ARTIFACT CLASSIFICATION

SUBJECTS: Science, language arts
SKILLS: Application, analysis, evaluation
STRATEGIES: Scientific inquiry, research skills, classifying, role playing
DURATION: 30 to 45 minutes
CLASS SIZE: Any; work groups of 4 to 5

Objective:
In their study of artifact classification students will use pictures of artifacts or artifacts from a teaching kit to classify artifacts and answer questions about prehistoric lifeways.

Materials:
"Ancient Artifacts" and "Classification" activity sheets for each group; an archaeology teaching kit if available (optional).

Vocabulary:
artifact: any object made or used by humans.
scherd: a broken piece of pottery.

Background:
The purpose of archaeological research is to learn about the lifeways of past peoples. The research design developed for each archaeological project usually consists of a series of questions and how they will be answered using the archaeological data.

The artifacts from the site form an important part of the data base. Artifacts are classified so that they can be used to answer research questions.

Procedure:
1. Tell the students to imagine they are a team of archaeologists. The team has completed excavation of an ancient site in the Southwest. They are now ready to begin analyzing the artifacts brought back to the laboratory to find out about the people who lived at the site. They will use a series of questions to structure their inquiry.

   • What was the diet of the site’s residents?
   • What did they use for personal adornment?
   • How many different ways did they decorate their pottery?
   • How many different kinds of raw materials did they use to make their tools?

2. Distribute the "Ancient Artifacts" and "Classification" activity sheets. Working individually or in small groups, the students cut out the artifacts on the "Ancient Artifacts" activity sheet. They group the artifacts so they can answer the questions on the "Classification" activity sheet. Have the students answer the research questions and tell how they classified the artifacts to do that.

As the students work they will find that objects move from one category to another depending on the question asked. For example, the two pieces of shell could be used to answer questions concerning diet and adornment. Thus, they could be classified as food remains and as jewelry.

3. Have students create one or more questions of their own. How might they classify their objects to answer these questions?

Closure:
Summarize what you have learned about classification and answering archaeological research questions.

Evaluation:
The students hand in the "Classification" activity sheet for evaluation.

Links:
Section One, Lesson 6: "Classification and Attributes"
Section One, Lesson 7: "Scientific Inquiry"

Classification Activity Sheet Answers
1. corn, beans, meat, and shellfish
2. turquoise and shell
3. checkerboard, lines, dots, shapes, and plain
4. bone, stone, plant fibers, shell, and clay
### Ancient Artifacts

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<td>Shell &amp; cordage</td>
<td>Bone</td>
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<td>Beans</td>
<td>Corn</td>
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Classification

Name: _______________________

1. What was the diet of the site's residents?

2. What did they use for personal adornment?

3. Describe the different ways they decorated their pottery.

4. Name the different kinds of raw materials they used to make their tools.
ARCHAEOLOGY AND TREE-RING DATING

(Adapted from Date a Tree, by Barbara Gronemann, 1986, Southwest Learning Sources and the Arizona Archaeological Council.)

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<th>Science, social studies, mathematics, language arts</th>
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<td>45 to 60 minutes</td>
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<td>CLASS SIZE:</td>
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Objectives:
In their study of dendrochronology students will use activity sheets and a discussion to:
1. Apply principles of dendrochronology to determine a tree’s age and to recognize climatic variation.
2. Analyze and experience how archaeologists use tree rings to accurately date archaeological remains and study past climates.

Materials:
Transparency of the “Master Sequence,” “The Stump” and “Be A Dendrochronologist” activity sheets, scissors, glue or Scotch tape, (optional: slices of tree stumps or limbs), and transparency of “Be A Dendrochronologist.”

Vocabulary:
dendrochronology: determining the age of a tree by counting its rings; the study of tree-ring dating.
increment borer: an instrument used to remove a core sample from a tree.

Background:
Dendrochronology (den-droh-cruh-NOL-uh-jee), also called tree-ring dating, is based upon the fact that trees grow in width by adding an outer layer, usually one per year. When looking at a cross section of a tree trunk, these yearly layers appear as light and dark rings of varying widths. The layer next to the bark is the most recent yearly growth, and the center of the tree is the first year of growth. One pair of light and dark rings results from one year’s growth. The light colored section is the spring and summer growth when the tree has a lot of sap. As the weather cools, and the tree slows its growth rate, the cells become smaller and thicker-walled. Finally, the sap stops flowing and the tree ceases to grow during the winter, forming a smooth dark ring. By counting the dark rings, the age of a tree can be known if the cross section of the trunk is complete.

In the arid West, trees seldom have sufficient moisture to grow to their yearly maximum potential. The width of the tree rings varies with the growing conditions of each year. For instance, higher rainfall and a longer growing season produce a wider ring than does a year of low rainfall and prolonged cold. Tree rings can thus tell us about year-to-year climatic conditions in the region in which the tree grows. The tree-ring patterns have been found to never repeat in exactly the same way.

Dendrochronology was first studied in 1904 by Dr. Andrew E. Douglass, an astronomer at the University of Arizona. He was trying to analyze climate, and he soon noticed that the trees showed the same patterns of ring widths, because they had all experienced the same climatic conditions. In order to study climate further back in time, Douglass analyzed wood from prehistoric Indian ruins in the Southwest. He used a “bridging” method to do this.
First, he looked at trees recently cut, so that he knew the exact year that the tree added its last growth ring. By counting inward and subtracting the number of rings from the year the tree was cut, the year that tree started to grow could be calculated.

The cutting year of another piece of wood can be determined by matching its tree-ring pattern with the pattern of a piece of wood whose cutting year is known. Say there was a drought 50 years ago, appearing as a very narrow tree-ring. This narrow tree-ring will appear in all the trees in the area, but at different positions in the stump, because the trees are of different ages. The drought ring may have occurred during one tree's second year of growth, in another's 75th year of growth.

A master sequence is made by drawing vertical lines on a piece of paper at the end of every tree ring. The sequence is a series of parallel lines; the width between each line is the same as the width of each tree ring. By continually matching and recording the ring patterns of older and older pieces of wood, a master sequence of tree-ring patterns is now extended as far back as 8700 years in some places.

A master sequence of ring patterns is prepared for different regions, since rainfall and temperatures, and hence tree ring widths, vary from place to place. The master sequence is represented on a slip of paper with vertical lines drawn on it, which match tree rings of a known date. The dendrochronologist makes a graph of the ring patterns for the particular piece of wood he or she is studying, then slides it along the master sequence until the patterns match. The cutting date of the piece of wood is now known.

Dendrochronology is particularly valuable to archaeologists since it can tell them very precisely how old a site is. Many ruins still have wood preserved in their walls and roofs, and even charcoal from a burned structure or a cooking fire can sometimes show clear tree-ring patterns. Archaeologists are also very interested in knowing about past climate since it influenced where people lived, what kinds of foods they grew, and what wild plants and animals were available to them.

Rather than remove a beam from an ancient structure, dendrochronologists use an increment borer, a small drill which removes a thin tube of wood from the beam. This borer will leave a hole in the beam that is only about the size of a soda straw.

This method of core removal is also used on living trees so that the tree does not have to be cut down.

By studying many pieces of wood from a prehistoric village, archaeologists can learn about such things as the village growth history, remodeling, site abandonment and re-use. When people returned to a village that had been abandoned for several years, they would repair, replace, and sometimes remodel the buildings, using new wood. The year of their return can be read from the tree rings of the new wood.

Wooden beams, building materials, and charcoal provide a wealth of information about past cultures. However, people sometimes destroy this evidence when they visit Indian ruins. Ancient houses have been pulled apart and the beams used in a campfire. Illegal digging in ruins can also move beams and charcoal from their original location, and then archaeologists cannot tell their context. It is very important to our knowledge about the past that we visit sites with care, and not disturb or destroy anything that is there.

### Setting the Stage:
1. Share background information. (Optional: project the "Master Sequence" transparency and explain how the sequence is created.)
2. Using "The Stump" activity sheet or tree cookies, show students how to count tree rings and discuss the basic knowledge that can be learned from the study of tree rings.
3. Complete the activity sheet.

### Procedure:
1. If possible, bring in an increment borer and a core sample. Foresters with state and federal agencies might lend these to you. Explain how the borer is used and how the sample can be read, as in "The Stump" activity.
2. Give each student a copy of the "Be a Dendrochronologist" activity sheet. It depicts cross sections of two beams from different archaeological sites. Have students cut out the core samples. The innermost solid line represents the first year's growth. The students match their core samples to the master sequence. Glue the samples from each core onto the master sequence to see how the beams overlap and to date and place them in chronological order. (You may want to demonstrate or work along on the overhead projector.)
3. After students have dated the beams and put them in order, ask them to make some observations about the climate at these sites. What might have been the weather conditions at that time? How would the weather have affected farmers?

4. Share preservation information from the "Background."

**Closure:**

Have the students create a summary statement about the importance of tree-ring dating to archaeology. Have them also make a statement about the importance of preserving wood samples in archaeological sites.

**Evaluation:**

Students complete "Be a Dendrochronologist" activity sheet and turn it in for evaluation.

**Extensions:**

Extension 1. Instead of using "The Stump" activity sheet, teachers can use "Tree Cookies," which are polished cross-sections of tree stumps and limbs. Tree Cookies may be available in your area from the U.S. Forest Service or environmental education organizations.

Extension 2. *Project Learning Tree* has an excellent tree ring activity.

**References:**


**The Stump Activity Sheet Answers**

This tree was cut three years ago. Write that year ___.

