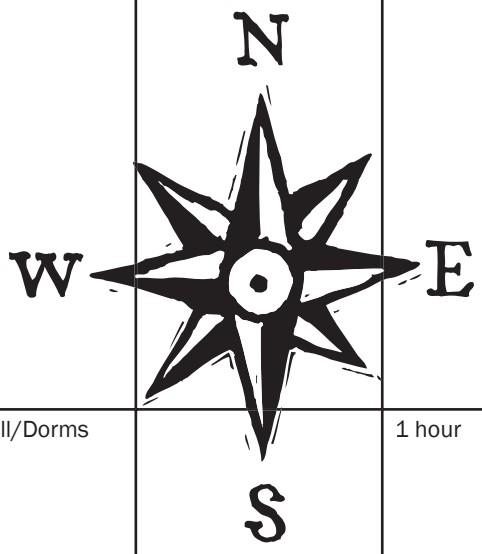
Historic Figures Core Curriculum	
Essential Question #3: How has encroachment on Indigenous lands, in the form of ranching and mining, evolved historically, and what impact has it had on Nevada?	
Goal	Students will: • explore the history of ranching in Nevada; • learn that ranching affected culture, economics, and the environment of the West; and • understand how the development of the West influenced Nevada today.
Objectives	Students will: • investigate the various types of ranching and describe the characteristics of each type; • itemize the cultural, environmental, and economic effects of ranching in Nevada; • be able to recognize the influence that key events of the developing West had on today's Nevada and describe how these key events specifically impacted culture, economics, and the environment.
Curriculum Essentials Framework Correlation	(5) 1.21 Differentiate between facts and opinions. (5) 2.18 Demonstrate an understanding that an individual can be both a consumer and a producer [NS 6.5.2], read and derive geographic information from photographs, maps, graphs, and computer resources [NS 1.5.3]. (5) 3.7 Recognize that states in the United States may be grouped into regions [NS 1.5.7]. (5) 3.9 Describe physical and human features and cultural characteristics of places and regions in the United States [NS 2.5.1]. (5) 3.11 Identify examples in the community or region that reflect cultural identity [NS 2.5.2]. (5) 3.13 Identify and describe the locations of selected historical events [NS 2.5.5]. (5) 3.14 Describe how the community and Nevada have changed over time [NS 2.5.6]. (5) 3.22 Identify the push-pull factors influencing human migration and settlement [NS 4.5.2], list examples of historical movements of people, goods, and ideas [NS 4.5.3], identify the sources of various economic goods and describe their movement between states or countries [NS 4.5.5]. (5) 3.33 Describe the patterns of distribution and use of natural resources in the United States [NS 5.5.6]. (5) 3.35 Describe how the physical setting influenced an event in the past [NS 6.5.1]. (5) 3.42 Investigate and interpret information from a variety of geographic sources [NS 7.5.4]. (5) 4.28 read, interpret, and analyze historical passages.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Lessons from historical literature provided

Activities	Site(s)	Equipment	Time
Students will volunteer their knowledge about the relationship between indigenous peoples and settlers. The instructor facilitates an activity similar to "Jeopardy" and/or "Millionaire" game shows, focusing on the problems that occurred as settlers moved into the region (especially regarding animals/game and mining of the land).	Flex-labs	*Celebrating Nevada Indians* curriculum materials "Jeopardy" and/or "Millionaire" style activity (Powerpoint)	3 hours

Historical Figures Core Curriculum (Essential Question #3 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Following the game show activity students will share thoughts about the lifestyle changes resulting from the encroachment, including relocation of American Indians to lands with fewer resources. Students will discover that communities evolve over time and events of the past shaped our present-day community.			
Students will hike to the wash/watershed area. Students will discuss how availability (and scarcity) of resources such as water determined settlement in Southern Nevada.	Wash/watershed Trails near outdoor Flex-labs		1 hour
Students will tour the original ranch site, stopping at interpretive displays to discuss the history of Oliver Ranch and observe artifacts reflective of the operation of the ranch (i.e., original foundation of the ranch buildings, original location of reservoir).	Interpretive Ranch Site		1 hour
Students will hike to the Wild Horse and Burro facility to learn about the role wild horses and burros in ranching.	Wild Horse and Burro Facility		2 hours
Students will hike or be transported to Spring Mountain Ranch State Park for a guided tour.	Spring Mountain Ranch State Park		3 hours
Notebook/Vocabulary			
Presentation of Findings	Sharing notebook entries at the Spring Mountain State Park.		
Follow-up Suggestions	Visit other historical sites and area museums (e.g., Spring Mountain Ranch, Pahrump Museum, Clark County Museum, Bonnie Springs, Old Mormon Fort, Red Rock Canyon Visitor Center, Tule Springs, Walking Box Ranch.		
Resources	• *Celebrating Nevada Indians* curriculum materials • Guest speakers; a list of names of presenters and short bios are available through Clark County School District Indian Education Opportunities Program. • Inter-American Commission on Human Rights Requests United States to Stay Action Against Western Shoshone Sisters (www.wsdp.org/oassum.htm) • Ranching Vocabulary (see selected resources)		
Multicultural/Historical/Social Connections	Connection to the Cultural Strands: American Indian influence. Correlation of history to today (i.e., careers, ranching, rodeos, culture). Indigenous People modern rodeo and ranching careers. Cultural richness: “Ranching Foreman.”		

Historic Figures Core Curriculum	
Essential Question #4: What has been the influence of explorers and historical figures in Nevada?	
Goal	Students will study historical figures from various Nevada cultures.
Objectives	Students will investigate various explorers, early settlers, and other historical figures in Nevada and assess their roles and influences/impacts on others and on Nevada economically and culturally.
Curriculum Essentials Framework Correlation	(5) 1.21 Differentiate between facts and opinions. (5) 3.13 Identify and describe the locations of selected historical events [NS 2.5.5]. (5) 3.14 Describe how the community and Nevada have changed over time [NS 2.5.6], list examples of historical movements of people, goods, and ideas [NS 4.5.3]. (5) 3.35 Describe how the physical setting influenced an event in the past [NS 6.5.1]. (5) 4.28 Read, interpret, and analyze historical passages.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Lessons from historical literature provided

Activities	Site(s)	Equipment	Time
Students will hike to the Old Spanish Trail to explore the migration of early settlers to the West. Students will discuss the first inhabitants of Nevada, focusing on the Southern Paiute. Students will discuss, from various perspectives, the first encounters between the American Indians of Nevada and the early settlers using, among other sources, *Life Among the Paiutes* (S. Winnemucca)	Old Spanish Trail	*Celebrating Nevada Indians* curriculum materials *Life Among the Paiutes* (S. Winnemucca)	1 hour
Part 1 (All Groups) Students will meet a Southern Paiute guest speaker and John C. Fremont (impersonator), one of the earliest explorers to map a route through Nevada. The speakers will discuss the impacts of explorers and early settlers in Nevada. Students will learn a few key Nevada place names and their origins. Fremont will also discuss period mapping techniques. Students will be "hired" to work in groups as "explorers" on discovery expeditions to survey and create effective route maps from the Friendship Circle to various designated sites. Students keep a log of their journeys. Landscape features (signs or objects representing: water and other features important to future settlers) will be planted throughout the area, and students will evaluate these items in deciding upon their route and in determining how detailed to make their maps. In addition to period mapping techniques, GPS technology is used.	Friendship Circle	Southern Paiute guest speaker John C. Fremont impersonator Map-making materials GPS units	3 hours

Historical Figures Core Curriculum (Essential Question #4 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Part 2 (All Groups) Students will present their logs and discuss the meaning of "discovery" from the viewpoints of American Indian and dominant cultures. Students will then exchange maps, using them to navigate to the indicated location. Students will annotate the maps for discrepancies between the map they are given and what they see. Students will be asked "How accurate are historical maps? How do modern and historical mapping techniques differ? How might trails and settlement have been different if GPS technology (and other technologies) had been available to create early maps?"	Friendship Circle and environs	See above 	1 hour
In their assigned groups, students will use any available resources and materials (e.g., historical literature, the Internet, etc.) to choose an explorer or other historical figure to research and present. Presentations will occur as a culminating activity in the Dining Hall.	Dining Hall/Dorms		1 hour
Notebook/Vocabulary	buckboard; chronometer; Global Positioning System (GPS); harness; latitude; longitude; navigation; Old Spanish Trail; sextant; survey; yoke;		
Presentation of Findings	Students share log entries.		
Follow-up Suggestions	Visit other historical sites and area museums (e.g., Spring Mountain Ranch, Bonnie Springs, Wheeler Camp, and Red Rock Canyon Visitor Center.		
Resources	• *Celebrating Nevada Indians* curriculum materials • Chaffin, T. (2002) *Pathfinder.* New York, NY: Hill and Wang. • Guest speakers; a list of names of presenters and short bios are available through Clark County School District Indian Education Opportunities Program. • Hopkins, S. W. (1994) *Life among the Paiutes: Their Wrongs and Claims* (reproduction). Reno, NV: University of Nevada Press. • Wheeler, G. M. (1875-1889) *Report of the United States Geographical Surveys West of the 100th Meridian.* Washington: Government Printing Office, Vol. 1. • Selected explorers and historical figures for student research: Antonio Armijo; Francois X. Aubry; Edward Beale; Bennet-Arcan Party; Escalante Group; Edward Fitzgerald; Father Francisco Garces; Jedediah Smith; Brigham Young • www.1st100.com/part1/		
Multicultural/Historical/Social Connections	Correlation of history to today (e.g., Mormon connection, Potosi Mine, transportation railroad versus wagon trains, utilization of the Spanish Trail). Cusp of change–valley used for travel (1840s).		

Historic Figures Core Curriculum	
Essential Question #5: What impact did mining have on Nevada?	
Goal	Students will understand the evolution and impact of mining on Nevada.
Objectives	Students will discuss how mining evolved in Nevada and its economic and environmental impacts.
Curriculum Essentials Framework Correlation	(5) 1.21 Differentiate between facts and opinions. (5) 2.18 Demonstrate and understanding that an individual can be both a consumer and a producer [NS 6.5.2]. (5) 3.1 Use maps and map features, including directional orientation, map symbols, and grid system, to identify and locate major geographical features in Nevada and the United States [NS 1.5.1], read and derive geographic information from photographs, maps, graphs, and computer resources [NS 1.5.3]. (5) 3.14 Describe how the community and Nevada have changed over time [NS 2.5.6], list examples of historical movements of people, goods, and ideas [NS 4.5.3], identify the sources of various economic goods and describe their movement between states or countries [NS 4.5.5]. (5) 3.33 Describe the patterns of distribution and use of natural resources in the United States [NS 5.5.6]. (5) 3.35 Describe how the physical setting influenced an event in the past [NS 6.5.1]. (5) 3.42 Investigate and interpret information from a variety of geographic sources [NS 7.5.4].
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Lessons from historical literature provided

Activities	Site(s)	Equipment	Time
Students will discuss how the land now known as "Nevada" was acquired from the American Indians. Discussion will involve treaties and provisions of the treaties, especially those on land use. Students will explore and discuss past and present mining (e.g., gravel, concrete, gypsum, silver, waste products) and mining operations. Students will conduct a vegetation survey at the mining site and record their data and observations in their science notebooks.	Mining Sites	*Celebrating Nevada Indians* curriculum materials Article 4 of *Treaty with the Western Shoshoni,* (sic) *1863* Hand lenses Field guide to Mojave Plants Science notebooks	30 minutes
Students will visit an area undisturbed by mining activity. Students will conduct a vegetation survey at the site and record their data and observations in their science notebooks. Students will compare these data to their results from the mining site.	Undisturbed venue	Hand lenses Field guide to Mojave Plants	30 minutes

Historical Figures Core Curriculum (Essential Question #5 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will examine rock and mineral samples found in Southern Nevada; they will use a rock and mineral test kit, dichotomous chart, and key to identify each sample. Students will record their observations in their science notebooks. Students will also learn about the many uses of minerals found in Nevada.	Flex-labs	Rock and mineral collections Rock and mineral test kit	1 hour
Students will participated in a mining activity (simulation).			
Notebook/Vocabulary			
Presentation of Findings	Sharing log entries in the Dining Hall.		
Follow-up Suggestions	Visit other historical sites and are museums (e.g., McCaw School of Mines, Las Vegas Quarry, Sandstone Quarry, Potosi Mine, Eldorado Mine)		
Resources	• Mining Vocabulary (see selected resources) • Rohde, D. (2002) *Native Plants Of Southern Nevada.* Utah: University of Utah Press. • *Treaty with the Western Shoshoni* (sic), *1863* (www.wsdp.org/treaty.pdf) • www.42explore.com/mining.htm		
Multicultural/Historical/Social Connections	Discuss variety of mining (e.g., Jim Wilson mine, gold-silver mining, Lied Mining, cement mining). Explore process of getting raw ore to market (wagon versus railroad). Correlation of history to today (e.g., housing, materials, mining, ghost towns, gypsum mine, town of Blue Diamond, Bonnie Springs, Goodsprings). Sustainability water issues. Scientific impact of mining (e.g., impact on plants, environmental impact).		

Historical Figures Curriculum Correlation to BLM Mission

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#1 How has the West changed and developed and how have these developments and changes influenced Nevada culture and economics? • Students explore the cultural landscapes of the area and the measures taken to preserve culturally significant sites. Students hike to early immigrant trails to look for evidence of the migration of settlers to the West. Students explore the reasons behind expansion into Nevada.	• Cultural sites • Cultural landscape • Homesteading • Petroglyphs • Westward expansion	• Archaeological and historical sites • Archeological Resource Protection Act • Cultural heritage preservation • NEPA • Public consultations with affected parties • Role of the General Land Office
#2 What aspects of the American Indian cultures are visible in Nevada? **#4 What has been the influence of explorers and historical figures in Nevada?** • Students learn selected Nevada place names and their American Indian, explorer, and settler origins. • Students engage in a mapping exercise (European perspective) and determine how settlement was affected by the mapping techniques of the period. • Students research, discuss, and present American Indian contributions to the world (and Southern Nevada).	• Land survey • Mapping • Population of the area • Westward expansion	• Historic and prehistoric • Westward expansion
#3 How has encroachment on Indigenous lands, in the form of ranching and mining, evolved historically, and what impact has it had on Nevada? • Students walk the perimeter of the desert learning center property. Could you make a living on this section of land? Students discuss open land versus developed land.	• Artifacts • Homesteading • Westward expansion • Population growth • Ranching/farming • Living on the land	• Role of General Land Office • Land disposal
#5 How did mining evolve and what impact did mining have on Nevada? • Students explore the history of the various types of mining operations in Nevada, especially gypsum mines. Students examine the value of mined products and explore effects of mining on the land.	• Mining • Disturbance of site • Rocks and minerals	• Role of General Land Office

Historical Figures Core Curriculum Selected Resources and Materials

Ranching Vocabulary

ALLIGATOR PLIERS device used for clinching off nails in a horse's hoof.

BLM Bureau of Land Management, an agency of the U.S. Department of the Interior.

BATWING CHAPS a once-popular style of leather chaps, loosely fitted but fully covering the legs, waist to ankle, wrapped around the rider's trouser legs and strapped or buckled behind. See also chaps.

BELL MARE a female horse outfitted with a bell, used to aid ranchers on the open range; male horses naturally follow the female and thus the ringing of the bell indicates the location of the entire cavvy, even in the dark when the horses cannot be seen. See also bell mule.

BELL MULE a mule outfitted with a bell; see also bell mare.

BIT the metal mouthpiece of a bridle, used to control or direct the horse.

BOSAL a small braided rawhide hackamore serving as a nose band.

BRAND special mark or identifying design owned by a rancher and used in registering and identifying cattle and horses. See also branding and branding iron.

BRANDING the act of marking an animal. See also brand, branding iron.

BRANDING IRON the handmade iron or steel tool that applies the identifying mark to the beast. The end with the owner's brand is heated to red hot in a fire in the corral and then pressed against the side of the animal. Branding irons are read from top to bottom, left to right, and from outside in. Because some irons are similar, ear notches and throat wattles are also cut onto the cattle to aid in identification. Rights to use a certain brand or iron may be sold separately from ranch property. Branding irons came from Hispanic Mexico, where they developed before the year 1600. Also referred to as an iron. Each iron is the creation of an individual blacksmith-buckaroo.

BRIDLE a harness, consisting of a headstall, bit, and reins, fitted to a horse's head.

BRONC BUSTER a special buckaroo who starts colts (break horses); also known as a bronc peeler.

BRONC PEELER see bronc buster.

BUCKAROO cowboy; Anglicized from vaquero, which derives from the Spanish word for cow, vaca.

BUNCHGRASS the general name for assorted hardy forage grasses of the genus *Andropogon* and other genera that grow in tufts.

BUNKHOUSE a small house on the home ranch that houses buckaroos and ranch hands, with space for cooking, eating, sleeping, and storing horse gear and equipment.

CAVIATA the group of saddle horses used during the roundup; each rider owns or is assigned specific mounts that make up a string. Term prevalent in Northern Nevada. See also cavvy, remuda.

CAVVY see caviata; see also remuda.

CHAPARRAL tough, thick brush; from the Spanish chaparro for dwarf evergreen oak.

CHAPS pronounced "shaps"; leather leg coverings of various styles worn by working buckaroos when riding in brush or sage, for warmth in the winter, and for show in rodeos or parades. The word comes from the Mexican-Spanish chaparreras. There are several different styles: shotgun chaps, hair chaps (woolies), batwing chaps, stove-pipe chaps, and chinks, reflecting different regional traditions as well as changing fashions and personal preferences within the same region.

CHEEK PLATES the parts of a bit that line the inside of a horse's cheeks.

CHINKS short, fringed chaps that reach below the knee and are often open behind the leg. Chinks may have originated when a buckaroo's well-worn old chaps were cut back in an attempt to salvage something of value. Whatever the origin, chinks are easy to pack and more comfortable than full-length designs in hot weather.

CHUCK BOX box containing dishes, utensils, and some food, serving as a portable kitchen while moving camp. Chuck boxes are an offshoot of the horse-drawn chuckwagons employed in trail drives and roundups in the old days. See also grub box.

CINCH a girth for a saddle or pack.

CORRAL an enclosure that confines livestock.

CRICKET roller on the bar of a steel bit intended to ease its movement on the horse's tongue.

CUFF a band that protects a buckaroo's shirt and wrists; often made of leather and brass.

DITTY BAG handy pouch for personal items; could be hung from the saddle or a bunkhouse nail.

FIADOR a thin rope knotted to a hackamore, running under the horse's lower jaw, to add stability; also called theodore.

GRUB BOX see chuck box.

HACKAMORE a headstall or a halter used for breaking a horse, usually made of braided rawhide with associated leather strips and a macardy. Derived from the Spanish jaquima, meaning halter.

HAIR CHAPS a semi-shotgun style of chaps; hair chaps of Angora goat skin with the fleece out were widely used in northern Nevada from early times into recent years. In their time, hair chaps or Angora woolies

were popular for their warmth and comfort, their appearance, and ability to "turn the storm." See also chaps.

HAIR TWISTER a device that twists horsetail hair into a cord when the block is rotated on the spindle. The cord is braided or twisted into a rope. Sometimes called tarabilla.

HAME a curved support connecting the collar of a draft horse to traces.

HARNESS HORSE see stitching bench.

HAROBED a mechanized piece of farm machinery that picks up individual hay bales and arranges them on a platform. At the end of a run, the platform tilts to a vertical position and the bales are set down in a stack. The machine was invented in the late 1950s by Gordon Grey, who named it by spelling his daughter Deborah's name backward. In 1962, Grey and his partner were bought out by the Sperry-New Holland Company, who began marketing the machine under the name Stackcruiser.

HAY DERRICK one of several devices used in the West to stack loose hay. The typical Nevada derrick featured a tall mast secured by cables, with a pivoting boom used to raise batches of hay to the top of the stack. These labor-intensive devices have been largely supplanted by machines that bale and stack hay.

HAYING HOOK tool used to handle bulky bales of hay. Also called hay hooks.

HEADSTALL the part of a bridle that encircles the head of a horse.

HELPER see ranch hand.

HOBBLE a device fastened to the front legs of an animal likely to wander off.

IRON see branding iron.

LARIAT rope used to lasso livestock. Lariat and riata are both derived from the Spanish la reata (the rope). The classic nineteenth-century lariat was made from the fibers of the maguey plant (genus Agave), sometimes called a "magee" or "grass rope". In contrast, the classic riata was made of braided rawhide. Today, most cowboy ropes are made of nylon are generally called lariats.

LATIGO the leather strap used to tie the cinch to the saddle's rigging straps.

LEPPY an orphaned calf.

LINE CAMP temporary base of operations for buckaroos; may have a cabin or other shelter.

MACARDY long rope of twisted horsehair pulled from the mane or tail; also known as McCarty, it derives from the Spanish word mecate, meaning maguey-fiber rope.

MAVERICK an unbranded cow running loose. See also oreanna; compare with leppy.

McCARTY see macardy.

MOTHER UP reunite calves and cows after branding or other activity that separates them.

NECKERCHIEF see wild rag.

OREANNA an unbranded cow running loose. Prevalent in Nevada. See also maverick.

PACK SADDLE a saddle designed to support loads on the backs of pack animals.

PARADA the group of animals cut from the rodera. From the Spanish apartar, to set apart or separate. Also known as prada or paratha.

PARATHA see parada.

PART THE HERD to separate specific categories of animals from the rodera. See also parada, rodera.

POMMEL the ball at the front of a saddle.

PRADA see parada.

QUIRT a riding crop.

RANCH HAND ranch worker who performs a variety of chores, less narrowly defined than buckaroo. See also helper, swamper, and choreboy.

RAWHIDER a buckaroo who braids rawhide lariats, hackamores, quirts, bosals, and macardies.

REINS straps fastened to the bit which the rider uses to control the horse's movements.

REMUDA the group of saddle horses used during the roundup; each rider owns or is assigned specific mounts that make up his string. See also caviata; cavvy.

RIATA rope used to lasso livestock. Riata and lariat are both derived from the Spanish la reata (the rope). The classic nineteenth-century riata was made from braided rawhide, was sixty or more feet long, and was generally used by buckaroos who dallied the rope. In contrast, the classic lariat was made from the fibers of the maguey plant and was generally used by cowboys who tied their ropes hard-and-fast. See also lariat, dally, and hard-and-fast.

RODERA group of bunched cattle from which specific categories of animals are segregated. From the Spanish rodear, to surround. See also parada.

ROMAL extension to the reins that functions as a riding crop. See also quirt.

ROWEL a revolving disk with sharp pointed edges at the end of a spur.

RUNNING IRONS branding irons which are kept by ranchers and used to mark strays when necessary, or to put a neighbor's brand on strays that drift into the wrong herd.

SADDLE BLANKET blanket placed under the saddle to cushion the horse's withers and to soak up sweat.

SAW BUCK wooden braces used to hold wood when cutting. The term is also used to name a type of pack saddle.

SHOTGUN CHAPS the traditional style of chaps, they are straight, plain, narrow, and completely enwrap the rider's legs from belt to boot sole; they have to be stepped into and pulled up over trousers. See also chaps.

SNOUTED TAPS short stirrup covers. See tapaderas.

SOUGAN a blanket or quilt for use on a bunk or on the range, where it and the occupant are protected by a canvas tarp.

SQUEEZE CHUTE device to hold a cow or calf for medication or branding.

STACKCRUISER Sperry-New Holland brand name of automatic hay baler. See also harobed.

STACKER a ranch hand employed to stack hay.

STIRRUPS a pair of rings attached to a saddle; they aid the rider in mounting and provide support while riding; may be covered with tapaderas.

STIRRUP COVERS see tapaderas.

STITCHING BENCH combined seat and clamp that holds saddlery leather for sewing; also known as a harness horse.

STOCK SADDLE a saddle used to work cattle. Working saddles, like all cowboy tools, see wide variation throughout the West.

STOVE-PIPE CHAPS a style of chaps.

SWAMPER see ranch hand.

SWATHER a farm machine that cuts hay and lays it in windrows for the baler.

TAPADERAS leather covers or hoods over the stirrups; also known as taps.

TAPS see tapaderas.

TARABILLA see hair twister.

THEODORE see fiador.

VAQUERO Mexican cowboy; from the Spanish word for cow, vaca. Buckaroo was Anglicized from vaquero.

WAR BAG a smaller version of the common duffle bag, used by buckaroos to carry clothing and personal

gear; sometimes called war sack.

WAR SACK see war bag.

WATTLE a flap of skin that hangs from the neck, jaw, shoulder, or brisket of a cow or steer, used by buckaroos to identify the ownership of animals at a distance. Produced when calves are branded by cutting away a short length of hide. Also used as a verb.

WATTLING cutting away a short length of a calf's hide to produce a wattle. See wattle.

WEANER a weaned calf.

WILD RAG a large piece of soft cloth worn by a buckaroo wrapped around the neck twice and then tied in a small knot in the front. Also known as scarf, neckerchief, or bandanna, this basic item can be plain black or a brilliantly colored print.

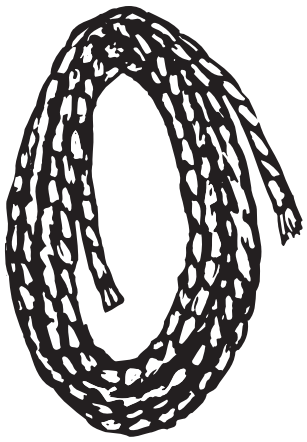
WINDROW a row of raked hay that is drying before being baled. Also used as a verb.

WOOLIES CHAPS see hair chaps. See also chaps.

WRANGLER a ranch hand charged with caring for the horses; a wrangler herds the horses into the field to graze, then herds them back into the corral.

WRANGO see wrangler.

YEAR IRONS branding irons that apply a single digit brand indicating the year; for example, "4" indicates 2004, "5" indicates 2005.



Mining Vocabulary

ADIT an entrance to a mine, generally a horizontal tunnel.

AMALGAMATION the technique of using mercury to attract small particles of crushed gold and join with them in an amalgam, or alloy. Gold may be recovered by distilling off the mercury.

ARRASTRA a mill, consisting of one or more large stones dragged around on a circular bed, used to grind ore.

CORNISH PUMP a type of pump developed in Cornwall, England, and commonly used in deep mines of the nineteenth century to raise underground water.

CROSSCUT a horizontal tunnel driven perpendicular to the main direction of a vein.

DRIFT an underground tunnel that follows the course of a vein.

FOOTWALL the wall or rock on the underside of a stope.

GALLERY a drift which has been enlarged into an underground room by the extraction of ore.

GANGUE the worthless rock in a vein which holds valuable metals.

GEOLOGY the science or study of rocks in the Earth.

HANGING WALL the wall or rock on the upper or top side of an ore deposit.

LEVEL horizontal passageways or tunnels in the mine leading from shafts, established at regular intervals.

LODE an ore deposit occurring in place within definite boundaries separating it from the adjoining rocks.

METAMORPHISM a pronounced change in the constitution of rock affected by pressure, heat, and water that results in a more compact and more highly crystalline condition.

MINERAL a substance that occurs naturally in the Earth which may, or may not, be of economic value. It is homogenous, has certain chemical makeup, and usually appears in crystal or grain form.

ORE a mixture of minerals and gangue from which at least one of the minerals can be extracted at a profit.

PAN a shallow metal dish used for washing Earth and stones to separate the gold.

PLACER an alluvial or glacial deposit containing particles of gold or other valuable minerals.

ROCKER a device for washing gold-bearing Earth to recover the precious metal.

SHAFT a vertical entrance to a mine cut downward from the surface.

SQUARE SET a set of timbers used for support in underground mining.

STAMP MILL a machine for crushing ore by the weight of constantly falling pieces of iron, stone, or wood. The action approximates the pulverizing of material with a mortar and pestle.

STOPE an excavation created by the removal of ore and consequent widening of the drift.

TAILINGS finely ground particles of ore deposited as waste after processing by a mill or smelter.

VEIN an opening, fissure, or crack in rock, containing mineralized material.

WASTE rock containing no ore but removed in the course of mining operations.

WINDLASS a device used to raise ore from a shaft.

WINZE a vertical or inclined opening sunk from a point inside a mine.

Case Summary:

Inter-American Commission on Human Rights Requests United States to Stay Action Against Western Shoshone Sisters

By the INDIAN LAW RESOURCE CENTER

April 7, 1998

- On March 6, 1998 the Inter-American Commission on Human Rights of the Organization of American States "reiterated its request to the United States Government to stay its action [impeding Western Shoshone land use] pending an investigation by the Commission" of the case. The Inter-American Commission is the organ mandated by the Charter of the OAS with the task of promoting the observance of human rights among OAS member states, including the United States. As a member of the OAS, the United States is legally bound to uphold the organization's human rights principles.

- The Commission's request to the United States was in response to a communication from Western Shoshone sisters Mary and Carrie Dann urging relief against notices and orders issued by the Bureau of Land Management (BLM) on February 19, 1998. By the notices and orders, the BLM repeats earlier assertions that the Danns and other Western Shoshone people are in trespass of lands; orders them to remove their livestock and property from the lands; and threatens them with fines, imprisonment, impoundment of cattle, and confiscation of property if they fail to comply with the order.

- The United States government has failed to comply with the request of the Inter-American Commission to stay the BLM's threatened actions. Instead, on April 6, 1998 the BLM issued another notice to the Danns. In this most recent notice the BLM threatens to take enforcement action against the Danns if they do not remove their livestock and cattle from the disputed land within fifteen days.

- The Inter-American Commission's recent request is the second such request made to the United States in relation to the Danns. The first was in 1993, just after the Dann sisters initiated proceedings against the United States before the Commission. The Danns filed a

lands and to the enjoyment of their culture which is tied to the land. The Danns assert that the United States' actions which impede their use and enjoyment of Western Shoshone ancestral lands are in violation of relevant provisions of international human rights law, and that the mechanism by which the United States purports to have extinguished Western Shoshone land rights is invalid for its discriminatory character and failure to accord due process.

- In its various responses to the Inter-American Commission, the United States does not contest that the Danns are Western Shoshone Indians or that the lands in question are Western Shoshone ancestral lands. Rather, the United States denies altogether the continuing existence of Western Shoshone legal rights to ancestral lands, and it bases that denial on earlier proceedings before the U.S. Indian Claims Commissions (ICC). The United States characterizes the ICC proceedings as having conclusively established that Western Shoshone title to land and appurtenant rights were extinguished at same point in the past.

- The United States' legal position relies on the U.S. Supreme Court decision in United States v. Dann, in which the Court held that the Western Shoshone are statutorily banned from asserting aboriginal title to ancestral lands, as a result of the stipulated finding by the ICC that Western Shoshone title had been extinguished some time ago by actions of "gradual encroachment." The Court held that, under the relevant statute, the Western Shoshone became barred from asserting title when "payment" of the claim occurred, and the Court determined that such payment occurred when the government placed money in a U.S. Treasury account for the benefit of the Western Shoshone.

- In its ruling in United States v. Dann, the Supreme Court did not consider the extent to which gradual encroachment had actual occurred onto Western Shoshone lands, or that such gradual encroachment does not ordinarily suffice under U.S. law to extinguish Indian land rights. Nor did the Court take into account that numerous Western Shoshone had alleged fraud in the ICC proceedings and had attempted to withdraw the claim before the ICC when it became apparent that they could only receive money and not confirmation of land rights through those proceedings. The Supreme Court simply ignored such considerations in favor of an unmitigated application of the statutory bar of the Indian Claims Commission Act.