How old is the tree? 16 years old

What year did the tree start growing? The year it was cut minus 16.

In what year of growth was there the least rainfall? 6

In what year of growth was there the most rainfall? 8

**Be A Dendrochronologist Activity Sheet Answers**

1. Climate and the years the site was occupied.

2. It could be skewed. However, if archaeologists find that some beams date well before the others at a site, they would suspect that the early beams had been re-used.

3. Removing beams removes information about the site's date and climate. Moving beams around confuses the record, and archaeologists cannot then tell to which room the dated beam belongs.

4. a. Which beam is the oldest? B
   b. How old was Tree A when it was cut? 14
      Tree B? 13
   c. How many years ago did Tree A start growing?
      990  Tree B? 999
   d. How many years ago was Tree A cut? 977
      Tree B? 987

5. Tree A: dry cycles - 0  wet cycles - 2

   Tree B: dry cycles - 2  wet cycles - 2

6. Examples: availability of food and water and other resources might change; survival might depend on adapting to these changes; human populations might change.
Master Sequence

Section from a living tree.

Beam from a barn.

Beam from an old house.

The Stump

Name: ____________________

This tree was cut 3 years ago.

Write that year ________

How old is the tree? ____________________

What year did the tree start growing? ____________________

Find the ring that grew the year you were born. Was it a wet or dry year? ____________________

In what year of growth was there the least rainfall? ____________________

In what year of growth was there the most rainfall? ____________________
Be A Dendrochronologist  (page 1)

Master Sequence

1,000 years ago

995 990 985 980 975 970

968 years ago

Taken from Dendrochronology/Tree-rings worksheet © 1986, Barbara Gronemann, Southwest Learning Systems; used with permission.
What can a tree tell us?

1. Name two things archaeologists can learn about a site from tree rings.

2. How is the tree-ring record affected if prehistoric people used wood beams from older sites when building new homes?

3. What happens to the archaeological record if someone removes a beam or even places it somewhere else on a site?

4. Refer to Page 1 of your “Be a Dendrochronologist” activity sheets:

   Which beam is the oldest? 
   How old was Tree A when it was cut?  Tree B?  
   How many years ago did Tree A start growing?  Tree B?  
   How many years ago was Tree A cut?  Tree B?  

5. Answer the following:

   Tree A:

   List the number of dry cycles (two or more dry years) 

   List the number of wet cycles (two or more wet years) 

   Tree B:

   List the number of dry cycles (two or more dry years) 

   List the number of wet cycles (two or more wet years) 

6. How might climatic changes have affected the lifeways of prehistoric people?
POLLEN ANALYSIS

SUBJECTS: Science, math, language arts
SKILLS: Knowledge, comprehension, application, analysis, synthesis, evaluation
STRATEGIES: Brainstorming, forecasting, discussion, problem solving, writing, graph reading
DURATION: 45 to 60 minute period
CLASS SIZE: Any

Objectives:
In their study of pollen analysis, students will use pictures of pollen grains, an activity sheet and a graph to:
1. Identify six pollen grains and the climatic conditions in which they grow.
2. Infer prehistoric climate and plant use by interpreting two pollen samples.
3. Determine how climate affected a prehistoric village by interpreting a graph of pollen frequency through time.

Materials:
Transparency of “Magnified Pollen Grains” master; “Two Pollen Samples” and “Pollen Change Over 200 Years” activity sheets for each student.

Vocabulary:
coproolithes: fossilized feces (human).
palynology: the study of pollen grains.
pollen: a powdery substance produced by flowering plants. Pollen is the male genetic material, which pollinates (fertilizes) the female part of the flower to produce fertile seeds.

Background:
Pollen has four very valuable features which make it useful for study (Moore and Webb, 1978, p.1). Most importantly, it is preserved over enormous timespans if it is buried and maintained in fairly constant environmental conditions. Pollen grains have been found preserved in rock millions of years old. Other plant parts (leaves, flowers, stems) are far less likely to be preserved. Secondly, pollen grains, because of their very small size, tend to be carried in air currents. Thirdly, plants produce great amounts of pollen. These factors mean that pollen grains are dispersed widely, and it is likely that many of the plants growing in a region will be represented in a pollen sample. Finally, different kinds of plants produce different looking pollen grains. This distinctiveness allows identification to (usually) the genus level and, in some cases, to the species level.

Pollen becomes deposited in sediments by settling out of the air onto the ground surface where it becomes buried. Pollen also shows up in areas of a site where people processed plants, such as in hearths and storage rooms. When archaeologists are excavating a site they regularly take pollen samples—small bags of sediment—which are sealed and sent to a palynologist. Pollen is recovered through a laboratory procedure called “pollen extraction,” which essentially involves dissolving the sediments and leaving the pollen, which is then placed on a microscope slide. Magnifying the grains 400 to 1000 times, palynologists count and identify the pollen. They are then ready to begin interpreting their results.

Archaeologists use pollen analysis to understand plant use and past climates. The study of archaeological pollen can tell us if people were growing their own food or relying upon wild plants, or some combination of both. It is possible to learn about past climates because every plant species has specific requirements for temperature and moisture.
Palynologists can infer what the climate had to have been to support the plants represented in the pollen record.

Pollen analysts can help us with modern-day problems, too. For example, the concern about global warming makes it important to understand long-term climatic change, so that archaeologists can separate natural climatic cycles from human-caused changes.

Weather patterns on a local level are directly relevant to us as well. Palynologists are finding patterns in long- and short-term droughts in the Southwest. As population there grows and as demands on the water supply increase, such information could be invaluable in planning wise growth.

Pollen has other uses besides providing clues about past climates and past people. Pollen is a very nutritious food, high in protein. Corn pollen is fed to livestock as a dietary supplement, and some people claim pollen has medicinal healing effects (Stanley, 1971). Prehistoric people used pollen as a food. Cattails produce abundant pollen, and Utah’s Fremont people apparently used it as a flour (Madsen, 1979). Coprolites found in Great Basin caves show that Archaic people were eating the pollen of cattails, grasses, cottonwood trees, and various other plants.

Pollen has a special spiritual meaning to some Indian people. Corn pollen represents the power of fertility and reproduction, and is an element in many rituals of the Hopi, Zuni, and Rio Grande Pueblo people (Waters, 1972, p.162). To the Navajo people, pollen of “corn and other plants is very important in maintaining the proper relationship to the Holy People. In [traditional] households the day still begins with the sprinkling of pollen from one of the little bags and a brief murmured prayer” (Kluckhohn and Leighton, 1974, p. 203).

Sites that have been dug up by looters looking for artifacts have lost their potential to tell us about past climates. Looters mix layers from earlier times with those from later times and expose previously sealed layers to contamination with modern pollen. They probably do not even realize they are destroying this fascinating evidence of the past. It is up to everyone to preserve our past. It could mean our future.

### Procedure:
1. Using the projected master of “Magnified Pollen Grains,” review from which plant each grain comes. If possible, bring examples of the plants to the classroom. List on the board what students know about the conditions where that plant typically grows.
   - pine: cool and moist, usually in the mountains
   - cattail: wet, marshy
   - sagebrush: warm and dry, typically in deserts
   - corn: domesticated crop, requires warmth and moisture
   - Mormon tea (ephedra): warm and dry, desert plant
   - dandelion: grows in disturbed areas such as in farm fields and yards; thrives on warmth and moisture
2. Ask students to imagine uses for the listed plants. Supplement their list with the following information about how prehistoric people in the Great Basin used them (from Wheat, 1967, and Fowler, 1986), or research how prehistoric people in your locality used these or other plants.
   - pine: building material, firewood, edible pine nuts
   - cattail: edible roots, flowers, stalks and pollen; leaves used for making rope, mats, bedding, and temporary brush structures
   - sagebrush: medicine, firewood, bark woven into mats and clothing, edible seeds
   - corn: cobs used as fuel, grain eaten fresh or ground into flour, pollen used ritually
   - Mormon tea: edible seeds, foliage used for tea
   - dandelion: edible greens (Note: The dandelion that grows in our yards today is not a native plant. A relative of the dandelion, which grows under similar conditions, is native and was used by prehistoric people.)
3. Present background information about how pollen analysis is done and how archaeologists use pollen analysis to learn about prehistoric environments and plant use.
4. Distribute the “Two Pollen Samples” activity sheet. This is a very simplified version of what

### Setting the Stage:
Project the master of “Magnified Pollen Grains,” covering the title. Ask the students to guess what they are seeing.
actual pollen samples might look like. Explain that
the activity sheet reports the results of two pollen
sample analyses: one sample is from a hearth of a
1000-year-old site, and the other sample is taken
from outside the site limit at a depth that is the same
age as the hearth. (For this exercise, assume that
pollen from the hearth got there by direct human
action, and that the pollen in the sample from outside
the site settled out of the air from the plants growing
nearby.)

5. Students identify the plants for each pollen
grain and write a paragraph interpreting the results
from each sample. Examples:

hearth sample: people were preparing a meal of
corn, dandelion greens and pine nuts. Since
corn and nuts are storable and greens are not,
we can infer that this meal was being cooked in
the spring or summer when dandelion greens are
available. Pine nuts must have been gather-
ered far away, based on the results of the other
pollen sample. The sample also demonstrates
use of wild and domesticated plant food. Alter-
natively, the pine pollen could have come from
firewood instead of pine nuts; the presence or
absence of pine nut hulls or pine charcoal from
the hearth could clarify which use was occurring.

outside of site sample: the site is located in a
desert environment, because of the presence of
sagebrush and Mormon tea. However, a water
source (spring, marsh) must have been very
close by, since cattails are present.