- Despite the United States' position, the Danns and other Western Shoshone people have continued to use Western Shoshone aboriginal lands in accordance with historical custom. The Western Shoshone never have consented to the taking of their aboriginal territory, the

of Western Shoshone lands by non-Indians, while leaving the Western Shoshone in peaceable enjoyment of their ancestral territory. Additionally, the Danns and other Western Shoshone have refused to accept the money awarded by the ICC, and that money has not been distributed out of the U.S. Treasury account, where it remains today.

- The Danns filed their petition with the Inter-American Commission on Human Rights in the hope of resolving the ongoing dispute with the United States. At stake is their way of life which is entirely dependent on the land and its resources. Earlier this year, the Yomba Band of Western Shoshone intervened in support of the Danns in the case before the Commission.

- For its part, the United States has challenged the admissibility of the case before the Inter-American Commission. The United States argues that the dispute is not a matter of human rights, even though numerous developments internationally, including statements by U.S. diplomats in United Nations forums, and the Commission's own jurisprudence clearly regard indigenous land issues as falling within the ambit of human rights.

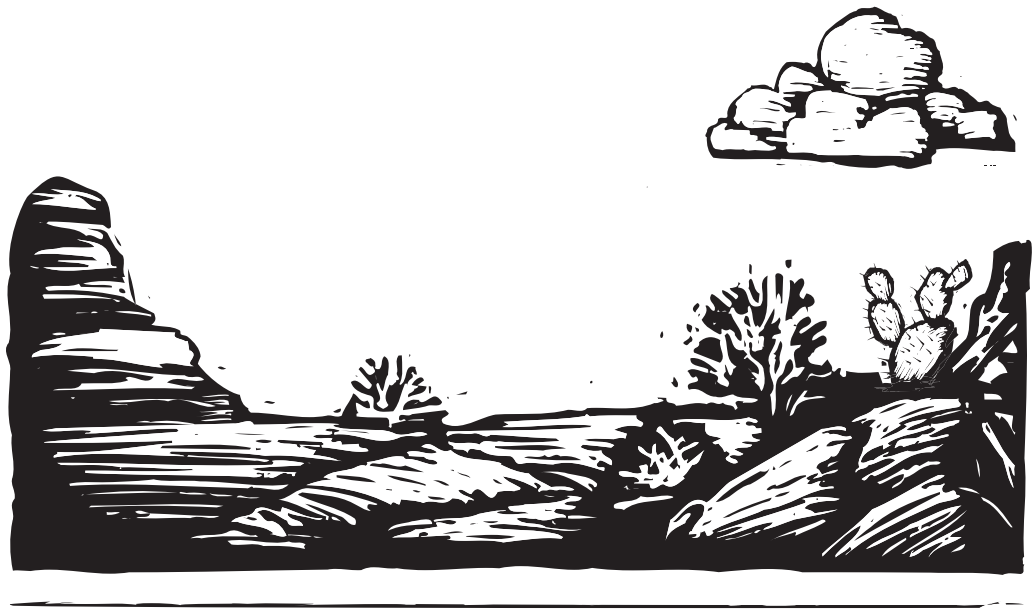
- The Inter-American Commission issued its request for a stay of BLM action to the United States as an interim measure, to prevent irreparable harm from coming to the Danns while the Commission proceeds to consider the various issues raised by the case.

For more information contact the Indian Law Resource Center in Helena, Montana at: (406) 449-2006 or in Washington, D.C. at (202) 547-2800.

Retrieved from www.wsdp.org/oassum.htm

Cultural and Historical Connections

A Pilot Curriculum: Sample Strategies



Acknowledgements

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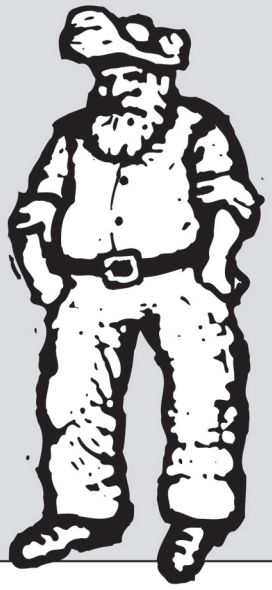
Introduction

Learning Cycle Component	Lesson Components and Procedure
Grade for Lesson	Grade 5
Unifying Concept	Historical Narratives (Nevada Historical Thinking Standards)
Topic	Explorers and Historical Figures in Southern Nevada
Essential Questions	• What has been the influence of explorers and historical figures in Nevada? • What are the influences early inhabitants of the Las Vegas area had on southern Nevada historically and today?
Goals	NS (5) 4.3 Ask a historical question and identify resources to be used in research NS (5) 4.4 Organize historical information from a variety of sources
CEFs	(5) 4.3 Ask a historical question and identify resources to be used in research (5) 4.4 Organize historical information from a variety of sources (5) 4.11 Describe colonial life in North America
Introduction	1. Pose Essential Questions. 2. Form partnerships within the group. Assign each dyad an historical figure, explorer, or an early inhabitant of Nevada to research and think about during the site tour and historical hike. In addition, ask them to imagine what life would be like if they were children of the early inhabitants. Historical figures could include names such as: • Walter Bracken • Ilee Morfy Castillo • William Andrews Clark • Geneva Douglas • John C. Fremont • Oscar Decatur "O.D." Gass • Willard George • Howard Hughes • Velma B. Johnston "Wild Horse Annie" • Vera Krupp • Dot-So-La-Lee • Rafael Rivera • Helen J. Stewart • Yonema "Bill" Tomiyasu • Del E. Webb • Whispering Ben • Bill Williams • James Bernard Wilson, Sr.

Learning Cycle Component	Lesson Components and Procedure
Introduction *Continued*	Early inhabitants could include groups such as: • Dam Builders • Explorers • Farmers • Homesteaders • Miners • Mormons • Pioneers • Ranchers • Southern Paiutes • Trappers 3. Coordinate on-site activities/presentations by the Park Interpreter as well as representatives from the Bureau of Land Management instructional staff which include: • Video: Overview of Site • Tour of Site • Historical Hike • PowerPoint Presentation of Red Rock Desert Learning Center



Lesson One

Historical Figures of Southern Nevada: A Poetic Monologue

Learning Cycle Components	Lesson Components and Procedures	Materials
Introduction	1. Pose Essential Question: What has been the influence of explorers and historical figures in Nevada? 2. Discuss/debrief information about explorers and historical figures gleaned from the video, on-site tour, and historical hike. 3. Review the format for a biopoem (Handout #1). 4. Present the poetic monologue of Rafael Rivera, an historically controversial trail guide (Handout #2).	Handout #1: BIOPOEM Handout #2: EXAMPLE OF A BIOPOEM
Exploration	1. Ask partners to use the Internet and printed materials to research their explorer or historical figure and take notes (Handout #3). 2. Ask partners to use the biopoem format (Handout #1) to write a monologue about their explorer or historical figure. 3. Review the definition of "Readers' Theater" and "Tips for Readers" (Handout #5). 4. Allow time for partners to practice reciting their monologues. They may read lines or stanzas alone or in pairs.	Handout #3: RESOURCES: STARTING POINTS Spring Mountain Ranch Docent Manual Handout #5: READERS' THEATER
Exploration Assessment	1. Ask partners to use the rubric (Handout #4) to assess their biopoem. 2. Use the rubric (Handout #4) to provide feedback.	Handout #4: BIOPOEM RUBRIC

Learning Cycle Components	Lesson Components and Procedures	Materials
Concept Development	1. Review the Storytelling Checklist (Handout #6). 2. Have partners share the biopoem for their character with their peers.	Handout #6: STORYTELLING CHECKLIST
Concept Development Assessment	1. Ask partners to use the checklist (Handout #6) to assess the presentation of their monologue. 2. Use the checklist (Handout #6) to provide feedback.	Handout #6: STORYTELLING CHECKLIST
Application and Further Questions	1. Discuss/debrief the Biopoem activity. 2. Discuss the use of poetic monologues as a form of historical narrative. 3. Have small groups debate, "Who is the most influential person in Southern Nevada History?" Ask them to share choices and provide supporting evidence.	
Application Assessment	Assign Notebook entries: • Biopoem. • Position Statement on whether or not the poetic monologue is a form of historical narrative. • Position paragraph (with supporting evidence) choosing the most influential person in Southern Nevada history.	

Learning Cycle Components	Lesson Components and Procedures	Materials
Adaptations for Diverse Learners: English Language Learners	1. Provide bilingual dictionaries. 2. Define words that are critical to the activity; ask students to add the vocabulary to their word banks. 3. Use gestures, drama, and visual stimuli to teach concepts and vocabulary. 4. Pair native speakers of English with non-native speakers.	
Adaptations for Diverse Learners: Gifted/Talented	1. Give early finishers choices such as: illustrate the biopoem or transform the biopoem into a rap. 2. Add technology choices such as: record a podcast of an interview with a historical figure from Southern Nevada or create a PowerPoint presentation using text and photos of the historical figure.	
Adaptations for Diverse Learners: Special Needs	1. Provide peer readers and writers. 2. Allow students to record position statements. 3. Use choral reading, guided reading, or repeated reading during rehearsal of monologues. 4. Allow partners to choral read poetic monologues to peers.	

Lesson Two

I am the Child of an Early Inhabitant

Learning Cycle Components	Lesson Components and Procedures	Materials
Introduction	1. Pose Essential Question: What are the influences early inhabitants of the Las Vegas area had on Southern Nevada historically and today?	
	2. Discuss/debrief information about early inhabitants of the Las Vegas area gleaned from the video, on-site tour, and historical hike.	
	3. Review the format for an I AM Poem (Handout #7).	Handout #7: I AM POEM
	4. Discuss the Ancient Native American Proverb:	
	Proverb Treat the earth well: it was not given to you by your parents, it was loaned to you by your children. We do not inherit the Earth from our Ancestors, we borrow it from our Children.	
	(*Quotes from Our Native Past*. Retrieved January 1, 2006, from http://www.ilhawaii.net/~stony/quotes.html)	
	5. Present the example of the I AM Poem: Seattle, Chief of the Northwest Nations (Handout #8). Discuss the quotations in the poem recounted in Jeffer, S. (1991). *Brother eagle, sister sky: A message from Chief Seattle.* New York, NY: Dial.	Handout #8: EXAMPLE OF AN I AM POEM

Learning Cycle Components	Lesson Components and Procedures	Materials
Exploration	1. Ask partners to imagine themselves as a child of an early inhabitant of Southern Nevada. Review "Hot Potato Seat: A Role-playing Exercise" (Handout #9) with the group. 2. Review "Creating My Character" (Handout #10). 3. Ask partners to use the Internet and printed materials to research the early inhabitants and take notes, focusing on the questions from "Creating My Character" (Handout #10). 4. Have students take turns in the "Hot Potato Seat" role playing their characters. 5. Ask partners to use the "I AM" format to write a poetic narrative about the role they have created: I Am a Child of an Early Inhabitant (Handout #7).	Handout #9: HOT POTATO SEAT A ROLE-PLAYING EXERCISE Handout #10: CREATING MY CHARACTER Handout #3: RESOURCES: STARTING POINTS Unit X: Westward Expansion materials from Mojave Desert Discovery Handout #7: I AM POEM
Exploration Assessment	• Observation: How well did the partners respond to probing "Hot Potato" questions? • Ask partners to use the rubric (Handout #11) to assess their own "I Am" poem. • Use the rubric (Handout #11) to provide feedback.	Handout #11: I AM POEM RUBRIC
Concept Development	1. Review the definition of "Readers' Theater" and "Tips for Readers" (Handout #5). 2. Have partners share their *I Am a Child of an Early Inhabitant* poem with their peers.	Handout #5: READERS' THEATER

Learning Cycle Components	Lesson Components and Procedures	Materials
Concept Development Assessment	1. Ask partners to use the checklist (Handout #6) to assess the presentation of their own monologue. 2. Use the checklist (Handout #6), to provide feedback.	Handout #6: STORYTELLING CHECKLIST
Applications and Further Questions	1. Discuss/debrief the activities. 2. Discuss the use of the I AM poem as a form of historical narrative. 3. Have small groups discuss how the early inhabitants of the Las Vegas area influenced Southern Nevada historically and today. 4. Have small groups compare/ contrast the lives of children historically and today.	
Application Assessment	Assign Notebook entries: • I AM poem. • Position Statement on whether or not the I AM poem is a form of historical narrative. • A list of at least five ways the early inhabitants of the Las Vegas area influenced Southern Nevada historically and today. • A VENN diagram or Compare/ Contrast Thinking Map comparing the individual's life with the child's life described in his/her I AM poem.	VENN diagram or a Thinking Map

Learning Cycle Components	Lesson Components and Procedures	Materials
Adaptations for Diverse Learners: English Language Learners	1. Provide bilingual dictionaries. 2. Define words that are critical to the activity; ask students to add the vocabulary to their word banks. 3. Use gestures, drama, and visual stimuli to teach concepts and vocabulary. 4. Pair native English speakers with non-native speakers. 5. Permit partners to draw pictures or sketch responses to the "Creating My Character" handout. 6. Allow partners to choral read I AM poems to peers.	
Adaptations for Diverse Learners: Gifted/Talented	1. Give early finishers choices such as: write diary entries for their character or create a short story or comic book about an event in the life of their character. 2. Add technology choices such as: use the Internet to research the music of their character's time period or create a graphic organizer describing their character.	
Adaptations for Diverse Learners: Special Needs	1. Provide peer readers and writers. 2. Permit partners to type or sketch responses to the "Creating My Character" handout. 3. Use choral reading, guided reading, or repeated reading during rehearsal of I AM poems.	

Lesson Three

Our Stories, Our Legends: Paiutes and Pioneers

Learning Cycle Components	Lesson Components and Procedures	Materials
Introduction	1. Ask if anyone would like to share a memorable family story about the people, places, or events connected to his or her immediate family or past relatives. 2. Ask if individuals would like to share stories about how they got their names. 3. Discuss the importance of storytelling among the native tribes of Nevada. Emphasize that storytelling serves: • as an oral tradition; • as a way of preserving their culture and history; • to teach about relationships between people and nature; and • as a form of entertainment and a source of amusement. *Native Nevada Classroom* (1992). Retrieved January 7, 2006, from http://www.unr.edu/nnap/nnc_intro.htm 4. Discuss the following quote from Livo, N. J., & Rietz, S. A. (1986). *Storytelling: Process and practice*. Libraries Unlimited, Inc: Littleton, Co.	*Native Nevada Classroom: Nevada Native Storytelling* http://www.unr.edu/nnap/NT/st-1.htm provides stories from the four native tribes of Nevada. "Celebrating Nevada Indians," a project of the Nevada Native American Education Association is available at the University of Nevada, Las Vegas (UNLV) College of Education Curriculum Library.

Quote:

The storyteller is a chosen one: a transmitter of a history and/or a morality, a preserver of cultural memory, a repository of information, a walking library, a cultural and literary resource.

Learning Cycle Components	Lesson Components and Procedures	Materials
Introduction, continued	5. Tell the group that one way to dramatize scenes from a story is to create a tableau. **A tableau?** A tableau is a dramatic technique in which individuals, partners, or members of a group create an image by arranging their bodies in a frozen scene. The human statues capture a moment of time that communicates an idea, an intention, or a single action. 6. Warm-up Activity: Each group selects three early inhabitants of Southern Nevada, (e.g., a miner, trapper, and rancher). They create frozen statue-like images of each inhabitant, capturing an action describing the person. Allow the groups time to experiment with different body arrangements; encourage them to have fun expressing themselves.	
Exploration 	1. Download from the Internet the following three legends: • *Coyote Legend* • *Coyote and Sun: A Paiute Legend* • *Origin of the Great Basin People* 2. Form small groups; ask the groups to read, discuss, and compare/ contrast the stories about the origin of the Great Basin people.	http://www.ccmuseum.org/InFocus/Hooper/hooper2.htm http://www.firstpeople.us/FP-Html-Legends/Coyote-teandSun-Paiute.html http://www.unr.edu/nnap/NT/st-30.htm

Learning Cycle Components	Lesson Components and Procedures	Materials
Exploration, continued	3. Distribute "Scenes from Origin of the Great Basin People" (Handout #12) to each group. There are seven scenes in the tableau. • Tell the groups that they will work on only one scene at a time. • Assign a "director" to facilitate the division of characters for each scene. • Make sure that each group member has a role. 4. Ask the groups to: • discuss the intentions, motivations, feelings, and actions of the characters; • decide how to arrange their bodies to create the images that are necessary to tell the story; • decide on appropriate facial expressions for each character. 5. Allow time for the groups to practice each scene in the tableau.	Handout #12: SCENES FROM ORIGIN OF THE GREAT BASIN PEOPLE (Hooper, F. *Native American Perspective: Indian Ways and Tradition Recalled.* Retrieved December 1, 2005, from http://www.ccmuseum.org/InFocus/Hooper/hooper2.htm)
Exploration Assessment	Observation of the group process. Did group members listen, offer suggestions, and support each other?	
Concept Development	1. Have each group share its tableau with the other groups. 2. Facilitate the decision-making process in which the whole group selects one small group to perform each scene for the final tableau performance of: *Origin of the Great Basin People*. 3. Arrange logistics for the final performance of the tableau.	

Learning Cycle Components	Lesson Components and Procedures	Materials
Concept Development Assessment	1. Ask each group member to write a reflection (Handout #13) to assess his or her own small group's performance of the tableau. 2. Read the reflections and comment.	Handout #13: REFLECTION
Applications and Further Questions	1. Discuss/debrief the final performance of the tableau. 2. Discuss the use of storytelling as a form of historical narrative. 3. Provide copies of other stories/ legends that reflect the culture of the Southern Paiutes. 4. Discuss: • what the stories reveal about culture and history; • what the stories teach about relationships between people and nature; and • how the stories serve as a form of entertainment and a source of amusement. 5. Form small groups; ask each group to select and read a story/legend, choose a key event, and create a tableau. 6. Have each group share its tableau with the other groups.	Handout #14: RESOURCES: STARTING POINTS
Application Assessment	1. Assign Notebook entry: Position Statement on whether or not storytelling is a form of historical narrative. 2. Observation of the group process, the selection of the key event, the arrangement of the bodies, and the expression on the faces.	

Learning Cycle Components	Lesson Components and Procedures	Materials
Adaptations for Diverse Learners: English Language Learners	1. Provide bilingual dictionaries. 2. Define words that are critical to the activity; ask students to add the vocabulary to their word banks. 3. Pair native speakers of English with non-native speakers.	
Adaptations for Diverse Learners: Gifted/Talented	1. Assign a VENN diagram or a Thinking Map to compare/contrast different versions of the same legend. 2. Have learners research puppetry and shadow puppets. Ask them to create a shadow play of one of the stories/legends.	VENN diagram or a Thinking Map *Puppetry traditions from around the world* http://www.sagecraft.com/puppetry/traditions/index.html Search for "Shadow Puppets"
Adaptations for Diverse Learners: Special Needs	1. Provide peer readers and writers. 2. Make sure all group members are included in the tableau. 3. Assign peer support. 4. Allow students to record position statements.	

Handouts

Biopoem

Line 1	First name
Line 2	Description
Line 3	Four characteristics of this person
Line 4	Contemporary of ... (minimum one other person)
Line 5	Keenly interested in ...(minimum three areas)
Line 6	Who feels ... (minimum three emotions and explanations)
Line 7	Who needs ... (minimum three items and descriptions)
Line 8	Who wants or wants to change ... (minimum three items and descriptions)
Line 9	Whose contribution(s) to southern Nevada include ...
Line 10	Who lived in ... (geographical and time reference)
Line 11	Who is remembered as/for ...
Line 12	Last name

Cultural and Historical Connections
HANDOUT #2

Example of a Biopoem

Rafael

A trade caravan scout;

A controversial historical figure on a reconnaissance mission;

Intrepid teenager, daring explorer, willing to reconnoiter,

to go where no man has gone before;

Contemporary of Antonio Armijo, the intelligent rogue leader of the pack train;

Keenly interested in venturing into uncharted territory,

exploring new terrain, mapping out routes;

Who feels the excitement of scouting, the thrill of discovering

a passable trail, the solitude of his life;

Who needs a good horse, adequate provisions,

and an understanding of nature's bounties and perils;

Who wants to lead, to travel, to discover;

Who was the first non-native to see Las Vegas Valley—

Some say, "Yes" -- some say, "No;"

Who lived in many different places,

wherever the trails took him in the late 1820s;

Who is remembered by many as "First in Vegas Valley,"

by others as a scout who never saw Las Vegas.

Rivera

Resources: Starting Points

Cultural and Historical Connections
HANDOUT #3

Print Materials

- Nevada Kids Page (Department of Cultural Affairs): Children's Books on Nevada
  http://dmla.clan.lib.nv.us/docs/kids/nvbooks.htm
  Provides a list of non-fiction and fiction children's books on Nevada.

- Tinkler, C. (Ed.). (1994). *Mojave desert discovery: An educator's guide to the cultural and natural history of Death Valley National Monument, East Mojave National Scenic Area, Joshua Tree National Monument, Lake Mead National Recreation Area, Red Rock Canyon National Conservation Area*. A project funded by the National Park Service and the National Park Foundation.

- Clark Country School District Social Studies textbooks and other resources such as "*This is Nevada: InterAct*"

- University of Nevada, Las Vegas (UNLV) College of Education Curriculum Library
  4505 South Maryland Parkway, Box 453009, Las Vegas, NV 89154-3009 • (702) 895-3884
  http://library.nevada.edu/cml

- Nevada State Museum and Historical Society
  700 Twin Lakes Drive (in Lorenzi Park), Las Vegas, Nevada 89017 • (702) 486-5205
  The library at the Nevada State Museum and Historical Society has a collection of photographs, maps, records, and other printed materials pertaining to Las Vegas and Nevada history.

- Harry Reid Center for Environmental Studies
  4505 South Maryland Parkway, Las Vegas, NV 89154 • (702) 895-3382 • http://hrcweb.nevada.edu/

- UNLV Library and Las Vegas-Clark Country Library District
  http://www.library.unlv.edu • http://www.lvccld.org/

- People and Stories from Nevada's History. A project of Nevada Institute for Children's Research and Policy. Women's Research Institute of Nevada, College of Education, UNLV: Las Vegas, NV.

- Smith, S., Moe, J., Letts, K., & Paterson, D. *The intriguing past: Fundamentals of archaeology*.
  A project of the U.S. Department of the Interior, Bureau of Land Management.

- Smith, S., Moe, J., Letts, K., & Paterson, D. (1996). *Intrigue of the past: A teacher's activity guide for fourth through seventh grades*. A project of the U.S. Department of the Interior, Bureau of Land Management.

Resources: Starting Points, continued

Internet Materials

- **City of Las Vegas: History** (*A timeline of the history of Las Vegas*)
  http://www.lasvegasnevada.gov/FactsStatistics/history.htm

- **Las Vegas Review-Journal: The First 100** (*A three-part series from the Las Vegas Review-Journal chronicling 100 people who had major impacts on Las Vegas over the city's first century*)
  http://www.1st100.com/

- **Nevada Department of Cultural Affairs: Discover Nevada History** (*Includes links to historic places, maps, photographs, people, history of government and mining as well as other sites.*)
  http://dmla.clan.lib.nv.us/docs/nsla/archives/history/

- **Nevada Division of State Parks: Spring Mountain Ranch State Park** (*Describes park origins and history*)
  http://parks.nv.gov/smr.htm

- **Nevada History: A Walk in the Past** (*Contains links to historical photos, Nevada Constitution, Nevada symbols and timelines, and interactive maps of Nevada counties*)
  http://www.nevada-history.org/

- **Nevada's Past at a Glance: A History Timeline** (*Gives a Nevada timeline from 1826 to the present*)
  http://nevada-history.org/nevada_timeline.html

- **Nevada Women's History Projec**t (*Details the roles and contributions of Nevada women, featuring Dat-So-La-Lee and Sarah Winnemucca*)
  http://www.unr.edu/wrc/nwhp/

- **Red Rock Canyon Interpretive Association** (*Click on "Brochures;" click on "Cultural Resources"*)
  http://www.redrockcanyonlv.org/index.htm

- **Red Rock Canyon National Conservation Area** (*Click on "People and Cultures"*)
  http://www.desertusa.com/redrock/

Resources: Starting Points, continued

Internet Materials, continued

- **Outdoors in Nevada** (*Describes points of interest, timeline, and photographs of Spring Mountain Ranch*)
  http://www.outdoorsinnevada.com/

- **ProTeacher** (*Search for "Nevada State Studies"*)
  http://www.proteacher.com/

- **Spring Mountain Ranch State Park (***Highlights information on Red Rock Canyon and Spring Mountain Ranch*)
  http://www.sunsetcities.com/Red-Rock-Canyon/springmountainranch00.html

- **U.S. Department of the Interior: Bureau of Land Management • BLM Learning Landscapes**
  (*Contains a variety of activities and resources for teachers, students, and explorers.*)
  http://www.blm.gov/education/

Media Materials

- **KLVX Educational Media Center** • KLVX Educational Media Center (EMC) is a full-service media distribution library that serves the entire Clark County School District. Several films such as *Lake Mead - Las Vegas - Hoover Dam*, *Las Vegas, Crossroads of the West*, *Remembering Las Vegas: In the Beginning* provide historical information, film footage, and old still photographs about Las Vegas, Red Rock Canyon, and Spring Mountain Ranch. In particular, the film *Water Rules - a History of Water in the Las Vegas Valley* uses historic figures such as John C. Fremont, Octavius Gass, Walter Bracken, and Helen J. Stewart to tell the story of the discovery, development, and depletion of water in the Las Vegas area. Contact the media center at **http://media.klvx.org/**

- **Traveling History Trunks** • The traveling history trunks contain artifacts, reproductions, reprint books and informational materials on: Mining in Nevada, Women in Nevada 1850-1920, Pioneer Children 1850-1920, and Centennial Las Vegas. Contact Nevada State Museum and Historical Society at 700 Twin Lakes Drive, Las Vegas, NV 89017 • (702) 486-5205 • **http://www.nevadaculture.org**

Biopoem Rubric

Evidence of Research

0 There is no or minimal evidence of research; there are less than five specific facts.
1 There is evidence of research; there are more than five specific facts.

Accuracy of Information

0 Statements are too general or inaccurate.
1 Facts are specific and accurate.

Creativity (e.g. originality, humorous, rhymes)

0 The biopoem contains no or minimal descriptors/images, no dialogue, nothing original, interesting, or provocative.
1 The biopoem contains descriptors/images, dialogue, something original, interesting, or provocative.

Mechanics (e.g. vocabulary, spelling, grammar)

0 The mechanics detract from the meaning of the piece; there is more than one error.
1 The mechanics enhance the meaning of the piece; there is no more than one error.

Form: Formula of a Biopoem

0 Form is not evident.
1 Form is evident or effectively adapted.

_____ Total possible points: 5

Readers' Theater

Cultural and Historical Connections
HANDOUT #5

What is Readers' Theater?

Readers' Theater is drama with no memorization, no full costumes, and no full stage sets. If costumes are used, they should be neutral and suggest or imply the nature or personality of the character. If stage sets or props are used, they should be simple and suggestive. Scripts are always used. Partners should read lines or stanzas alone or in pairs with as much creative expression as possible.

Tips for Readers

1. Each person needs his or her own script. Sharing scripts makes it harder to follow along.
2. Always read the whole script through first. Get comfortable with the words and their meanings, and try to understand the context of your character's words.
3. Review difficult or unfamiliar pronunciation and vocabulary. Ask for help if you need it!
4. Highlight or underline your part.
5. Try out different voices, rates of speech, accents, postures, and gestures. Use creative expression, enunciation, appropriate volume, and intonation.
6. Study yourself in a mirror. Can you make your face look angry, sad, afraid, happy, or anxious?
7. Emphasize key words and phrases appropriatetly for the mood you are trying to express.
8. Rehearse with your partner before performing. Offer specific feedback. Instead of, "Read with more expression," say, "Sound and look angrier."
9. When your partner is reading, be silent and still. Follow along so that you'll know when to speak.
10. Hold your script at waist level. If you hide behind it, your voice will be muffled and difficult for the audience to hear.
11. Look up from your script at your partner and the audience.
12. Make sure that the audience can see and hear you.
13. Have fun! And, If you make a mistake, just go on as if you didn't.

Storytelling Checklist

			YES	NO
Voice	1.	Is my volume appropriate, not too loud, not too soft?		
		a. I can be heard easily by the audience.	_____	_____
		b. I vary volume to show emotions/actions.	_____	_____
		c. I emphasize key words or phrases.	_____	_____
	2.	Is my rate appropriate, not too quick, not too slow?		
		a. I speak normally.	_____	_____
		b. I vary rate to indicate emotions/actions.	_____	_____
		c. I use pauses effectively.	_____	_____
	3.	Is my pitch appropriate, not too low, not too high? I use a pitch that reflects the biopoem's:		
		a. mood	_____	_____
		b. action	_____	_____
Face	3.	Are my facial expressions appropriate? My face reflects:		
		a. emotions/intentions	_____	_____
		b. actions	_____	_____
	4.	Is my eye contact appropriate?		
		a. I look directly at my audience when needed.	_____	_____
		b. I look at my partner when needed.	_____	_____
		c. I hold my script at waist level.	_____	_____
Body	5.	Are my body movements natural, not too much, not too little? My movements:		
		a. emphasize the most important actions of the story	_____	_____
		b. do not distract from the monologue	_____	_____
	6.	Is my posture appropriate? My posture indicates:		
		a. motivation/purpose	_____	_____
		b. feelings/reactions	_____	_____
	7.	Are my gestures appropriate, not too many, not too few? My gestures:		
		a. look natural	_____	_____
		b. emphasize or clarify what I am saying	_____	_____

I AM Poem

Cultural and Historical Connections
HANDOUT #7

The "I AM" poem is designed to create a descriptive portrait of a character with words. Remember, the poem is written from the viewpoint of the person being described. Below is the model you will use to write an "I AM" poem.

First Stanza

I am	(two special characteristics you have)
I wonder	(something you are actually curious about)
I hear	(an imaginary sound)
I see	(an imaginary sight)
I want	(an actual desire)
I am	(the first line of the poem repeated)

Second Stanza

I pretend	(something you actually pretend to do)
I feel	(a feeling about something imaginary)
I touch	(an imaginary touch)
I worry	(something that really bothers you)
I cry	(something that makes you very sad)
I am	(the first line of the poem repeated)

Third Stanza

I understand	(something you know is true)
I say	(something you believe in)
I dream	(something you actually dream about)
I try	(something you really make an effort about)
I hope	(something you actually hope for)
I am	(the first line of the poem repeated)

who I am

Example of an I AM Poem

Treat the earth well: it was not given to you by your parents, it was loaned to you by your children.
We do not inherit the Earth from our Ancestors, we borrow it from our Children.
Ancient Native American Proverb[1]

I AM SEATTLE, CHIEF OF THE NORTHWEST NATIONS

First Stanza

I am	Seattle, chief of the Northwest Nations.
I wonder	"How can you buy the sky? How can you own the rain and the wind?"
I hear	my mother's voice; "Every part of the earth is sacred."
I see	my father's face, "We are part of the earth and it is part of us."
I want	all of us to treat the earth with respect.
I am	Seattle, chief of the Northwest Nations.