6. Distribute the “Pollen Change Over 200
Years” activity sheet. Be sure students understand
that the vertical line on the left indicates time and
that the graphs show an increase in amounts mov-
ing from left to right. Ask them to identify the pollen
grains and interpret the graph. Specifically, how
was the climate changing over the 200 years, and
how did this affect the villagers? An example:

The climate is cooling and becoming wetter, as
shown by the increase of pine pollen. People
were growing corn, and along with it in their
disturbed fields grew dandelions. Therefore,
corn and dandelion increase and decrease to-
gether. By 850 years ago the climate appears to
have become too cool to grow corn successfully,
and people abandoned the site at that time.

Closure:

In summary, what two kinds of information
can pollen from archaeological sites tell us? Why is
it important that sites be left undisturbed if archae-
ologists are to use pollen analysis to learn about past
climes and how people lived?

Evaluation:

Evaluate students on their identification of the
pollen grains and the application of their knowledge
to interpreting the pollen sample results.

Extension:

The following questions enable students to ap-
ply their knowledge of pollen analysis to problem
solving. Pose the questions either as class discussion
topics or as a quiz.

1. If you lived in a northern state, what would
you know about the past climate if pollen from an
archaeological site 1000 years old showed that co-
conut palms and pineapples had grown there?

The climate must have been warmer and moister than
today, with a moderate climate all year round. We
know this from examining the climate where coconut
palms and pineapples grow today.

2. A man accused of murder has been caught,
but he says he has never been in the forest where the
body was found. He claims that he was in the desert
at the time of the murder, and he is wearing the same
muddy clothes he had on then. He says that he got
muddy when trying to remove his truck from a mud
hole in a jeep trail. How might you use pollen
analysis to discover where he really was?

A situation similar to this actually happened. “A
man was arrested and charged with the murder of
another man while on a journey along the Danube
near Vienna; however no body could be found. Pollen
analysis of a soil sample from the arrested man’s
shoes revealed much pine and alder pollen . . . . Fortu-
nately, only one area was known along the Danube
where pine and alder grew together . . . so the suspect
was confronted with this fact. He was so shocked at
the deduction that he admitted the crime and the
precise location where he had hidden the body”
3. You know of an ancient well-preserved Indian village near your home. Citizens of your town are trying to decide whether they should build a very expensive reservoir to store water in case of another drought. One evening, you are out for a walk and meet some people who are talking about going up to the Indian village to dig for artifacts. What might you tell them is wrong with doing that? What kind of information important to your town could they be destroying?

In digging the site, they destroy information about past people and past climates. It is also against the law to dig sites on public lands. The site could be a storehouse of information about past climates, information which could be very useful to the citizens of the town as they consider the reservoir. They could learn the pattern and duration of droughts in the area over hundreds of years through analyzing pollen contained in the site's deposits.

Link:
Section One, Lesson 3: “Observation and Inference”

References:
Bradley, R.S., 1985, Quaternary Paleoclimatology. Allen and Unwin Inc., Boston, MA.


Two Pollen Samples Activity Sheet Answers
1. corn
2. dandelion
3. pine
4. sagebrush
5. cattail
6. Mormon tea

Pollen Change Over 200 Years Activity Sheet Answers
1. pine
2. corn
3. dandelion
Magnified Pollen Grains

- Corn
- Sagebrush
- Cattail
- Mormon Tea
- Dandelion
- Pine
Broken Pots

Find the circumference of the pots represented by the sherds below.

\[ r = \frac{C^2}{8M} \quad \text{Circumference} = 2 \pi r \]
ARCHAEOLOGY AND ETHNOGRAPHIC ANALOGY: THE ANASAZI AND THE HOPI

Subjects: Science, social studies, language arts
Skills: Analysis, synthesis, evaluation
Strategies: Role play, reading, map reading, analogy
Duration: 45 to 60 minutes
Class size: Any; work groups of 2

Objectives:
In their study of ethnographic analogy students will use an ethnography and an archaeological site map to:
1. Infer the use of ancient Anasazi artifacts based on the Hopi’s use of similar items.
2. Explain why archaeologists use ethnographic analogy.

Materials:
“Flatrock Ruin” activity sheet and the Hopi ethnography for each student or team.

Vocabulary:
ethnographic analogy: inferring the use or meaning of an ancient site or artifact based on observations and accounts of its use by living people.
etnography: description of a culture based on observation of and interaction with living people.
kiva: usually an underground structure, for ceremonial use. First built by the Anasazi people; Hopi and Rio Grande Pueblo people continue to build and use kivas today.

Myth: usually a traditional story of presumably historical events that serves to unfold part of a world view of a people or explain a practice, belief, or natural phenomenon.

Background:
Cultural anthropologists write ethnographies or descriptions of the people that they study. An ethnography usually includes information on the kinship system, subsistence activities, religion, and many other aspects of the culture. Sometimes ethnographies tell how certain artifacts or buildings were used. Archaeologists often use ethnographic information to help them interpret how artifacts and sites might have been used by ancient people. For example, circular subterranean structures in ancient Anasazi sites are interpreted to be kivas, similar to those constructed by the modern Hopi in northern Arizona.

While ethnographic information does not provide direct proof of the function of archaeological materials, it offers invaluable assistance in determining how certain artifacts and structures may have been used by their makers. If an archaeologist is studying sites in a region, he or she could use ethnographic information about the peoples who lived there at the time of Euro-American contact and were studied by anthropologists. Knowing how the people lived in an area could help in interpreting the archaeological sites located in the same area.

Archaeologists also use historic photographs to find clues about the uses of artifacts and features. In addition, many historic travelers, such as Meriwether Lewis and William Clark or John Wesley Powell, recorded their observations of native life before it was changed by contact with Euro-American cultures. These observations also provide important
clues to archaeologists in interpreting artifacts and archaeological sites.

**Setting the Stage:**
Share the background information with the students.

**Procedure:**
1. Have students form teams of two. Distribute copies of the activity sheet to each team and have them imagine they are archaeologists studying the site represented by the map.
2. Have the students read the ethnography and fill in the activity sheet using the information in the ethnography. For example, to determine how the Anasazi used a kiva, they locate where kivas are discussed and write the interpretation in the blank.
3. Ask the students: What were you able to learn about the archaeological site using the ethnography of the Hopi? Were you able to find out how the Anasazi inhabitants must have met some of their basic needs? Which ones? (food—piki bread, corn; explanation—kiva, sipapu, kachinas, the sacredness of corn)
4. How might you check the validity of your interpretations? Additional archaeological information might strengthen conclusions based on ethnographic information. For example, if you thought that the flat rock was used for making piki bread, you might examine it for traces of cornmeal or pollen. Such evidence may indicate that the rock was used for cooking.

**Closure:**
Give reasons why ethnographic information is helpful in interpreting archaeological sites.

**Evaluation:**
The students turn in their activity sheets for evaluation.

**Links:**
Section One, Lesson 2: "Culture Everywhere"

**References:**


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**Flatrock Ruin Activity Sheet Answers**

1. A round ceremonial structure
2. May symbolize where the first people came onto the earth.
3. Used for cooking, probably piki bread
4. Used to make piki bread
5. Corn is sacred, it may have been used in a ceremony.
6. The Hopi consider it to be a Kachina.
7. They were probably farmers. Their housing was similar to that of the Hopi. They probably made piki bread to eat. Their religion may have been similar to that of the Hopi.
THE HOPI OF NORTHERN ARIZONA

Hopi—Descendants of the Anasazi

The Hopi people of Northern Arizona recognize themselves as descendants of the Anasazi Indians. "Hopi" means "peaceful people." The Anasazi lived in the Four-corners region from about 1500 to 700 years ago when they abandoned their cliff dwelling homes and moved southward to the Rio Grande River drainage and the Hopi Mesas. Why they moved is not understood.

Modern Hopi people have many of the same cultural characteristics that archaeologists have recorded about the Anasazi. For example, the Hopi live in adobe structures on top of mesas and build round ceremonial structures called kivas. The Anasazi made their homes out of adobe and also built kivas. The Hopi are masters of dry farming (growing food without extensive irrigation), and they cultivate corn, beans and squash. These foods were also grown by the Anasazi in much the same way.

Corn—A Way of Life for the Hopi

Corn is very sacred to the Hopi people. Traditionally, their survival depended on corn. Pollination and moisture are important for the growth of this lifeblood food, and pollen and rain are very sacred to the Hopi. They grow four different colors of corn—blue, white, yellow and red—representing the four cardinal directions. Blessings, dances and ceremonies are offered to corn, and it is eaten with almost every meal. A Hopi baby is named during a ceremony in which he or she is given a first taste of corn mush.