Second Stanza

I pretend	nothing. I truly believe that we are merely a strand in the web of life, and "Whatever we do to the web; we do to ourselves."
I feel	the blood that flows in my veins; it is like the sap that courses through the trees.
I touch	the "rivers which are our brothers. They quench our thirst, carry our canoes, and feed our children."
I worry	the warning voices of our ancestors will be forgotten.
I cry	that some do not realize that the earth is loaned, not given to our children and their children's children, generation after generation after generation.
I am	Seattle, chief of the Northwest Nations.

Third Stanza

I understand	"The earth does not belong to us. We belong to the earth."
I say	"The earth is our mother."
I dream	this land will be loved and preserved.
I try	to make everyone understand—do not waste; do not destroy.
I hope	they will listen.
I am	Seattle, chief of the Northwest Nations.[2]

[1] Quotes from Our Native Past. Retrieved January 1, 2006, from http://www.ilhawaii.net/~stony/quotes.html

[2] Adapted from: Gabriel, H., & Banbury, M. (1999). Early European settlers and Native Americans: Going back in time to discover who "I am." Louisiana Social Studies Journal, 1-5.

Cultural and Historical Connections
HANDOUT #9

Hot Potato Seat: A Role-Playing Exercise

Key Question:
What are the influences that early inhabitants of the Las Vegas area had on Southern Nevada historically and today?

Role Player:

a. Imagine that you are the child of an early inhabitant of Southern Nevada. For example, you can be the child of a: Southern Paiute, explorer, miner, rancher, or Mormon.
b. Research/create your character in preparation for the "Hot Potato" Seat.
c. Assume the identity of your character. (Costumes enhance role-playing.)
d. One by one sit in the "Hot Potato" seat in front of the class and introduce yourself to your peers.
e. When class members interview you, answer "in character."

Audience:

a. Ask probing, critical questions referred to as "potato" questions. Dig for "whole potatoes," not "tater tots."
b. Ask "W" questions: Who? What? When? Where? Why?
c. Ask questions that will increase your understanding of how the early inhabitants of the Las Vegas area influenced Southern Nevada historically and today.

My Questions:

Gabriel, H., & Banbury, M. (1999). Early European settlers and Native Americans: Going back in time to discover who "I am." Louisiana Social Studies Journal, 1-5.

Creating My Character

After researching the life and times of early Native Americans and European settlers from Southern Nevada, create the character, the child of an early inhabitant for your I AM poem. Think about the following questions:

- How old am I? When was I born?
- What gender am I?
- What do I look like? Height? Weight? Eyes, Nose, Mouth, Ears, Chin, Hair?
- What type of clothes do I wear?
- How is my health?
- What do I like? What do I dislike?
- What is my personality like?
- What are my wants? What are my needs?
- What keeps me from getting what I need or want?
- What do I eat and drink?
- What are my responsibilities?
- What do I do in my spare time?
- What does my home look like outside and inside?
- What does my bedroom look like?
- What is my family like?
- What is a typical day like for my father?
- What is a typical day like for my mother?
- What do my parents do for a living?
- How do I travel from place to place? Where do we go?
- How is my family linked to the land?

Who am I?

I AM Poem Rubric

Cultural and Historical Connections
HANDOUT #11

Evidence of Research

0 There is no or minimal evidence of research; there are less than 10 specific descriptions.
1 There is evidence of research; there are more than 10 specific descriptions.

Accuracy of Information

0 Statements are too general or inaccurate. Statements do not "ring true."
1 Statements reflect time and place. Statements "ring true."

Voice:

0 The poet seems uninvolved or distanced from the topic and/or audience.
The reader doesn't get a sense of what life would have been like for the child of an early inhabitant of Las Vegas.
1 The poet speaks directly to the reader in a way that is individualistic, expressive, and engaging. The reader has a good sense of what life would have been like for the child of an early inhabitant of Las Vegas.

Mechanics (e.g. vocabulary, spelling, grammar)

0 The mechanics detract from the meaning of the piece; there is more than one error.
1 The mechanics enhance the meaning of the piece; there is no more than one error.

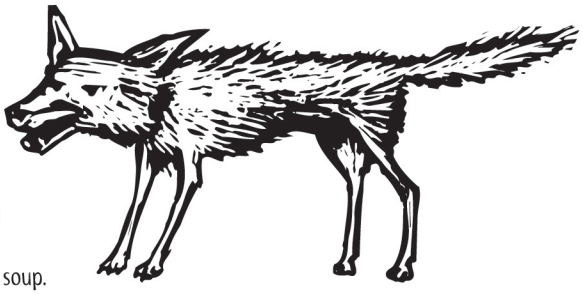
Form: Formula of an I AM Poem

0 Form is not evident.
1 Form is evident or effectively adapted.

_____ Total possible points: 5

Cultural and Historical Connections
HANDOUT #12

Scenes From Origin of the Great Basin People



COYOTE LEGEND SCENE 1
(NARRATOR)

Legends are stories which gifted Indian men and women relate to their children on wintery evenings and through the dreary days of the rainy season, and especially around the fire after a meal of rabbit soup. Many of their legends assume to explain the origin of things and the mysteries of existing phenomena. Other legends tell of the creation of the world, of man, sun, moon and stars, of the whale killer and other animals, especially the coyote who found a place in Indian history for his cunning activities. Indian tribes across the region showed great respect for Coyote even as they portrayed him as a source of misfortune; Coyote brings news of death even today. Coyote also enriched their brief lives by stealing fire for them and pilfering pine nuts from the first pine nut grove. He disseminated people far and wide and I shall tell you how.

COYOTE LEGEND SCENE 2
(NARRATOR, COYOTE, MRS. COYOTE, PEOPLE)

Coyote was going to get people from up north. Mrs. Coyote went with him. Together they put all the people in one great big water jug. The jug was big at the bottom and small at the top; that is the shape of water jugs.

COYOTE LEGEND SCENE 3
(NARRATOR, COYOTE, MRS. COYOTE)

As Mr. Coyote and Mrs. Coyote were coming down south they could hear all kinds of noises coming from the jug. Coyote was curious and wanted to lift the stopper and peek inside. Mrs. Coyote scolded him and said he would have to wait until the right time, then and only THEN, he could peek inside.

Scenes From Origin of the Great Basin People, continued

Cultural and Historical Connections
HANDOUT #12 continued

COYOTE LEGEND SCENE 4
(NARRATOR, COYOTE, MRS. COYOTE)

When they stopped to rest on their long journey, Coyote was curious. When Mrs. Coyote wasn't looking, Mr. Coyote sneaked over to the jug and took the lid off so he could peek inside.

COYOTE LEGEND SCENE 5
(NARRATOR, COYOTE, MRS. COYOTE)

Just then Mrs. Coyote said it was time to go. Coyote, afraid of being caught, jumped back and forgot to put the lid on.

COYOTE LEGEND SCENE 6
(NARRATOR, COYOTE, MRS. COYOTE, NATIVE AMERICANS)

As they started off again, the Indians inside noticed that the lid was off. All of them wanted to escape because they didn't know where they were going. Unknown to Coyote, the Indians started getting out. The tall skinny ones got out first. They were the Indians that settled in the Northeastern part of the United States. Different types of Indians were scrambling out and heading in different directions.

COYOTE LEGEND SCENE 7
(NARRATOR, COYOTE, MRS. COYOTE, PAIUTES, SHOSHONES, WASHOES)

When Mr. and Mrs. Coyote reached Nevada and looked in the water jug, there were only a few Indians left. They were too short to reach the opening and too fat to fit through the hole up top. These were the Paiutes, Shoshones, and Washoes that settled here around the Great Basin.

Reflection

Group Process

Did I "build" the tableau with my group, i.e., did we work well together, listening to each other's ideas, supporting each other, and offering suggestions?

I think our group did a good job with….

I think our group could improve by….

Cultural Tableau

Did the tableau clearly communicate the intentions or actions of the characters?

I think the tableau was good because….

I think the arrangement of our bodies in the tableau were….

I think the expressions on our faces in the tableau were….

If we were to create this tableau again, we….

Resources: Starting Points

Cultural and Historical Connections
HANDOUT #14

Curriculum Materials

* **Curriculum Unit Project for CI 692 : NATIVE AMERICANS OF NEVADA**
  http://www.unr.edu/cll/ci692/cuunits/nativeamericans.pdf
  This is a pdf file that contains six detailed lessons on Native Americans of Nevada and a list of recommended books.

* **Department of Cultural Affairs, Division of Museums and History:**
  Nevada Native America on the WWW
  http://dmla.clan.lib.nv.us/docs/museums/reno/expeople/nameron.htm
  Contains links to information, teaching projects, and resources on Nevada Native Americans.

* **Nevada Department of Cultural Affairs**
  Native Americans in Early Nevada
  http://www.nevada-history.org/indians.html
  Contains a brief biography of seven famous Native Americans of Nevada: Chief Winnemucca, Sarah Winnemucca Hopkins, Captain Truckee, Numaga, Johnson Sides, Helen Joaquin, and Natchez; an article on "Southern Nevada Paiutes" from the Southern Nevada Paiutes, as well as other historical stories.

* **Native Nevada Classroom**
  http://www.unr.edu/nnap/nnc_intro.htm
  The Department of Teaching and Learning Technologies at the University of Nevada, Reno developed the three curricula included on this site: Project Willow, an environmental science curriculum; Washoe Culture, a social sciences curriculum; and Nevada Tribes, which contains samples from the curriculum entitled "*Celebrating Nevada Indians*."

* **Native Nevada Classroom: Nevada Native Storytelling**
  http://www.unr.edu/nnap/NT/st-1.htm
  Provides stories from the four native tribes of Nevada.

Resources: Starting Points, continued

Curriculum Materials, continued

* **Nevada Literacy Coalition, Nevada State Library and Archives**
  READiscover Nevada: A Great Basin Indian Bibliography of the Northern Paiute, Southern Paiute, Washoe, and Western Shoshone Tribes
  http://www.NevadaLiteracy.org
  Click on "Special Features;" Click on "Discover Nevada History;" Click on "Native Americans;" Click on "A Great Basin Indian Bibliography"
  Provides a list of children's books, a brief summary, and, in some cases, a critical evaluation and learning activity.

Nevada Native American Legends

* ***Coyote and Sun: A Paiute Legend***
  First People: Native American Legends
  http://www.firstpeople.us/FP-Html-Legends/Coyote-Paiute.html

* ***Coyote Legend***
  Hooper, F. *Native American Perspective: Indian Ways and Tradition Recalled*
  http://www.ccmuseum.org/InFocus/Hooper/hooper3.htm
  An article by Florence Frances Pacheco Hooper, a Paiute and a member of the Fallon Pai-Sho Tribe discussing her life and her Paiute ancestors. *Coyote Legend* is also included.

* ***How the Shoshone and Paiutes became allies*** **(Shoshone - Paiute Legend)**
  AAA Native Arts
  http://www.aaanativearts.com/article499.html

* **Native Nevada Classroom: Nevada Native Storytelling**
  http://www.unr.edu/nnap/NT/st-1.htm
  Provides stories from the four native tribes of Nevada and activities, lessons, and worksheets.

* **Native American Lore Index Page**
  http://www.ilhawaii.net/~stony/loreindx.html
  Native American Indian lore (150 stories) from several tribes

Resources: Starting Points, continued

Nevada Native American Legends, continued

* ***Origin of the Great Basin People***
  Native Nevada Classroom
  http://www.unr.edu/nnap/NT/st-30.htm

* ***Origin of the Pinenuts***
  Native Nevada Classroom
  http://www.unr.edu/nnap/NT/st-31_32.htm

* ***Paiute Legend***
  The Legend of the North Star
  Native American Lore Index Page
  http://www.ilhawaii.net/~stony/lore104.html

* ***Paiute Legend of the Stone Mother of Pyramid Lake***
  http://www.unr.edu/nnap/NT/st-4_5.htm

* ***Southern Paiute: Origin of the Echo***
  Nevada Historical Society
  Division of Museums and History
  Nevada Native America on the WWW
  Nevada Native Classroom
  http://www.unr.edu/nnap/NT/st-13_14.htm

* ***The Deer-Star: A Paiute Legend***
  Austin, M. Electronic Text Center, University of Virginia Library
  http://etext.lib.virginia.edu/etcbin/toccer-new2?id=AusDeer.sgm&images=images/modeng&data=/texts/english/modeng/parsed&tag=public&part=all)

Resources: Starting Points, continued

Nevada Native American Legends, continued

* University of Nevada, Las Vegas (UNLV) College of Education Curriculum Library
  4505 Maryland Parkway, Box 453009; Las Vegas, NV 89154-3009 • (702) 895-3884
  http://library.nevada.edu/cml
  College of Education Curriculum Library has resources such as *Indian Legends of the Paiute, Shoshone, and Washoe Tribes of Nevada*, (1972). Department of Education: Carson City, NV.

Story Telling

* **ARTS FIRST™ Toolkit K-5**
  Volcanoes Drama
  http://ali.apple.com/ali_sites/hli/exhibits/1001388/Lesson.html
  A personal narrative on the use of the tableau to dramatize the story of Pele and Namaka.

* **A Storytelling Bookshelf for Teachers**
  http://www.storyarts.org/store/bookshelf/index.html
  A collection of basic books for teachers on the art of storytelling, as well as anthologies of world folktales and a listing of easy-to-use materials to explore storytelling in the classroom.

* **Scholastic: Storytelling Workshop with Gerald Fierst**
  http://teacher.scholastic.com/writewit/storyteller/index.htm
  A workshop on how to become a storyteller.

* **Telling Stories: Using Drama and Multimedia with ESL Students**
  http://www.prel.org/eslstrategies/drama.html#
  Provides detailed step-by-step strategies for creating and dramatizing cultural stories: story-telling, auto image, tableau, narration, and play-building.

Night Sky Core Curriculum

Night Sky Core Curriculum Rationale

As astronomers, students will have an opportunity to explore and investigate the night sky. The intent of the night sky curriculum is to help students learn about the daytime and night-time sky by making observations, forming hypotheses, collecting and recording data, performing analyses, and drawing and presenting conclusions. Students will inquire into the following questions:

- What do you see in the sky? What were people looking for?
- What moves in the sky and why?
- What observations and information can be found from viewing the daytime sky?
- What are the cultural aspects to astronomy and the daytime/night-time sky?
- Who studies the sky and why?

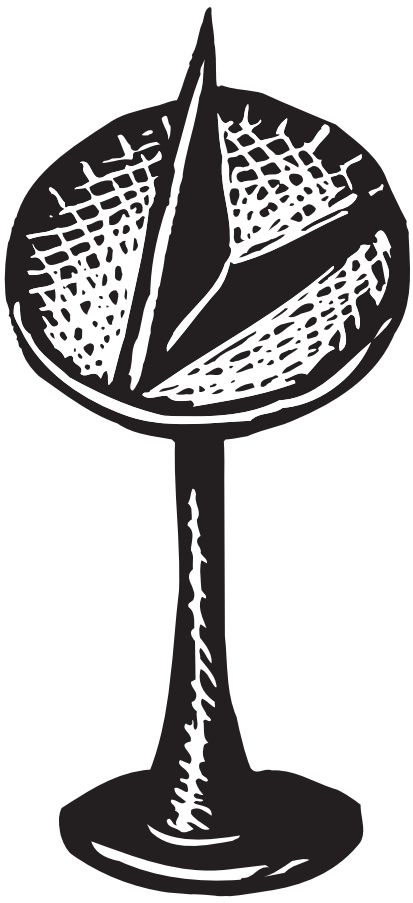
Night Sky Core Curriculum	
Essential Question #1: What do you see in the sky? What were people looking for?	
Goal	Students will be able to observe the sky and record their observations.
Objectives	Students will: • be introduced to astronomical tools used to make observations; • be introduced to different ways of observing the sky and will observe the sky; • will record their observations in their science notebooks; and • will discuss their observations and draw conclusions pertaining to astronomy.
Curriculum Essentials Framework Correlation	(5) 3.14 Investigate and describe the basic components of solar system. (5) 3.15 Describe the apparent motion of celestial objects across the sky.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Familiarity with cardinal directions (north, south, east, and west) • Experience in taking and recording temperature • General knowledge of the solar system and the Earth's rotation around the sun.