Hopi make a special food of corn called piki bread. It is made for special occasions and for ceremonies. "In every house there is a little oven made of a flat stone eighteen or twenty inches square, raised four or five inches from the floor, and beneath this a little fire is built. When the oven is hot and the dough is mixed in a little vessel of pottery, the good woman plunges her hand in the mixture and rapidly smears the broad surface of the furnace rock with a thin coating of the paste. In a few moments the film of the batter is baked; when taken up it looks like a sheet of paper. This she folds and places on a tray. Having made several sheets of this bread from the batter of one color and placed them on the tray, she takes the batter of another color and, in this way makes seven sheets of each of the several colors of corn batter" (Powell, 1972, p.20).
A traditional recipe for piki bread:
1 cup green juniper ash
1 cup boiling water
3 cups water
1 cup blue cornmeal
Sunflower oil for greasing stone
Mix ash with boiling water. Strain juniper ash into a pot. Stir.
Add blue cornmeal and water. Stir with a wooden spoon
or stick. Let cool. Spread on hot, greased griddle or stone
with palm of hand. Be certain the layer is very thin. Cook
for a very short time. Carefully, lift paper-thin layer from
the griddle by rolling from one end to the other, jelly roll

Blue corn and pinyon pine nuts are two other Hopi foods. Try blue corn chips,
blue popcorn, or pinyon pine nuts as examples of Hopi foods.

Hopi Kachinas
Kachinas hold great importance in the Hopi religion. "Kachina can mean three
things: the spirit the Hopi believe in, a masked dancer which embodies the kachina
spirit, and a carved doll, painted in the spirit’s likeness. Kachinas can take many
forms—ogres, animals, birds, or clowns. Mudheads are the best known Hopi
clowns" (Billard, 1974, p. 181).

Researchers believe the Kachina cult developed after the Anasazi moved southward (Adams, 1991, p. 186). However, some modern Kachinas can be traced to an
erlier time. Kokopelli, the hump-backed flute player, is found in early Anasazi rock
art. The figure has been found carved into the floors of at least two kivas in
southwestern Colorado.

Hopis believe that the kachina spirits live with them for six months of the year.
At the end of their stay, the kachina spirits are sent back to their home on the San
Francisco Peaks with a grand ceremony called the Niman or "home" dance. "It is on
these peaks where the kachinas are believed to feast on plump squash and melons
and gather their ceremonial needs for six more months of the year. A Hopi with a
pure heart may someday join his ancestors on the snowy peaks" (Billard, 1974, p.
179).
A Hopi Kachina Song

"In May, corn planting time, the Kachinas wear masks painted with rainbows, and they sing a song about butterflies flying over the corn and bean fields. One butterfly is flying after another, like a hunt, and there are many butterfly pairs. Even as the Hopis paint their faces for a ceremonial dance, so have the butterflies painted themselves with pollen for their flight over the corn blossoms.

The butterflies must go through many flowers, say the Hopi, to make themselves so pretty" (Williamson and Railsback, 1987, p. 47).

Korosta Kachina Song

Yellow Butterflies,
Over the Blossoming Virgin Corn,
With Pollen-Painted Faces
Chase One Another In Brilliant Throng
Blue Butterflies,
Over the Blooming Virgin Beans,
With Pollen Painted Faces
Chase One Another in Brilliant Streams.
Over the Blooming Corn,
Over the Virgin Corn,
Wild Bees Hum.
Over the Blooming Virgin Beans,
Over the Virgin Corn,
Wild Bees Hum.
Over the Field of Growing Corn,
All Day Shall Hang the Thunder Cloud;
Over Your Field of Growing Corn
All Day Shall Come the Rushing Rain.

Hopi Ways

John Wesley Powell, an early explorer and scientist, visited the Hopi Mesas in 1870. He observed:

In the early history of this country, before the advent of the Spaniards, these people raised cotton, and from it made their clothing; but between the years 1540 and 1600 they were supplied with sheep, and now the greater part of their clothing is made of wool, though all their priestly [clothing], their wedding and burying garments, are still made of cotton.

Men wear moccasins, leggings, shirts and blankets; the women, moccasins, with long tops, short petticoats dyed black, sometimes with a red border below, and a small blanket or shawl thrown over the body so as to pass over the right shoulder and under the left arm. A long [belt] of many bright colors is wound around the waist. The outer garment is also black. The women have beautiful, black glossy hair, which they take great pains in dressing. Early in
the morning, immediately after breakfast, if the weather is pleasant, the women all repair to the tops of the house, taking with them little vases of water, and wash, comb, and braid one another’s hair. It is washed in a mixture of the soap plant, a species of yucca, and then allowed to dry in the open air. The married ladies have their hair braided and rolled in a knot at the back of the head, but the maidens have it parted along the middle line above, and each lock carefully braided, or twisted and rolled into a coil supported by little wooden pins so as to cover each ear, giving them a very fantastic appearance.

I have already said that the people are hospitable; they are also very polite. If you meet them out in their fields, they salute you with a greeting which seems to mean “May the birds sing happy songs in your fields.” They have many other greetings for special occasions. Do one a favor and he thanks you; if a man, he says, “Kwa kwa”; if a woman, “Es-ka-li.” And this leads me to say that there is a very interesting feature in their language... many words are exclusively used by men, others by women. “Father,” as spoken by a girl, is one word; spoken by a boy it is another; and nothing is more vulgar than a man to use a woman’s word, or a woman a man’s (Powell, 1972, pp. 21-22).

A Hopi Origin Myth

The Hopi believe that the first people lived underground and then moved up onto the earth, coming through a hole they call a sipapu (SEE-pa-pu). Both the Hopi and the Anasazi include a sipapu as part of their kiva. The sipapu is a small hole in the floor, and is always located behind the fire pit on the north side of the kiva.

The story of the Hopi myth is told by Reynold Nash, a Hopi boy:

The Hopi people came up from a hole in the ground. When they die, they go back into the hole to another world.

The first world of the Hopi Indians was a bad place. The god who made the world said he would make a second world. He told Spider Woman that she should lead the people to a second world.

She showed them the way and when they got there they started planting and building homes, but things were not good. There was a lot of killing going on and there was no game to hunt. Spider Woman went to the god and told him what was happening. He said he would make a third world and that Spider Woman would lead the people again.

In the third world there was no killing and for a while there was enough game. The people tried to plant food but the plants could not grow because there was no light or heat.

The god told Spider Woman to build bonfires around the field. The fire gave some heat and light and the people built fires every day. That way they were able to make things grow. But still that dark world was not good. People were dying. Again Spider Woman went to tell the god what was happening.

He said he would make the fourth world. It would be the last one he was going to make, he said.
He said he would make the fourth world. It would be the last one he was going to make, he said.

The Hopi people came up into the light. They found good land to plant. They lived high up on the mesas where they were safe from their enemies, the Navajos and Utes and other tribes.

Now there are roads leading up to the thirteen Hopi villages, the same roads that used to be trails made by the first Hopis. The Hopis still have the same shrines their ancestors had.

The Hopi people have a good life. They grow their crops in peace. The men make kachina dolls out of cottonwood and the women make baskets out of yucca and pottery out of clay.

The Hopis are still in the fourth world. They thank the god and Spider Woman by taking prayer feathers to the shrines.

The Hopis enjoy staying in the fourth world. (Baylor, 1976, pp. 26-28)

The Hopi Today

The Hopi today are exquisite potters, basketmakers, carvers, weavers, and silversmiths. Many Hopi still live by their old traditions and ways, and some have adopted the ways of modern life. These two ways of living can cause many problems for the Hopi. Some of the challenges the Hopi face today revolve around land use, energy and mineral development, and social and health problems.

If you enjoyed this story you might want to read The Village of Blue Stone by Stephen Trimble or The Pueblo by Charlotte and David Yue.

References


How the Hopi used it.

1. Kiva
2. Sipapu
3. Hearth
4. Flat rock
5. Corn
6. Kokopelli carving

7. Based on the archaeological and ethnographic evidence, describe how the Anasazi lived at this site.
EXPERIMENTAL ARCHAEOLOGY: MAKING CORDAGE

SUBJECTS: Science, social studies, mathematics, language arts, art
SKILLS: Knowledge, comprehension, application, analysis, synthesis, evaluation
STRATEGIES: Reading, discussion, computation, scientific inquiry, brainstorming, experimentation, writing, invention
DURATION: One to two 45 minute class periods
CLASS SIZE: Any; work groups of 4 to 5

Objectives:
In their study of experimental archaeology students will make cordage and use an activity sheet to:
1. Experience a technique and skill prehistoric peoples needed for everyday life.
2. Compute the amount of time and materials that might have been required to make cordage in prehistoric times.
3. Construct a scientific inquiry to study the contents of an archaeological site.

Materials:
One spool of hemp rope (about 1/2 inch in diameter). Milkweed or dogbane plant stalks and sagebrush or juniper bark. (If you cannot obtain these native plant fibers, cotton string, raffia, woolen yarn, or other purchased string can be used; some craft stores sell a variety of suitable basketry fibers.) Transparency of the “Experimental Archaeology” activity sheet and a copy for each student or team.

Vocabulary:
cordage: several strands of fiber twisted together; string or rope.
experimental archaeology: scientific studies designed to discover processes that produced and/or modified artifacts and structures that are found in archaeological sites.
fiber: a slender threadlike strand or string. Bast fibers are the long fibers from a plant stalk.
Palute: an Indian tribe whose traditional territory included the Great Basin of California, Nevada, Oregon, Utah, and Idaho.
replication: the act or process of reproducing artifacts, structures, and use patterns.
sinew: animal tendon prepared to use as cord or thread.
technology: the technique or means for making or doing something, often associated with tool making.

Background:
Archaeologists cannot ask prehistoric peoples how they made their tools nor can they observe the manufacture and use of artifacts. Thus they must find other means to learn about past technological systems. Experimental replication of artifacts, structures, and wear patterns is one method. Experiments provide possible interpretations and a basis for further study but do not directly prove how artifacts were used or made.
Experimental archaeologists replicate artifacts using techniques that may have been used by ancient peoples. These studies help them to better understand the processes that produced the artifacts and structures found in archaeological sites. Replication studies include the reproduction of stone tools, basketry, ceramics, and cordage. By making these artifacts using prehistoric techniques, archaeologists can address numerous questions about how people lived in the past. Examples include: How long would it take to make a projectile point? Are some raw materials better for stone tool manufacture than others? What kind of clay is the best for ceramic vessels and where can it be found? How long would it take to make a small snare?