Activities	**Site(s)**	**Equipment**	**Time**
Students will hike (pre-dawn) to a pole installed at a flat location. To begin to understand the rotation of the Earth on its axis and around the sun, students will mark the endpoint of the pole's shadow. The shadow varies in length throughout the day, and in direction over the course of a year. Periodically during the day, students will make observations and record their findings.	Trails Friendship Circle	Pole Science notebooks Shadow-position markers Permanent chart of the direction of the shadow over the course of a year	1 hour with periodic visits throughout the day

Night Sky Core Curriculum (Essential Question #1 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will record the temperature as follows: 1) just before sunrise; 2) as the sun is just rising over the horizon; 3) 10 minutes after the sun has risen; and 4) periodically throughout the day when the shadows are measured (see above). Students will compare the readings and discuss the correlation between the position of the sun and temperature. Daily temperature is typically lowest just before sunrise.	Trails Pole site	Science notebook	1 hour
Students will return to the pole site to view markers placed by earlier groups at shadow positions (varying lengths and directions). Students will examine earlier-collected data and compare with the current data.	Trails Pole site	Science notebooks Additional position markers	1 hour
Students will compile a series of digital photographs of the sky that they take throughout the day at a static position. The series represents a visual history of the sky over the course of a day. Students will discuss how the sky changes throughout the day.	Trails Art Pavilion	Science notebooks Digital cameras Computers Photo printers Tripod that remains in place all day	1 hour
Students will construct simple versions of typical astronomical observation tools. Students will test the tools and provide rationale for how the tool they created aids in making observations of the sky. Students will discuss how their tools/technology could be improved upon.	Art Pavilion	Supplies for making observation tools	1 hour
Notebook/Vocabulary	astronomy; axis; horizon; revolution; recession; relative motion; rotate		
Presentation of Findings	• Students will share their science notebook entries. • Students will write a poem or story to describe how the appearance of the sky changes throughout the day.		
Follow-up Suggestions	Students monitor light (using the flag pole) at their school.		
Resources			
Multicultural/Historical/Social Connections	Correlate the importance of charting the sun, annually, to the American Indian culture and farming cultures. Students will discover that American Indians and farmers relied on the position of the sun to determine time of year and, thus, which crops should be planted and which should be harvested. Discussions can center on the significance of the sun to different cultural groups. In observing the sky, students can explore various perspectives including that of the American Indians, historical Nevadans, and current astronomers.		

Night Sky Core Curriculum				
Essential Question #2: What appears to move in the sky and why? In what ways does the planet Earth move? How does this movement relate to days, seasons, and years?				
Goal	Students will understand that our view of the sky changes as the Earth rotates on its axis and around the Sun.			
Objectives	Students will: • describe the apparent movement of selected celestial objects as viewed from the Earth; • understand that the perceived movement of celestial bodies results from the Earth's movement on its axis and around the Sun; and • relate the movement of the Earth to days, seasons, and years.			
Curriculum Essentials Framework Correlation	(5) 3.14 Investigate and describe the basic components of solar system. (5) 3.15 Describe the apparent motion of celestial objects across the sky.			
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • General knowledge of the solar system and the Earth's rotation around the Sun			
Activities		**Site(s)**	**Equipment**	**Time**
Students will be introduced to influential historical astronomers (impersonators). These astronomers will present their theories about the movement of the Earth. Students will conduct interviews and compile information about past scientific theories regarding the motion of the Earth, and how these ideas evolved over time. Students will compare/contrast, and discuss the theories and determine how many of these ideas are still used in our understanding of the Earth today.		Friendship Circle	Historical astronomer impersonators	1 hour
Students will demonstrate understanding of the Earth's motion through a role playing activity. Volunteers will represent the Earth, the Sun, and selected stars/constellations. Students will move about to depict the motions of the Earth and the effect that movement has on the Earth (e.g., varying amount of sunlight; varying views of the stars, etc.)		Dining Hall	Role-playing props and costumes	1.5 hours
Students will construct models of the Earth's movement. Students will be asked to present and explain their models.		Dorm	Art supplies	1 hour

Night Sky Core Curriculum (Essential Question #2 continued)	
Notebook/Vocabulary	astronomer; astronomy
Presentation of Findings	Students share science notebook entries.
Follow-up Suggestions	
Resources	Guest speakers
Multicultural/Historical/Social Connections	Integrate the following into activities: American Indian star legends; African American star legends/patterns; and South American star legends/patterns.

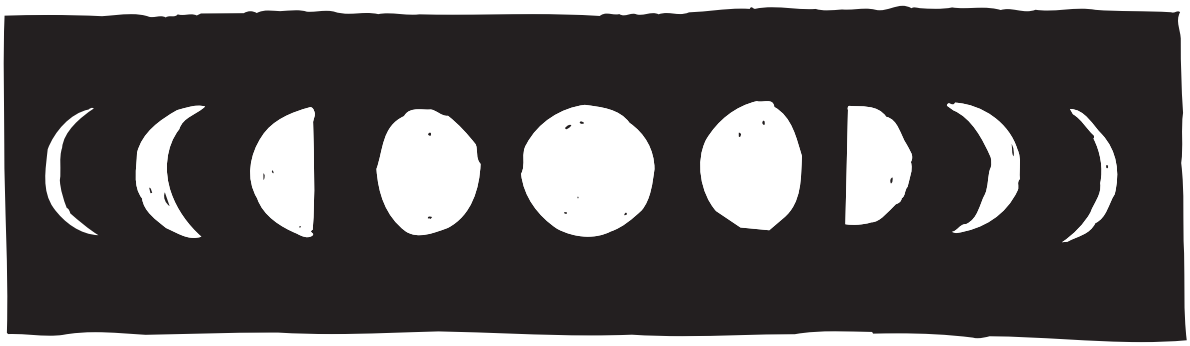


Night Sky Core Curriculum			
Essential Question #3: What can we learn by observing the daytime sky?			
Goal	Students will understand the information that can be gained through observing the daytime sky.		
Objectives	Students will: • describe objects that can be observed in the daytime sky; • identify methods to observe and track the Sun's "movement;" • explore the use of the sundial; • discuss the importance of the Sun; • identify the relationship of Red Rock Canyon to the daytime sky; and • describe the role of celestial bodies in navigation.		
Curriculum Essentials Framework Correlation	(5) 3.14 Investigate and describe the basic components of solar system. (5) 3.15 Describe the apparent motion of celestial objects across the sky.		
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • A basic understanding of the Earth's rotation and how day and night occur • Experience with use of a simple compass and knowledge of the cardinal directions		
Activities	**Site(s)**	**Equipment**	**Time**
Students will be introduced to the sundial and its origin (i.e., which cultures used it, when and where it was developed, reasons for its development). Students will examine how the sundial was used as a tool to measure time according to the position of the Sun.	Friendship Circle	Astronomer impersonators	1 hour
Students will build an equatorial sundial, and use it measure solar time. Students will need to determine latitude in order to construct the sundial. Students will compare measured solar time to standard time. Students discuss the benefits and limitations of using the sundial as a measuring device.	Art Pavilion or Dining Hall Outdoor location to use the sundials	Sundial construction materials Science notebooks	1.5 hours
Notebook/Vocabulary	dial plate; equator; equatorial; gnomon; horizon; latitude; sundial		
Presentation of Findings	Students take photos of their sundials in action and share the pros and cons of using a sundial.		
Follow-up Suggestions	Students install a sundial (or use the flagpole) at their school. By taking digital photos (or marking a board), they can observe part of the analemma figure over three or four months. An analemma is the figure-eight shape that results if the Sun's position in the sky is recorded at the same time of day throughout the year.		
Resources	Boyd, M. L. (2007) *Sundials: History, Art, People, Science.* London: Frances Lincoln http://liftoff.msfc.nasa.gov/academy/earth/sundial/Sundial.html		
Multicultural/Historical/Social Connections:	Identify cultural groups which used sundials		

Night Sky Core Curriculum	
Essential Question #4: Why do different people see different things in the daytime/ night-time sky? What are the cultural aspects to astronomy and the daytime/night-time sky?	
Goal	Students will understand the varying cultural aspects to viewing both the daytime and night-time sky.
Objectives	Students will: • define "calendar;" • describe the purposes of a calendar; • discuss how various cultures engaged in star gazing and utilized the information; • explain how the sky was and is used in navigation; and • explore how viewing the sky was and continues to be used in religious/spiritual practices by various cultures.
Curriculum Essentials Framework Correlation	(5) 3.14 Investigate and describe the basic components of solar system. (5) 3.15 Describe the apparent motion of celestial objects across the sky.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**

Activities	Site(s)	Equipment	Time
Students will be asked to examine the calendars of different cultures (past and present). Students will conjecture how the calendars were used, providing rationale. Students will try to interpret the symbolism on the calendars. Students will then engage in and activity that teaches them the purpose, benefits, and limitations of the cultural calendars. They will compare these calendars with the ones they (the students) use today.	Dining Hall	Cultural calendars	1 hour
Students will design a 12-month calendar providing rationale for any changes they make to names and holiday dates. Students will present their calendars and debate revising the 12-month year to a year with a different number of months. The lunar calendar will also be examined.	Dining Hall	Art supplies Names of the currently celebrated holidays	1 hour

Night Sky Core Curriculum (Essential Question #4 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will be introduced to and view selected constellations. They will learn the various names given to them (past and present) by different cultural groups in Nevada (e.g., Northern and Southern Paiutes, Western Shoshone) and throughout the world. Students will engage in an activity that teaches the significance of the names and the constellations themselves (with special focus on the Drinking Gourd/Big Dipper.)	Art Pavilion Trails	Telescopes	1.5 hours
Students will observe the moon. Students will record their observations. Students will add their data to a permanent lunar phase calendar. Students will explore the meaning of the moon through different cultures in Nevada and throughout the world.	Trails Dorm	Telescopes Permanent lunar phase chart Science notebooks Resources for inquiry into the different meanings of the moon	1 hour
Notebook/Vocabulary			
Presentation of Findings	• Students will share their science notebook entries.		
Follow-up Suggestions			
Resources	• Cherrington, E. H. (1984) *Exploring the Moon Through Binoculars and Small Telescopes.* New York: Dover Publications		



Night Sky Core Curriculum				
Essential Question #5: Who studies the sky and why? What equipment is used?				
Goal	Students will understand who, both past and present, studies the sky. Students will understand the equipment associated with the study of the sky.			
Objectives	Students will: • explore different careers associated with the study of the sky; • discuss historical figures who studied the sky and what they discovered; • understand the use of telescopes; • be able to discuss the use of the solar telescope; and • be able to identify satellites and understand how they are used.			
Curriculum Essentials Framework Correlation	(5) 5.3 describe key scientists, classical experiments in science, and technological inventions that lead to a better understanding of the impact of science on society.			
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**			
Activities		**Site(s)**	**Equipment**	**Time**
Students will discuss the use of telescopes. Parts of the telescope will be examined. Students will be asked to construct their own telescope in groups.		Art Pavilion	Telescope-construction equipment/materials	1.5 hours
Students will participate in a night hike. Students will bring their telescopes with them. In groups, students will be asked to observe the night sky and record what they identify.		Trails Observatory	Night-sky guidebooks Science notebooks Telescopes	1.5 hours
Students will hold a career night. Students will research and role play present day or historical figures associated with the study of the sky. Students will be interviewed about their career.		Dining Hall	Costumes Props Informational materials about astronomers	1 hour
Students will collect online data to create charts with which to predict the appearance of various satellites. Students will use their charts to identify satellites.		Flex-labs Outdoor location	Computer with Internet	1 hour
Notebook/Vocabulary		eyepiece; lenses; magnification; orbit; satellite; telescope		
Presentation of Findings		• Students will share science notebook entries. • Poster presentations.		
Follow-up Suggestions				
Resources				
Multicultural/Historical/Social Connections				

Night Sky Core Curriculum	
Essential Question #6: How does population growth in Las Vegas affect the daytime/ night-time sky?	
Goal	Students will understand how population growth affects daytime and night-time sky viewing.
Objectives	Students will: • define light pollution; • will be able to identify light pollution; and • discuss how the view of the sky in Red Rock Canyon has changed over time.
Curriculum Essentials Framework Correlation	(5) 4.11 Explain that changes in environments can be natural events or influenced by human activities, including technology.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** Students and their teacher will photograph the night sky (www.space.com/spacewatch/astrophotography_101_030627.html) prior to their visit. Photographs will be taken at the "star party" given at the school. It is important to document the precise method used to take the photo. Students will bring this photo with them to the site. Students will also be asked to write in journals what they see in the night sky. Journals will also be brought to the site.

Activities	Site(s)	Equipment	Time
Students will hike to an open area. Students will be given a paper towel tube and bubble wrap. Using just the paper towel tube, students will observe three things around them and record in their science notebooks how they appear through the tube. Students will then tape bubble wrap to the end of the tube. Students will observe the same objects and record any differences they note. Students will be introduced to the concept of light pollution. Students will also be given different colored plastic wrap to represent different types of pollution. Students will compare/contrast the different effects of pollution.	Trails	Paper towel tube Bubble wrap Science journals Wax paper Sheets of different colored plastic wrap	2 hours
Students will print out various star constellations. Students will observe the stars and identify one constellation from their charts. Students will note the different observations that can be made at varying telescope magnifications compared to viewing stars with the unaided eye.	Trails Observatory	Night-sky guidebooks Science notebooks Telescopes	1.5 hours

Night Sky Core Curriculum (Essential Question #6 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
At the site, students will sketch the night sky in their science notebooks. Students will then be given the drawings they did at their school. Students will present their drawings, comparing and contrasting the ones they brought from school with the ones they drew at Red Rock Desert Learning Center.	Trails Observatory Dorm	Science notebooks Science journals (from school) Art supplies	1 hour
Students will observe the moon. Students will record their observations. Students will add their data to a permanent lunar phase calendar. Students will explore the meaning of the moon through different cultures in Nevada and throughout the world.	Trails Dorm	Telescopes Permanent lunar phase chart Science notebooks Resources for inquiry into the different meanings of the moon	1 hour
Students will be given digital cameras. Students will be asked to take pictures of the night-time sky using the same method, same exposure time; same printing method they used at their school. Students will compare the photo taken at their school to the photo taken at the site. Students will discuss the differences. Students will also examine a series of sky photos shot at the same setting over time. Students will examine how light pollution can be seen from space.	Trails Observatory area Dorm	Digital cameras Computer and printer	2 hours
Notebook/Vocabulary	digital wrap; light pollution; exposure (photography)		
Presentation of Findings	• Photo poster presentations		
Follow-up Suggestions			
Resources	• www.space.com/spacewatch/astrophotography_101_030627.html		

Night Sky Core Curriculum				
Essential Question #7: What is the purpose and use of an observatory?				
Goal	Students will know the purpose and use of an observatory.			
Objectives	Students will: • describe astronomical observations humans can make with the unaided eye; • discuss stars and their characteristics; • identify and describe selected constellations; • be able to explain how weather is related to astronomy; and • discuss the moon and describe its various phases.			
Curriculum Essentials Framework Correlation	(5) 3.14 Investigate and describe the basic components of solar system. (5) 3.15 Describe the apparent motion of celestial objects across the sky.			
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:** • Participation in "Star Parties"			
Activities		**Site(s)**	**Equipment**	**Time**
Students will participate in a night hike. Students will make observations of the night sky with the unaided eye. Students will record their observations in their journals.		Trails Observatory	Science notebooks	1 hour
Students will be given a star chart. Students will identify the different constellations on the chart. Students will participate in a night-time hike. Students will be asked to identify a constellation.		Trails Observatory	Star charts	2 hours
Students will be given a blank and adjustable star wheel/chart. Students will create their own constellations from existing stars on their wheel/charts. Students will describe and present one constellation on their chart to the group.		Art Pavilion	Art supplies Science notebooks Star charts	1 hour
Students will be given the opportunity to interview astronomers. Students will be introduced to the different chemical make-up of the stars and how astronomers learned this using spectrographs.		Friendship Circle	Guest astronomers	30 minutes
Students will make observations of the moon. Students will be introduced to the phases of the moon and also the lunar eclipse and what it means when it occurs and how often it occurs. Students will explore the idea that there are times we do not see the moon at all in the evening sky and when we see moon during the day.		Trails Observatory	Science notebooks Solar System Model (Orrery) Telescopes	1 hour