Experimental archaeologists also study how artifacts were used in the past. They do this by using them in ways that produce wear or damage patterns similar to those observed on artifacts. For example, archaeologists have used stone tools to butcher zoo elephants that have died in order to learn how Paleo-Indians may have butchered mammoths. They examine the wear patterns resulting on stone tools as well as the cut marks on the bones of the butchered animal. The results of their studies are used to make inferences about how prehistoric peoples may have performed similar tasks.

In this lesson students will make cordage using native plant fibers. Cordage artifacts are commonly found in dry cave sites throughout the western United States and vary in size from tiny fragments to a net measuring 140 feet by 4 feet found at Hogup Cave in northwestern Utah (Aikens, 1970, p.125). Cordage was made prehistorically from a variety of materials including the bast fibers of milkweed and dogbane, yucca leaf fibers, and juniper and sagebrush bark. Human hair and animal sinew were also used. Finished cordage varied in size from 1 millimeter to several millimeters in diameter. Relative size may have been determined by the fibers selected and the intended purpose of the finished object. Experimental archaeologists produce cordage to learn how it was made, the characteristics of the finished pieces, and how much time was required to make these important artifacts.

**Setting the Stage:**

1. Distribute a piece of 2-ply twine about 12" long to each student. Ask them if they can determine how the twine was made.
2. The techniques that were used to make many prehistoric artifacts are unknown today. Thus, archaeologists are confronted with problems similar to what the students just experienced with the twine. To better understand how the artifacts were made and used archaeologists must sometimes learn prehistoric manufacturing techniques, occasionally by trial and error. This is called experimental archaeology.
3. Share the Background information.

**Procedure:**

1. The students read “The Paiutes Tie Their World Together.” Briefly discuss the importance of natural resources to the Paiute and their prehistoric ancestors.
2. Demonstrate how to make cordage with the commercial hemp fibers (steps 5–7 below); then divide the class into groups of 4 to 5 students. Give each student about 15" of fibers. Assist each group, asking students who readily learned the procedure to help other students.
3. To prepare the fibers, cut the purchased rope into 15" sections. Untwist the rope and pull the fibers straight. If using natural fibers, cut year-old dead stalks of milkweed or dogbane. Carefully break open the stalks and strip the fiber away. Gather the loose pieces of juniper or sagebrush bark from the woody portion of the plants. The removal of small pieces will not damage the plants. Use these natural fibers in the same way as the purchased rope.
4. To make cordage, first rub the hemp, bast fibers, or bark between both palms to remove debris. Separate two long strands of several fibers each from the 15" rope or plant section, starting from one end.
5. Hold one end of Strand A and one end of Strand B together, side-by-side, in your left hand between your forefinger and thumb (if right-handed, *vice-versa* if left-handed). Pick up Strand A between your right forefinger and thumb, and twirl the strand away from your body (clockwise), Step 1 on figure.

6. Take the twisted Strand A and bring it toward your body, *over and then under* Strand B, Step 2 on figure.
7. Hold strands A and B between your left forefinger and thumb about where you crossed A over B. Repeat the twirling and crossing sequence: pick up Strand B, twirl it away from your body, and cross it over and under Strand A.

8. Continue these steps. The twirling in one direction and crossing in another direction forms an interlocking pattern like that of machine-made rope. If the cordage looks all twisted in the same direction, then the locking twist is not taking place, and usually the strands are being twirled in the wrong direction.

9. Left-handed people will reverse the directions of twirling and crossing. They twirl the strands toward their bodies, and cross the strands under then over.

10. The process of making cordage is difficult to describe, and it sounds more complicated than it really is. Try it; it's surprisingly easy.

11. Distribute copies of the "Experimental Archaeology" activity sheet to each student or team. Project the "Experimental Archaeology" activity sheet. As a class, work through the first problem. Students complete the remaining problems working individually or in teams.

**Closure:**

1. Based on their experience with making cordage and the information in the reading, have the students share their impressions of what daily life of prehistoric people might have been like. In what ways might it have been similar to their own daily lives? In what ways was it different?

2. Tell the students that archaeologists have excavated an archaeological site and more than 100 pieces of cordage were found in it. The cordage artifacts were classified and described as follows (write the information on the board):

   **Category 1**
   - Material type: milkweed (or dogbane)
   - Average thickness: 3 millimeters in diameter
   - Average length: 105 centimeters
   - Number of pieces: 68

   **Category 2**
   - Material type: sagebrush bark (or juniper bark)
   - Average thickness: 6 millimeters
   - Average length: 32 centimeters
   - Number of pieces: 35

   Use scientific inquiry to study the two types of cordage.

3. Ask the question: Why is the sagebrush bark cordage thicker than the milkweed cordage? Brainstorm reasons such as: sagebrush is harder to work with, the sagebrush fibers are thicker.

4. Select one hypothesis. For example: Milkweed fiber is stronger than sagebrush bark fiber, so it doesn't need to be as thick as sagebrush bark cordage to be as strong.

5. Test this hypothesis by setting up an experiment to determine the relative strengths of cordage made from the two fibers. If you did not use the natural fibers to make cordage in the classroom, you can use different types of commercial string or yarn to design an experiment. For example, test the difference between cotton string and jute string.

6. Unless the milkweed cordage is poorly made it should be stronger than the sagebrush cordage. If the experiment determines that milkweed is stronger than sagebrush bark, ask the following question: Why is there more milkweed cordage than sagebrush cordage in the archaeological site? (Milkweed may have been chosen because of its strength. Availability of the two fibers and the purpose of the artifacts may also have been determining factors.)

**Evaluations:**

1. Evaluate students' efforts to make cordage.
2. Have students write a creative story or a report, make a chart, or construct a diorama about living in the Great Basin without modern technology. They need to include five things they would have to know how to do in order to live.
3. Evaluate the students' "Experimental Archaeology" activity sheets.

**Extensions:**

Extension 1. Research how such major technological changes as the acquisition of the horse and the development of farming as a way of life changed prehistoric cultures. Discuss examples from modern life such as automobiles and computers.

Extension 2. Demonstrate and/or display cordage in an Archaeology or Culture Fair.

Extension 3. Invent a modern use for cordage made from native plant fibers.
Links:
Section One, Lesson 6: “Classification and Attributes”

Section One, Lesson 7: “Scientific Inquiry”

References:


Experimental Archaeology Activity Sheet Answers

1. To answer the questions follow this general process for 10 meters of cordage
   a. Convert to centimeters
      100cm x 10m = 1,000 cm
   b. Set up the ratio
      10 / 25 = x / 1,000
   c. Solve for X
      25X = 10,000
      10,000 / 25 = 400 minutes
   d. Convert to hours and minutes
      400 + 60 = 6 hours 40 minutes

2. for 100 meters of cordage
   100cm x 100m = 10,000 cm
   10 / 25 = x / 10,000
   25X = 100,000
   100,000 / 25 = 4,000 minutes
   4,000 + 60 = 66.6 hours or 6 hours 40 minutes

3. for 10 meters of cordage
   100cm x 10m = 1,000 cm
   7 / 25 = x / 1,000
   25X = 7,000
   7,000 / 25 = 280 mins.
   280 + 60 = 4.6 hours or 4 hours 40 minutes

2. for 100 meters of cordage
   100cm x 100m = 10,000 cm
   7 / 25 = x / 10,000
   25X = 70,000
   70,000 / 25 = 2,800 minutes
   2,800 + 60 = 46.6 hours or 46 hours 40 minutes

3. conversion is not necessary
   1 / 2 = x / 50
   2x = 50
   50 + 2 = 25 stalks

4. 100 cm x 2 m = 200 cm
   10 / 25 = x / 200
   25x = 2,000
   2,000 + 25 = 80 minutes
   80 + 60 = 1.3 hours or 1 hour 20 minutes

5. First compute the number of square meters in the net.
   100 cm x 42 m = 4,200 cm
   4200 x 120 = 504,000 sq. cm.
   504,000 + 10,000 = 50,4 sq. m.

   Measure the approximate length of cordage in each square meter of the net. Multiply that amount by 50.4 the number of square meters in the net. If there are 3 meters of cordage in each square meter then there are 3x 50.4 = 151.2 meters of cordage in the entire net. Figuring 10 minutes per 25 centimeters of cordage, compute the amount of time required.

   100 cm x 151.2 m = 15,120 cm
   10 / 25 = X / 15,120
   25X = 151,200
   151,200 + 25 = 6048 minutes
   6048 + 60 = 100.8 hours
Experimental Archaeology

Name: ________________________

1. If it takes 10 minutes to make 25 centimeters of cordage, how long would it take to make 10 meters of cordage? 100 meters?

2. If you increased your speed from 10 minutes per 25 centimeters to 7 minutes per 25 centimeters, how long would it take to make 10 meters of cordage? 100 meters?

3. If it takes one milkweed stalk to make 2 meters of cordage, how many stalks would it take to make 50 meters?

4. It takes approximately 2 meters of cordage to make a snare to catch a small animal. How long would it take to make the cordage for the snare if you can make 25 centimeters in 10 minutes?

5. A cordage net measuring 42 meters by 120 centimeters was found at an archaeological site. How long do you think it took to make the net? How would you find out? (Outline the process).
THE PAIUTES TIE THEIR WORLD TOGETHER

Modern-day Paiutes are the descendants of people who lived in the Great Basin of the western U.S. for the past one thousand years. The Paiutes were very skilled and well-adapted to living in this region. They used tools made only from natural materials: bone, antler, sinew and hide from animals, plant fibers, clay, and stone. They were a hunting and gathering people who knew a lot about the Great Basin’s varied environments, seasons, and resources. In the fall, Paiute people gathered pine nuts in the pinyon forests of the Basin’s many mountain ranges. Springs and marshes provided fish, waterfowl, game, plant food, and building materials.

The Paiutes and their ancestors had to know where to find the things that they needed and at what time of year they were available. Stone that can be made into tools is found only in certain places. Large flocks of geese and ducks may live in the marshes for only a few weeks in the spring and fall. Many native plants that have tap roots (like carrots) are tasty and nutritious, but some are poisonous and it is difficult to tell the difference if one is not familiar with the plants. Specific knowledge of the environment was often a matter of life and death.

The Paiutes needed many tools to live in the Great Basin, but cordage was an especially important part of their lives. “Lacking nails, bolts, and screws the Paiutes tied their world together. They tied their wood and willows in bundles to carry them into camp; they tied small game onto their waist bands; they tied tules to make boats, and cattails to make houses; they tied babies in baskets, and arrowheads to shafts. They used cords in place of buttons and safety pins, to make traps, to catch fish and hang them to dry. In addition to the tough rope of cattails and sagebrush bark, they made strong string of sinew and human hair. They also used supple young willow withes for tying. But, the finest cordage of all was made of Indian hemp, or dogbane” (Wheat, 1967, p. 55). The Paiutes used many different kinds of fibers and each was suited to a specific purpose because of its special properties. They needed to know where and when to find each type of fiber, how to prepare the fibers, and how to make useful objects from them.

SECTION THREE

ISSUES IN ARCHAEOLOGY
INTRODUCTION

The lessons in this section provide opportunities for students to examine issues concerning archaeological resources and their protection. Although some of the issues are controversial, many teachers have successfully used lessons from Section Three with their students.

Kathleen Atkinson, Fourth Grade Teacher

"I was hesitant to do ethical/values-type lessons with my fourth graders. I thought that these types of activities might be too sophisticated for them, but I decided to try it and see what would happen. We had completed a unit on archaeology,... I chose to have them do Artifact Ethics from Section Three. I was amazed and pleased with their enthusiasm for the activity, and with the insights and conclusions they reached. They enjoyed the lesson and I think they appreciated being asked their opinions about a real issue they care about."

Laura R. Copeland, Junior High School Teacher

About Artifact Ethics, Section Three... "I love activities where there are no right or wrong answers... where every answer is just about as good as the other. In that way, students think more deeply about why they chose the answer that they did—not just because it was right or wrong. Everyone becomes a winner. This lesson is adaptable to many subjects where discussion of values is involved."

Deborah K. White, Sixth Grade Teacher

About Rock Art Three, Section Three: "I like doing things that shock them [the students], rather than dancing around the subject. This is a good opportunity. The only reservation I had was that I wanted them to fully understand why we did what we did before they left for the day. Everything worked just fine."
ARCHAEOLOGY AS A CAREER

Objective:
In their study of archaeology as a career, students will read essays and complete an activity to gain an understanding of and appreciation for the career of a professional archaeologist.

Materials:
Copies of the two essays for each student.

Background:
Archaeology is one of four sub-fields of anthropology. Anthropology is the study of humanity, in the broadest sense. Linguistic anthropologists study languages—how they change, how they are related to one another, and the relationship between culture and language. Cultural anthropologists study living groups of people. Physical anthropologists analyze the physical characteristics of human populations, and hominid evolution. Archaeologists study human cultures by analyzing material remains—artifacts and sites.

Anthropologists study human cultures and how they change. They seek to make general statements about human behavior. Anthropology addresses questions such as: In what ways does a culture change when people who were nomads become village-dwelling farmers? How does a technological invention, such as the automobile, change society? Is the passage through adolescence to adulthood less traumatic in some cultures than it is in others? Archaeology is the method anthropologists have of studying these kinds of questions through time. Archaeology is the laboratory of time, where human cultures, and how those cultures have changed, can be studied over thousands of years.

Archaeology is related to history in that both attempt to understand the past. The differences between history and archaeology center on the types of evidence used and, to some extent, the kinds of questions asked of that evidence. Historians rely mainly on written documents to study the past. They examine old courthouse records, newspapers, books, diaries, and letters, for example. Archaeologists study artifacts and sites—the things people used and the places where they used them.

Many people think that archaeologists study only ancient cultures, and that historians study only more recent events; yet historians do study the written records of the ancient Egyptians, which are over 5000 years old, and some archaeologists research the behavior of modern people by studying their garbage. In a nutshell, archaeology is a method of studying the past, even the past of 10 minutes ago, by researching material evidence—the things people used. History is a method of studying the past by researching written records.

In the United States, archaeologists earn degrees in Anthropology; but in some other countries, archaeology is considered to be its own discipline. A few colleges in the U.S. offer degrees in archaeology. Most practicing archaeologists have a Bachelor of Arts degree and a Master of Arts degree. Many archaeologists also have a Doctor of Philosophy degree, a necessity for becoming a university professor. Considerations for selecting a college or university include the kinds of programs offered there, the opportunities for fieldwork and internships, and the background and research interests of the faculty. At the undergraduate level, a broad anthropological background and an archaeological field school are most important. It is often advisable to seek employment in archaeology after completing
an undergraduate degree and before beginning a graduate program. Archaeology is such a diversified field of study that a refinement of research interests will help a person select the graduate school that best meets his or her needs.

Archaeologists can specialize in a wide range of topics. Some choose to work with museum collections. Others decide to specialize in one of the analytical techniques, such as pollen analysis, identifying animal bone and plant fragments, obsidian hydration dating, or geological sediment analysis. Some archaeologists specialize in a geographical area, like Peru or the Southwestern U.S. Underwater archaeology is another specialty. Fieldwork is a component of most archaeologists' work.

Employment opportunities in archaeology are primarily with colleges and universities, state and federal agencies, and private consultant firms. Cultural resource management is a branch of archaeology that grew out of legislation requiring state and federal agencies to consider the impact that a proposed development project, such as a pipeline or road, could have on prehistoric and historic sites. Governmental agency and consultant firm archaeologists as well as universities with an archaeology contracting division frequently do work on proposed development projects. Archaeologists pursuing research topics often receive funding by writing grant proposals.

Recently, there has been a surge of interest in involving the public in archaeology. Interpretation of sites, publications written for a general audience, tours, curriculum development, and children's activities are all a part of this new specialty, "archaeo-education."

Archaeology is a study that requires a broad understanding of many things—soils, plant and animal life, geology, surveying, chemistry, computers, statistics, and the social sciences, to name a few. People with interests in many fields will find an opportunity to integrate them in archaeology. Sometimes skills learned in archaeology will lead a person to new employment opportunities and career directions in related fields. Fieldwork in remote areas and foreign countries is another aspect of archaeology that many people enjoy. Also, archaeology is a career that is inviting to women. Nation-wide, nearly half of all people receiving degrees in Anthropology are women, and many become professional archaeologists.

Procedure:

This lesson can be used in a variety of ways. It can be a part of a careers fair or an element in a unit on archaeology. Some suggestions:

- Students research possible specialties in which an archaeologist might work. Also have them list the skills they think a person should have in order to work in that specialty.
- In small groups, students create a list of questions they would want to ask an archaeologist about his or her profession. They then arrange to interview an archaeologist.
- Students read the profiles of two archaeologists and write a short essay about why they will or will not consider a career in archaeology.
- Invite archaeologists working in a variety of specialties to speak to your class or be panel members discussing questions and issues identified by the students.
- Ask students to think of other fields of study that relate to archaeology. Conversely, ask them how they think being an archaeologist could provide a person with background in other fields.
- Either individually or as a small group project, students interview an archaeologist on the future of archaeology as a career.
PROFILE OF AN ARCHAEOLOGIST

WINSTON HURST

Winston Hurst lives in Blanding, Utah. He does research for various archaeological companies and teaches classes at the San Juan Center of the College of Eastern Utah. He is also a paid instructor on backpacking and horsepacking trips to areas of archaeological interest. Winston was born and raised in Blanding, Utah, and he is a graduate of San Juan High School. He earned his B.A. Degree in Archaeology from Brigham Young University and his M.A. Degree in Anthropology from Eastern New Mexico University.

How did you become interested in archaeology?
I was always fascinated with ancient things. By the time I was ten, my brother and I had a lab set up in a storage room and were pretending to be archaeologists. We spent a lot of time hiking around Blanding, exploring Indian ruins.

When did you decide to be an archaeologist?
In 1970, while serving in the Army during the Vietnam war, I spent a lot of time bored and reading. Some of the books were about archaeology and archaeologists. I realized then that some people really do archaeology for a living, and if they do, so could I. When I got out of the Army I enrolled in the archaeology program at BYU.