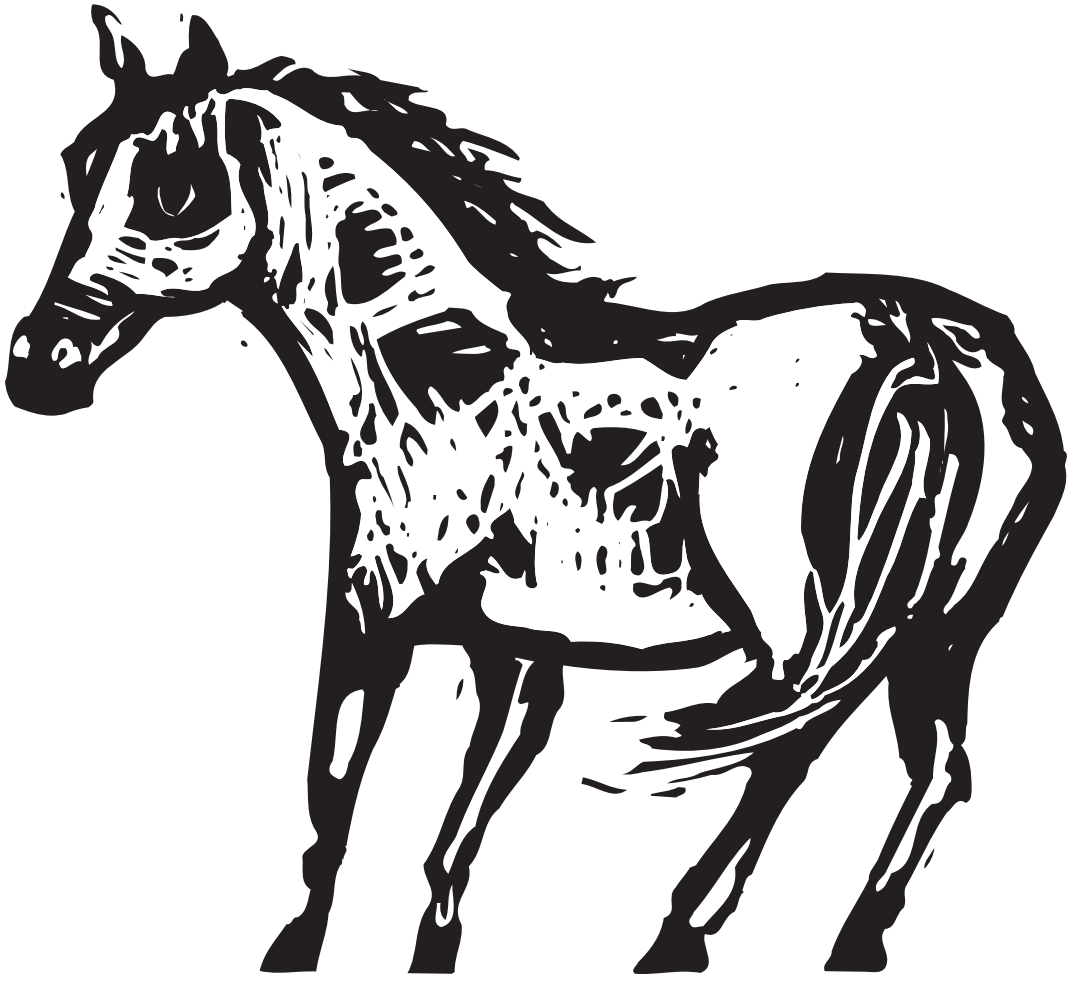
Night Sky Core Curriculum (Essential Question #7 continued)	
Notebook/Vocabulary	Gemini; Hubbell; Kit Peak; Lowell; observatory; spectrograph; stars
Presentation of Findings	• Science notebooks • Presentation of star charts
Follow-up Suggestions	
Resources	
Multicultural/Historical/Social Connections	

Night Sky Core Curriculum Correlation to BLM Mission

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#1 What do you see in the sky? What were people of the past looking for? • Students experience "Project Archaeology" to explore historical uses of the night sky.	• Historical use of the night sky	• Archaeology • Preservation of cultural resources
#2 What appears to move in the sky and why? In what ways does the planet Earth move? How does this movement relate to days, seasons, and years? • Students observe the night sky. Students discuss the concept of time and how long it would take to get from one place to another. Students choose one star and record the star position in their science notebook. Students observe the star over time, periodically recording its position. Students note the apparent movement of stars over time.	• Calendar • Prehistoric cultures and sites • Rock alignments • Sky usage • Sky and pattern of stars-planets-moon-sun • Use of sites correlated to cultural lifestyles	• Interpretation of cultural sites • Connection of sites to traditional use
#3 What observations and information can be found from viewing the daytime sky? • Students stick clear tape to the end of a paper towel roll and look through it. Students record their observations. Students then place pieces of clear tape outside in the wind. After a set period, students collect their tape pieces and apply them to the end of the paper towel roll as before. They look through the rolls and record their observations and answers to the following questions: What is the visual impact of the particles when looking through the tube? How might this be related to light and visual pollution? What might be some ways to lessen the impact? How might these particles affect air quality?	• Daytime sky • Public land use for research	• Recreation and off-road vehicle use • Recreation and Public Purpose Lands that are used for education/government • Reducing particulates by reducing off-road usage

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#6 How does population growth in Las Vegas affect the daytime/night-time sky? • Students investigate "Project Globe" to generate ideas about the impact of buildings on land. Students are introduced to this concept using a felt board picture of a landscape and then imposing a building on this landscape. Ecological footprint will be discussed. Students access Project Globe website providing them with information about visual footprint and light pollution. Students use Adobe imaging to create an environmental landscape. They are asked to construct a building (impose) on their landscape. Students discuss the challenges they face when trying to accomplish this task (e.g., natural color scheme, natural texture, natural lines, ecological footprint).	• Effect of structures on the land's "visual footprint" • Light pollution	• Planning process for Visual Resource Management

Wild Horse and Burro Core Curriculum



Wild Horse and Burro Core Curriculum Rationale

Through inquiry-based, experiential, and interdisciplinary lessons, students will learn about the care and management of wild horses and burros, their history, and laws pertaining to the management of these animals. While at the facility, students will explore interactive exhibits and may observe training demonstrations at the arena to learn about animal nutrition, health care, grooming, and adoptions. The facility is designed to provide students a safe environment to learn about these animals. Students will explore:

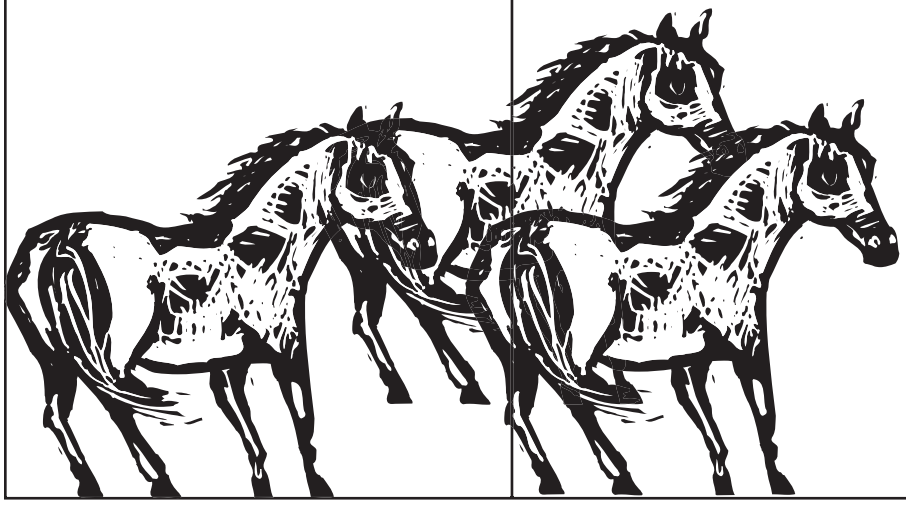
- How wild horses and burros interact with each other and their environment.
- The management of wild horses and burros.
- The interrelationship between humans and these animals.
- The differences between modern and extinct species.
- What is required to care for a wild horse or burro.
- How laws impact wild horses and burros.

Wild Horse and Burro Core Curriculum	
Essential Question #1: How do wild horses and burros interact with each other and their environment?	
Goal	Students will understand the ecology of wild horses and burros, their habitat requirements, and how this compares/contrasts with Mojave Desert environment and its native wildlife species.
Objectives	Students will have a basic understanding of: • the harsh environment provided by the Mojave Desert (e.g., heat, low precipitation, soils, and productivity); • the four basic habitat components every animal needs to survive (e.g., food, water, cover, and space); • different types of vegetation (e.g., grasses, forbs, shrubs, perennials, annuals, and native vs. introduced species); • the different species/uses of the Mojave Desert environment (e.g., habitat limitations and species adaptations); • habitat as a limited/finite commodity that must be shared by all inhabitants; and • the social structure of wild horses.
Curriculum Essentials Framework Correlation	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems. L5D1 Students know animals and plants can be classified according to their observable characteristics. L5D3 Students know that differences among individuals within a given species give them advantages and/or disadvantages in surviving and reproducing.

Wild Horse and Burro Core Curriculum (Essential Question #1 continued)	
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum develoment.	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems. L5D1 Students know animals and plants can be classified according to their observable characteristics. L5D3 Students know that differences among individuals within a given species give them advantages and/or disadvantages in surviving and reproducing.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**

Activities	**Site(s)**	**Equipment**	**Time**
Students will hike from the school to the Wild Horse & Burro Facility as they learn about the Mojave Desert (e.g., heat, precipitation, soils, and topography).	Trails	Science notebooks	15 minutes
Students will identify and discus vegetation consumed by wild horses and burros. Students will measure usage and make predictions about the ecological systems and the relationship to the survival of the animals. Students will record findings in their science notebooks.	Trails	Science notebooks	30 minutes
Students will participate in an activity that focuses on habitat limitations and the idea of habitat as a finite resource.	Trails		20 minutes
Students will hike to pasture area. Students will compare/contrast pasture terrain to desert terrain (e.g., discussion of four different habitat components). Observations will be recorded in science notebooks.	Trails Pasture	Science notebooks	15 minutes
Notebook/Vocabulary	Appropriate Management Level (AML); balance free-roaming; census; ecological; forage; grass; habitat; herd area; Herd Management Areas (HMA); lasso; livestock; long-term holding; monitoring; riparian; round ups/gathers; short-term holding; wildlife		
Presentation of Findings	• Oral presentation, poster, skit, poem, other.		
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.		

Wild Horse and Burro Core Curriculum (Essential Question #1 continued)	
Resources	
Multicultural/Historical/Social Connections	Impact of wild horses and burros on the American Indians of Nevada (e.g., depletion of food sources used by American Indians as a result of the introduction of wild horses and burros in Nevada). Careers (veterinarian, research scientist, research studies, BLM wild horse & burro specialist, range management).



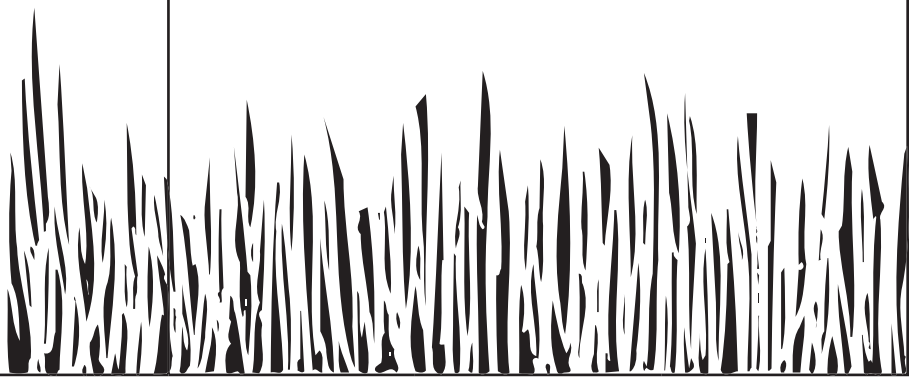
Wild Horse and Burro Core Curriculum			
Essential Question #2: How have wild horses and burros come to represent the essential spirit of the American West?			
Goal	Students will understand that wild horses and burros are protected and managed under federal law by the Forest Service (USFS) and the Bureau of Land Management (BLM).		
Objectives	Students will: • compare/constrast the modern wild horse and burro with the extinct equine species known to have lived in the same region; • understand how wild horses and burros came to be protected under federal law; and • be introduced to Wild Horse Annie and the letter-writing campaign by school children, which led to the passage of the 1971 Act.		
Curriculum Essentials Framework Correlation	(5) 4.4 Organize historical information from a variety of sources [NS 2.5.5]. (5) 4.28 Read, analyze, and interpret historical passages.		
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**		
Activities	**Site(s)**	**Equipment**	**Time**
Students will examine and participate in using the interactive exhibits, with focus on extinct equine versus modern equine (e.g., old bones, photographs, plaster castings).	Exhibits— Main Facility	Interactive exhibits	15—20 minutes
Students will participate in a storytelling session from the perspective of Wild Horse Annie.	Courtyard— Main Facility		20—30 minutes
Students will examine the historical aspects of wild horses and burros by viewing slide presentations/film. Students will then compose and present short stories about Wild Horse Annie.	Exhibits— Main Facility	AV equipment Films and slides	20—30 minutes
Staff members will engage students at various stations in a role playing activity. Each station introduces a different perspective (e.g., American Indian, Spanish Conquistadores, early settlers, miners, U.S. Calvary, homesteader, rancher).	Main Arena	Staff impersonators of various groups	20—30 minutes
Storytelling: students will read excerpts about horses.	Main Arena	Story exerpts	20—30 minutes
Students will view wild horses. Students will then participate in art projects depicting wild horses.	Pasture Art Pavillion	Art supplies	30—40 minutes
Notebook/Vocabulary	**Breeds**: Andalusian, Appaloosa, Arab, Draft, Military, Morgan, Pinto, Quarter; **Colors**: bay, buckskin, chestnut, palomino, pinto, roan; descendants; equine; equestrian; farming; mining; mule; POAs; ranching; Spanish Trail; thoroughbred		

Wild Horse and Burro Core Curriculum (Essential Question #2 continued)	
Presentation of Findings	Oral presentation, poster, skit, poem, other.
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.
Resources	• *America's Lost Mustangs* (2001) Videorecording. National Geographic Video • *Fury* (1955, 2005) Dir. Ray Nazarro, Sidney Salkow. Perf. Bobby Diamond, Peter Graves, Peter Aurness. Alpha Video, DVD • http://net.unl.edu/artsFeat/wildhorses/ • http://members.tripod.com/~horsefame/ (see especially, Roaney—William S. Hart's silent movie horse • *Spanish Barb: Horse for the Ages* (2001; *Saving the Endangered Species, 20*) Cinamour Entertainment • Pony Boy, G. (2000) *Of Women and Horses.* California: Bowtie Press • *Phantom Stallion* (1954, 1994) Dir. Harry Keller. Perf. Rex Allen, Slim Pickens. Timeless Multimedia, VHS • *Spirit: Stallion of the Cimarron*, Dir. Kelly Ashbury, Lorna Cook. Dreamworks, 2002 • Price, S. D. (1999) *The Quotable Horse Lover.* Massachusetts: The Lyons Press • www.phantomstallion.com • www.searchroots.com/Equus/famous.htm
Multicultural/Historical/Social Connections	Impact of wild horses, burros, and other grazing animals on the area's American Indians (historically and currently); historical ramifications (i.e., "Dustbowl" in the 1930s); historical implications such as farming, roping, and rodeos; purpose and jobs related to wild horses and burros; utilization of the animals and how this has evolved and changed over time (i.e., historian); percentage of horses still located in Nevada; discuss and correlate relevance; equine influences on the fine arts; current equine therapeutic benefits to humans.