What kinds of archaeology jobs have you had?
I have worked on many surveys and excavation projects in Utah and New Mexico. For five years I was the curator at Edge of the Cedars Museum in Blanding.
What do you enjoy about being an archaeologist?
I enjoy having a wide range of knowledge about humankind and the natural world, and especially the Anasazi, the Utes, and the Navajos and their ancestors, as well as the history of my own ancestors. In the course of doing archaeological work, I enjoy being at times a photographer, a map maker, a soil scientist, a library researcher, a teacher, an artist and a writer. I like being paid to explore, and to study and read the land—being able to know that I’m standing in the remains of a house that was lived in 1200 years ago, or in a camp used during the late Ice Age, 10,000 years ago. I also like very much the way archaeology combines mental challenge with work in the outdoors, and being a part of the fight to save archaeological remains from being destroyed by selfish and short-sighted people.

What do you dislike about being an archaeologist?
I don’t like the long hours and low pay, never having quite enough funding to do the job as well as I would like, and putting in long hours for free to make up for it. I dislike conflicts with relatives who want to destroy ruins just to find artifacts, but who don’t want to learn why that is wrong.

Have you made any important discoveries?
During the 1970s I found and mapped almost 250 old Navajo and Ute sites around Blanding and added a whole new chapter to local written history that never before had been recorded. The most exciting thing for me recently has been the discovery of an ancient Anasazi road system in southeastern Utah.

What advice would you give a young person considering a career in archaeology?
Pay attention and learn everything—be like an information sponge. The great thing about archaeology is the way it combines all kinds of skills, from math to biology to art to computers to public speaking. Start early. Read a lot, and arrange to help work on archaeological projects. Do not start collecting artifacts on your own—that will not help you become an archaeologist; it will give you a bad reputation, and it is against the law.

What else would you like to tell people about archaeology?
The land is not just a big vacant lot that we can trash out and mess up without hurting anything. The land and the ancient remains on it are like a great book, the greatest of all books about the history of humanity. This book takes great patience and discipline to read, but it’s worth it because it contains vast knowledge that cannot be gotten anywhere else. It is also a very fragile book, and a lot of it has already been destroyed without ever being read. More is being destroyed every day. This should give everyone a feeling of sadness and anger and a desire to help stop this destruction.
PROFILE OF AN ARCHAEOLOGIST

DIANA CHRISTENSEN

Diana Christensen lives in St. George, Utah, and is the District Archaeologist for the Bureau of Land Management Arizona Strip District. Diana grew up in Bountiful, Utah, and graduated from Viewmont High School. She received an associate’s degree from Ricks College, Rexburg, Idaho, and earned her B.A. and M.A. degrees in Archaeology from Brigham Young University.

How did you become interested in archaeology?
I read a book on Tutankhamen, Egypt’s boy king, when I was in the sixth grade. I immediately wanted to become an Egyptologist. Over the years my interests expanded to include archaeology in general.

When did you decide to be an archaeologist?
When I was a junior in college, majoring in geology, I discovered that I loved taking archaeology classes and I really enjoyed fieldwork. I decided to follow what I really enjoyed, and changed my major to archaeology.

What kinds of archaeology jobs have you had?
I have worked for private consultant companies, a research firm, and state and federal government agencies. I have worked in Louisiana and Missouri, in Mexico and Guatemala, and all over the western United States, mostly doing survey and excavation work.
What do you enjoy about being an archaeologist?
The most enjoyable aspect of archaeology for me is working outside and exploring for unknown sites. Trying to figure out what people were doing at those sites is challenging and interesting, and I like that.

What do you dislike about being an archaeologist?
I dislike all of the paperwork you must keep track of and complete, such as site forms, maps, photos, and reports. However, it is necessary to leave good documentation of your work, so that others can make use of it too.

Have you made any important discoveries?
Not in the sense of making the front page of the newspaper; but in reality most of archaeology is not major “finds.” It’s dedicated slow work, fitting together many small pieces of information to come to an understanding about how past people lived. I feel I have contributed many of these pieces of information to our data base.

What advice would you give a young person considering a career in archaeology?
Take science, math and history courses in school. Apply for programs and opportunities you hear about in archaeology. I have found that many people don’t apply for programs because they don’t think they will be accepted. Don’t be one of these people—go for what you want. You may be surprised when you are accepted.

What else would you like to tell people about archaeology?
If you want to be an archaeologist, go for it! When I was studying archaeology at BYU, everyone, even my parents, advised me against it. They thought I would never get a job as an archaeologist. I am very glad that I didn’t listen. I love being an archaeologist!
ROCK ART ONE: AN INTRODUCTION

SUBJECTS: Science, social studies, language arts, art
SKILLS: Knowledge, comprehension, analysis, evaluation
STRATEGIES: Brainstorming, discussion, visualization, drawing, writing, observation
DURATION: 45 to 60 minutes
CLASS SIZE: Any

Objectives:
In their study of rock art students will use art materials, colored photographs, and rock art examples to:
1. Differentiate between symbol, petroglyph, pictograph, and rock art.
2. Interpret rock art to illustrate its importance in the cultural heritage of a people and as a tool for learning about the past.
3. Evaluate the importance of protecting rock art for study.

Materials:
Transparency or copy for each student of “Clear Creek Canyon Rock Art Panel,” and clay or plaster of paris slabs (prepared ahead of time), paper, paint or marker, paper clip. “Interpretation of Clear Creek Canyon Rock Art Panel” masters.

Vocabulary:
petroglyph: a design chiseled or chipped out of a rock surface.
pictograph: a design painted on a rock surface.
rock art: a general term for the pecking, incising, or painting of designs onto rock surfaces.
rock art panel: a group of pictograph and/or petroglyph figures.

symbol: a thing which represents something else.

Background:
Indian people throughout North America created rock art in prehistoric times. Its meaning is mysterious and at times controversial. Some people think that rock art is a type of storytelling. Others believe it depicts religious or spiritual beliefs, while still others regard it as solely an artistic expression.

North American rock art is not a true writing system which can be “read” like Egyptian hieroglyphics or a phonetic alphabet, although some rock art specialists attempt to decode rock art symbols. Archaeologists analyze rock art figures and patterns, and frequently find that different cultural groups made different styles of rock art. Other rock art researchers analyze stories and information from Indian people to draw conclusions about rock art.

Some Indian tribes have oral traditions about rock art and its meaning. Many Indian people believe that the spirit of the makers resides in what they have created; therefore, rock art is living, and it has a spirit. Whatever our responses to, or interpretations of rock art may be, it stimulates our thoughts and imaginations and expands our awareness of cultural expressions. Rock art can mean something different to each person who ponders it.
Setting the Stage:

1. Brainstorm examples of symbols meaningful to us today.
2. Give each student a piece of paper, a marker or paint, clay or plaster of paris slab and a paper clip. Ask them to flatten the clay into a slab and imagine that it or the plaster of paris slab and the paper are rock walls. Ask them to imagine they are living 1,000 years ago. Have them carve a symbol of their culture into the clay or plaster of paris (rock) with the paper clip. Have them paint or draw this same symbol on the paper.
3. Show the students the words "pictograph" and "petroglyph." Ask them to determine which word fits which method of rock design and give reasons for their answers. Verify the correct answer and explain that both design methods are classified as rock art. Or, give them the definitions of the root words prior to determining the correct definitions:
   picto = to paint (Latin)
   graph = to write (Greek)
   petro = rock (Latin)
   glyph = carved work (Greek)

Procedure:

1. Project the "Clear Creek Canyon Rock Art Panel" transparency. Explain that this rock art panel was created by the prehistoric people of Utah.
2. Use the following questions to analyze the rock art panel:
   a. What words might you use to describe the symbols on this page?
   b. Why do you think people created these designs?
   c. If there is a message in these designs, what do you think it is?
   d. Specifically, what might the message be in the symbol labeled with a, b, c? Using the "Interpretation" activity sheet share the four American Indian interpretations of this symbol. (Note: The letters are not part of the original art work.)
3. In what ways might rock art be important to archaeologists' study of ancient people?
4. How might vandalism to rock art create problems for the archaeologist? for the descendents of the prehistoric rock artists? for all of us?

Closure:

In summary, why is the preservation of rock art important?

Evaluation:

Instead of answering the last question as a group, require students to answer it individually in a story, poem, essay, advertisement or song.
Clear Creek Canyon Rock Art Panel
Interpretation of Figure in Clear Creek Canyon
Rock Art Panel, Central Utah

Levan Martineau, hired by the Paiute tribe of Utah to interpret Clear Creek Canyon rock art.

Martineau thinks this is part of a larger story of the emergence from the underworld.

a. The clan sign of the Badger clan. Badger was involved in and recorded the emergence story.

b. The river reed which the people of the underworld crawled through to get to this world.

c. A god-like figure who is part of the emergence story.

Indian Joe (Joseph J. Pickyavit), Ute Indian.

Pickyavit thinks that this figure was left by the “Pueblo Indians” whom he said once lived in Clear Creek Canyon. He feels this figure deals with making rain.

a. Rain cloud making rain.

b. Lightning bolt making lightning with the rain storm.

c. Medicine man with good powers in a rain sing (ceremony to bring rain).

Wil Numkena, Hopi Indian and Director, Utah Division of Indian Affairs.

Numkena thinks this figure deals with the emergence into the fourth world.

a. Seed sack that contains the seeds used by the chipmunk to grow a plant for the people, which they used to climb out of the underworld.

b. The spruce or pine tree which they climbed to get out of the third or underworld.

c. A two-horned priest of the higher order of the priesthood and keeper of the oral traditions and the stories of the fourth world.

Kenneth Smith, Navajo Indian and early worker at Fremont Indian State Park.