Wild Horse and Burro Core Curriculum	
Essential Question #3: How are wild horses and burros managed?	
Goal	Students will understand the need to balance habitat needs for wild horses and burros with other users/uses of the desert environment.
Objectives	Students will address the following: • dietary and water requirements of wild horses and burros; • differences between horses and burros; • other native wildlife species that rely on the same forage/water as wild horses and burros; • the need to balance uses of habitat (including the concept of allocating forage and water to all the various uses, and what needs to happen when wild horse and burro uses begin to exceed the share of limited forage and water resources); • management tools (including gathering/removing excess wild horses and burros and preparing them for adoption through the Adopt A Horse or Burro Program); and • Minimal Feasible Management Level (MFML).
Curriculum Essentials Framework Correlation	(5) 4.2 Investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all. (5) 2.3 Investigate and describe how plants and animals have features that help them live in different environments. (5) 2.12 Investigate and describe how environmental changes allow some plants and animals to survive and reproduce but others may die.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms. L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems. L5D3 Students know that differences among individuals within a given species give them advantages and/or disadvantages in surviving and reproducing.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**

Activities	Site(s)	Equipment	Time
Students will participate in team activities to create ways to divide up resources (note: activity reinforces the idea of habitat as finite). Students will include American Indians as a group in competition for resources with wild horses and burros.	Courtyard—Main Facility	Activity materials	15—20 minutes
Students will discuss options for management when wild horses and burros exceed the appropriate levels, followed by a question and answer session.	Courtyard—Main Facility		15—20 minutes

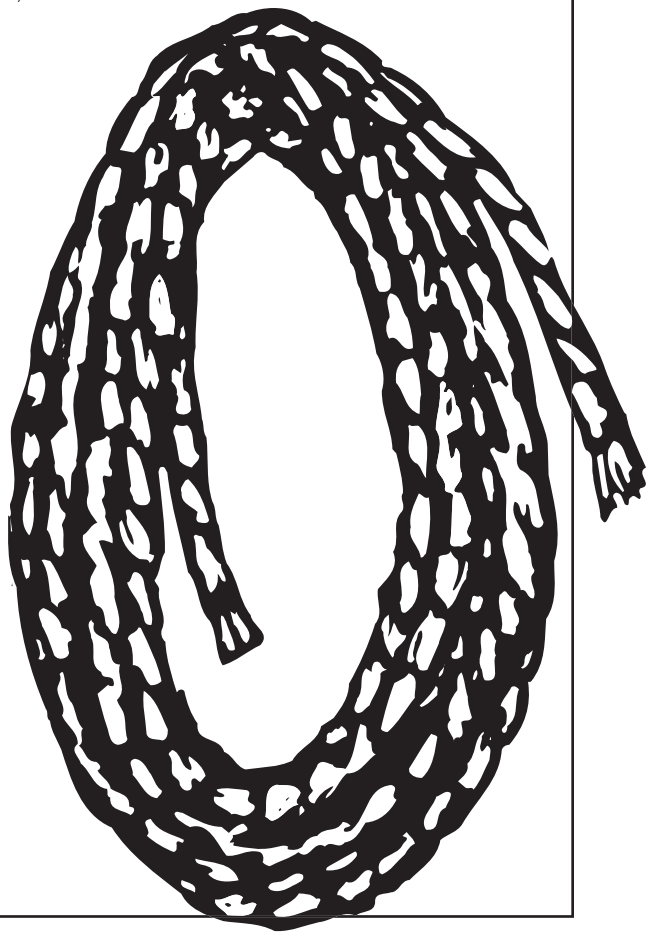
Wild Horse and Burro Core Curriculum (Essential Question #3 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will tour the wild horse and burro facility to view animals removed from the range and introduced to the adoption program. Culminating activity will be a presentation in the arena from adopters with their adopted horses or demonstration animals.	Catwalk Tack Room Research Room Exhibit Room		30 minutes—1 hour
Notebook/Vocabulary	appropriate management level (AML); balance free-roaming; brand inspector; census; cowboy; ecological; forage; grass; habitat; herd area (HA); Herd Management Areas (HMA); lasso; livestock; long-term holding; monitoring; mustang; Ranger Management Specialist; riparian; round ups/gathers; short-term holding; Wild Horse & Burro Specialist; wildlife; wrangler		
Presentation of Findings	• Oral presentation, poster, skit, poem, other.		
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.		
Resources	• Harbury, M. et al. (1984) *The Last Of The Wild Horses.* Garden City, NY: Doubleday. • Ryden, H. (1999) *America's Last Wild Horses.* Guilford, CT: Lyons Press. • *The Last of the Wild Horses* (1948) Dir. Robert L. Hippert. Perf. James Ellison, Mary Beth Hughes • www.tfaoi.com/aa/2aa/2aa47.htm		
Multicultural/Historical/Social Connections	Required caring on land: census, wrangler, wild horse specialist, range manager, helicopter pilot, contractor. Careers: veterinarian, farrier, chiropractor, equine body work, brand inspector, farmer, feed store.		



Wild Horse and Burro Core Curriculum	
Essential Question #4: What is required to care for a wild horse or burro?	
Goal	Students will understand animal behavior, and what is involved in caring for a wild horse and burro.
Objectives	Students will: • understand animal behavior (including domestic vs. wild, peripheral vision, key animal behavior); • understand what it takes to care for a horse or burro (including basic health care, parts of the horse, tack items, grooming, hoof care, basic training concepts, uses of horses and burros, necessary equipment); and • understand the difference between wild horse and burro needs in the wilderness versus needs in captivity.
Curriculum Essentials Framework Correlation	(5) 4.4 Organize historical information from a variety of sources [NS 2.5.5]. (5) 4.28 Read, analyze, and interpret historical passages.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	L5C5 Students know that plants and animals have adaptations allowing them to survive in specific ecosystems. L5D3 Students know that differences among individuals within a given species give them advantages and/or disadvantages in surviving and reproducing.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**

Activities	Site(s)	Equipment	Time
Students will examine animal behavior/role play possible narration after viewing and observing wild horse and burros. The idea of safety will be reinforced.	Pasture		15—30 minutes
Students will participate in stations/centers to learn about parts of the wild horse/burro, tack and grooming, animal nutrition, and health care needs.	Courtyard— Main Facility		40 minutes—1 hour
Students will observe possible packing demonstrations and training demonstrations to learn about care.	Arena		20—30 minutes
Students will have the opportunity to interact with the animals (i.e., pet and groom) and learn about socialization and safety .	Arena		15—30 minutes

Wild Horse and Burro Core Curriculum (Essential Question #4 continued)	
Notebook/Vocabulary	bit; blankets; bridle; colt; corral; crop; curry comb; finishing brush; fly masks; foal; gelding; halter; head stall; hoof pick; lunge line; lead rope; mare; martingale; pasture; philly; round pen; scraper; sweat scraper; skeletal terms; vaccines; worming
Presentation of Findings	• Oral presentation, poster, skit, poem, other.
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.
Resources	• Harbury, M. et al. (1984) *The Last Of The Wild Horses.* Garden City, NY: Doubleday. • Ryden, H. (1999) *America's Last Wild Horses.* Guilford, CT: Lyons Press. • *The Last of the Wild Horses* (1948) Dir. Robert L. Hippert. Perf. James Ellison, Mary Beth Hughes. • www.tfaoi.com/aa/2aa/2aa47.htm
Multicultural/Historical/Social Connections	Required caring on land: census, wrangler, wild horse specialist, range manager, helicopter pilot, contractor. Careers: veterinarian, farrier, chiropractor, equine body work, brand inspector, farmer, feed store.



Wild Horse and Burro Core Curriculum	
Essential Question #5: What is the interrelationship between wild horses and burros and man? What are some possible career options?	
Goal	Students will understand the interrelationships between wild horses and burros and man. In addition, students will be introduced to some animal related career options.
Objectives	Students will: • interact with a wild horse and burro; and • be introduced to some options for careers in animal-related fields.
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats.
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum develoment.	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms.
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**

Activities	Site(s)	Equipment	Time
Students will tour the wild horse and burro facility. Students will observe and discuss the socialization and interrelationship between wild horses and burros and humans. Discussion of different human uses for horses and burros. Question and answer session.	Arena Catwalk Stalls Training Area		20—30 minutes
Students will be introduced to the equipment used to socialize and care for wild horses and burros. Students will be able to experience sitting in a saddle while also holding and examining other equipment used. Question and answer session.	Tack Room		20—30 minutes
A scientist will speak to students about current research on wild horses and burros. Students will view a horse skeleton and discuss the evolution and anatomy of horses and burros.	Main Reception Area Research Area		20—30 minutes

Wild Horse and Burro Core Curriculum (Essential Question #5 continued)			
Activities	**Site(s)**	**Equipment**	**Time**
Students will observe the training, grooming, and care of wild horses and burros. Students will have the opportunity to interact with the animals, focusing on the emotional and social ties to the animals (e.g., Spirit Stallion of Cimarron).	Arena		20—30 minutes
Through various stations, students will be introduced to some animal related careers (e.g., training, veterinarian, farrier, feed and tack store). Students will conduct interviews about possible career options.	Courtyard		15—30 minutes
Notebook/Vocabulary	bit; blanket; boots; bridle/headstall; chaps; halter; harness; head; jobs; reins; saddle; spurs; stall; therapy; wagon		
Presentation of Findings	• Oral presentation, poster, skit, poem, other.		
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.		
Resources	• Bouman, D. T. & Bouman, J.G.(1994) *Przewalski's Horse: The History and Biology of an Endangered Species.* Albany, NY: State University of New York Press. • Waring, G. H. (2003) *Horse Behavior: Behavioral Traits and Adaptations of Domestic and Wild Horses, Including Ponies (Noyes Series in Animal Behavior, Ecology, Conservation, and Management).* Norwich, NY: Noyes Publications.		
Multicultural/Historical/Social Connections	Adaptations made by American Indians of Nevada to the introduction of horses historically and currently; social structure correlated between horses and humans; correlation and evolution of anatomy between wild horses and burros and humans; and participation in adoptions. Careers: ranching, farming, veterinary, farrier, tack store, tourism, cowboy, brand inspector, helicopter pilot.		

Wild Horse and Burro Core Curriculum			
Essential Question #6: How have laws regarding wild horses and burros changed and evolved over time, and how do these laws impact wild horses and burros?			
Goal	Students will understand the history and effect of laws regarding wild horses and burros.		
Objectives	Students will: • understand Minimal Feasible Management Level; • understand multiple use; • understand the history of management; • understand how laws have changed and evolved regarding wild horses and burros; • understand how theses laws affect wild horses and burros; and • understand their role of stewardship in relation to these laws.		
Curriculum Essentials Framework Correlation	(5) 4.1 Investigate and describe the interrelationships and interdependence of organisms with each other and the non-living part of their habitats.		
Nevada Science Standards Correlation NOTE: Nevada Science Standards were under revision during curriculum development.	L5C3 Students know that changes to an environment can be beneficial or detrimental to different organisms.		
Prerequisite Classroom Experience	**Prior Knowledge and/or Background Activities:**		
Activities	**Site(s)**	**Equipment**	**Time**
Students will tour the wild horse and burro facility. Students will review the evolution of laws regarding wild horses and burros.	Arena Catwalk Stalls Training Area		20—30 minutes
Students will be introduced to the equipment used to socialize and care for wild horses and burros. Students will discuss the role of stewardship in socialization. Question and answer session follows.	Tack Room		20—30 minutes
Students will visit interactive exhibits about wild horse and burros laws. Students will complete an activity on Wild Horse Annie and the 5th grade letter-writing campaign. Question and answer session follows.	Main Reception Area Research Area	Interactive exhibits on the Wild Horse Annie Act and The Wild Free-Roaming Horses and Burros Act of 1971	20—30 minutes

Wild Horse and Burro Core Curriculum (Essential Question #6 continued)	
Notebook/Vocabulary	campaign; Congress; herd area; herd management area; House of Representatives; Velma B. Johnston; law; legislation; manage; The Public Rangelands Improvement Act of 1978; Senate; stewardship; Wild Horse and Burro Act; Wild Horse Annie Act; The Wild Free-Roaming Horses and Burros Act of 1971
Presentation of Findings	• Oral presentation, poster, skit, poem, other.
Follow-up Suggestions	• Students follow up and post science notebook entries online. • Students share what they have learned with others at their school. • Students research other public lands with wild horses and burros. • Students learn about the interviewing (individual and team) process.
Resources	• www.pbs.org/wnet/nature/cloudslegacy/roundup.html • www.returntofreedom.org/kids/annie.html • www.unr.edu/wrc/nwhp/biograph/johnston.htm • www.wildhorseandburro.blm.gov/history.htm • www.wildhorseandburro.blm.gov/theact.pdf
Multicultural/Historical/Social Connections	History of Velma B. Johnston and the progression of laws regarding wild horses and burros; the role of stewardship and management in relation to wild horses and burros; how students have had an effect on initiation of current law; and process of law.

Wild Horse and Burro Correlation to BLM Mission

Essential Questions and Correlated Activities	Educational Themes	BLM Mission
#1 How do wild horses and burros interact with each other and their environment? **#3 How are wild horses and burros managed?** **#4 What is required to care for a wild horse or burro?** **#5 What is the interrelationship between wild horses and burros and man?** • Students observe corrals and pastures. • Students become familiar with equipment. • Students observe training and participate in equine care. • Students learn about volunteerism and meet guest volunteers. • Students conduct a census and complete mathematical integration. • Students collect data to determine spring activity, then compare their data to baseline activity.	• Care and socialization of horses and burros • Equestrian equipment • Historical uses/evolution of equipment • Management/protection of riparian areas • Stewardship of public land and resources	• Appropriate Management Level (AML) • Archaeology • Accomplish mandated roles in equipment use—tack as well as the working facility (working coral chute system) • BLM rangers training horses for use as "working horses" • Carrying capacity of the land • Herd management areas • Maintain ecosystem balance • Preservation of historical resources • Volunteerism—volunteers involved in stewardship of the land and resources
#2 How have wild horses and burros come to represent the essential spirit of the American West? • Students examine protected trail remnants and ranch structures. • Students review the adoption process and are introduced to a horse. Students have online interaction with the adoption of their horse. Students view artifacts related to historical views (e.g., square nails and handmade horse shoes). Students compare/contrast modes of transportation in relation to wild horses and burros. • Students discuss the history of trading, which is how horses became wild. Students examine how various breeds came into existence.	• Biodiversity/genetics (e.g., animal survival interrelated to the environment) • Historical equine use in ranching and mining • Introduction and evolution of wild horses and burros in non-native settings • Preservation of public land and resources • Wild horse and burro timeline	• Archaeology and cultural history • Biology • Domestic stock turn out into wild populations • Pre-history and history • Preservation of resources • Range management • Sustaining the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations • Wildlife biology
#6 How have laws regarding wild horses and burros changed and evolved over time, and how do these laws impact wild horses and burros? • Students participate in activities related to the historical evolution of laws affecting wild horses and burros.	• Historical evolution of laws in Nevada	• Requirements dictated to BLM through laws • Yearly amendment of laws