Smith thinks this figure was part of a fertility ceremony.

a. This was the sack of seeds widely planted.

b. This was a stalk of corn; corn was the most important food source for the people.

c. This was some type of god of fertility or germination who helps the crops and plants to germinate and grow.

(Provided through the courtesy of Gordon Topham, Fremont Indian State Park, Clear Creek Canyon, Utah.)
ROCK ART TWO: CREATING YOUR OWN

SUBJECTS: Science, art
SKILL: Synthesis
STRATEGIES: Visualization, drawing
DURATION: 30 to 45 minutes
CLASS SIZE: Any

Objectives:
In their study of rock art, the students will use regional rock art symbols or their own symbols to:
1. Create a petroglyph replica.
2. Cooperatively create a “rock art panel.”

Materials:
Brown construction paper, a roll of brown butcher paper, a box of cotton swabs, one cup of chlorine bleach diluted with an equal amount of water, small paper or plastic cups, “Rock Art Symbols” master displayed on the overhead projector or a copy for each student.

Setting the Stage:
Distribute a copy of the “Rock Art Symbols” master or display on the overhead projector. Give students time to observe and talk with each other about the symbols.

Procedure:
1. Explain to students that they will be using symbols to make an artwork which resembles petroglyphs. They will also contribute to a “rock art panel.” They may use the symbols from the “Rock Art” master for their artwork, or they may create their own.
2. Give each student a piece of brown construction paper and a cotton swab. The art is created by dipping the cotton swab in bleach mixed with an equal amount of water and rubbing the wet cotton swab on the paper to form the desired design. Demonstrate the process, emphasizing to students that they must be very careful not to touch anything but the paper with their cotton swab. Place a jar lid with a small amount of bleach in the center of the work table or carry a small cup of bleach to each student and have them dip their cotton swab. They should only need one or two dips for the activity.
3. Lay the roll of brown butcher paper on a table or floor. Divide the class into groups no larger than 10 students. An adult aide for each group would be helpful. Alternatively, have only one group at a time do the activity.

Background:
Rock art “...occurs in caves, on cliff walls, or on boulders. Rock art occurs all over the world, in virtually every culture, and surviving examples are known to be as old as 30,000 years, from the time of the last Ice Age. In modern America, the most common kind of ‘rock’ art is that which is painted on the concrete and brick walls of the artificial canyons of our cities and on bridge abutments and rock faces along our highways. In modern American culture, as in all cultures, it expresses the values, attitudes, beliefs, and desires of the society” (Hurst and Pachak, 1989, p. 1).
4. After students have completed their own "petroglyph" they take turns making figures on the large piece of butcher paper. Space students a few feet apart, and have small groups work at a time. Exhibit the "rock art panel" in the classroom or hallway. The panel is used for an activity in Rock Art Three.

 Closure:
Have students share the meanings of their rock art.

References:
Rock Art Symbols
ROCK ART THREE: PROTECTING OUR PAST

SUBJECTS: Social studies, language arts
SKILLS: Analysis, synthesis, evaluation
STRATEGIES: Observation, discussion, values clarification, brainstorming, decision making, problem solving, writing, drawing, invention, communication
DURATION: One to three 45-minute periods
CLASS SIZE: Any; work groups of 3 to 4

Objectives:
In their study of rock art, students will use a replica of a vandalized rock art panel to:
1. Examine their feelings about rock art vandalism.
2. Discuss ways to protect rock art and other archaeological sites.
3. Evaluate the Archaeological Resources Protection Act.
4. Develop an educational campaign.

Materials:
"Rock Art Panel" created in Lesson 19: "Rock Art Two: Creating Your Own"; photograph of vandalized rock art; copies of the "Federal Laws Protecting Archaeological Resources" and "Protecting Rock Art" masters for each student or team. (Optional—copies of your state laws protecting archaeological and historic sites; available from your State Historic Preservation Office.)

Vocabulary:
deface: spoiling or marring the surface or appearance of something.
vandalism: willfully or maliciously defacing or destroying public or private property.

Background:
America is fortunate to have many fine examples of rock art, and a rich archaeological heritage. Our past, however, is threatened by people who collect artifacts and dig sites as well as by those who vandalize rock art panels.
Collecting artifacts, digging sites, and defacing rock art and ruins has several harmful results. First of all, it destroys data, the evidence of people who lived here before us. Sites are very fragile, and one person with a shovel and ten minutes of time can destroy hundreds of years of prehistory. We and the generations of tomorrow are being robbed of the chance to learn about America's past.
Secondly, disturbing and vandalizing sites attacks the cultural heritage of Native Americans. These sites are the burial grounds, homes and sacred places of their ancestors. Archaeological sites can represent part of their spiritual and cultural legacy. To destroy or deface these places can be the equivalent to someone vandalizing your home, church, or cemetery.

Finally, people who vandalize and destroy sites steal from all of us the opportunity to appreciate and understand other cultures. It is a personally enriching experience to gain a perspective on one's life and time by understanding how and where we fit in the human history of this land.

Setting the Stage:
1. The purpose of the first part of this activity is to cause students to react to their “rock art panel” being defaced or threatened. You need to decide the best approach for your students. If the students are mature and if they will not think that school is an unsafe place, then anonymously deface the “rock art panel” by painting words over it. Say nothing to the students, but when they begin to talk about it, start the activity. Alternatively, bring the rock art panel into the classroom and, holding a can of spray paint or a marker, ask “How would you feel if I were to write my name over the rock art panel you created? Would that harm it?” Connect their feelings about their rock art being damaged to how Native Americans, archaeologists, and the public might feel when they see vandalized sites.
2. Show students a picture of defaced rock art, preferably one from your own state. Alternatively, show them the photo of vandalized rock art in Buckhorn Wash, Central Utah (next page). Ask them how they feel about the vandalism of these ancient and irreplaceable rock art panels, and what they think should be done about it. It is important to move students beyond the “witchhunt,” that is, trying to discover and punish the person who did the damage. Ask students to think of solutions for repairing the damage and preventing vandalism from happening in the future.
3. Distribute “Protecting the Past.” Have the students read this page in preparation for creating an educational campaign.

Procedure:
1. Inform the students about the problem of people vandalizing archaeological sites, including rock art panels, ruins, cave sites, and historic buildings. Explain that vandalism includes a range of behavior, from picking up arrowheads to mining sites with a bulldozer.
2. Ask students to brainstorm: What are the harmful results of vandalism? They can brainstorm in the following categories: destruction of data, destruction of cultural heritage, destruction of historical appreciation; or they can be given the categories after brainstorming. (See “Background” for ideas to add to students’ list.)
3. Distribute or project “Federal Laws Protecting Archaeological Resources.” Review the ARPA and its penalties, and your state’s laws that protect archaeological resources.
4. Assist students in creating a pamphlet, a radio announcement, poster, advertisement, etc. that will communicate to others the importance of protecting archaeological resources. They should include a description of the ARPA, and might also include some of the ideas from “Protecting Rock Art.”

Closure:
Students’ products could be shared at visitor centers, libraries, a PTA meeting, a teacher convention booth or a school archaeology fair.

Evaluation:
Evaluate the students’ products.

Extension:
Ask students to propose an improvement to the ARPA. As a class project, have students prepare their ideal law to protect archaeological sites.

Links:
Section Three, Lesson 22: “Artifact Ethics”
Section Three, Lesson 28: “Take Action—Save the Past”
Vandalized rock art, Buckhorn Wash, Emery County, Utah. Photograph by Stephen F. Poreda.
FEDERAL LAWS PROTECTING ARCHAEOLOGICAL RESOURCES

Federal laws provide for severe penalties to those who disturb and destroy sites more than 100 years old. The Archaeological Resources Protection Act (ARPA) was passed in 1979, and prohibits unauthorized digging and collecting of archaeological resources, including pottery, basketry, bottles, sites with coins or arrowheads, tools, structures, pithouses, rock art, graves and human skeletons. No person may sell or buy any archaeological resource which was illegally acquired. Penalties for those convicted of violating ARPA are:

1. First Offense: a person who breaks this law for the first time may be fined $100,000 and spend one year in jail. If the cost of repairing the damage exceeds $500, the offender may receive a fine of $250,000 and spend two years in jail.

2. Second Offense: a person who breaks this law for the second time may be fined $250,000 and spend five years in jail.

3. Vehicles and other equipment used in breaking this law may be confiscated.

ARPA provides for REWARDS to people who supply information leading to the arrest and conviction of ARPA violators.

ARPA applies to all public lands, including those administered by the U.S. Forest Service, Bureau of Land Management, the military, Fish and Wildlife Service, the National Park Service, and the Bureau of Reclamation.

Statutes similar to ARPA have been passed by several states. Contact the State Historic Preservation Office to learn what the laws are in your state.

Some people who dig in sites are engaged in an illegal market activity, are armed with weapons, and should be considered dangerous. Never approach someone you see digging in sites or collecting artifacts. Instead, record information about them—their physical description, what they were seen doing, the license number of their vehicle—and immediately report them to a local law enforcement agency.

People enjoying recreation in the out-of-doors occasionally find archaeological sites, and wonder what they should do. Always leave artifacts where they are found, including small surface finds such as potsherds and stone flakes. Discoveries of rare or remarkable artifacts and sites should be reported to the land managing agency, or, in the case of private lands, to a local agency archaeologist or the State Historic Preservation Office.
Protecting The Past: Things Not To Do

1. Touching rock art with your hand can harm it.

2. Making paper rubbings or tracings may crumble the rock art.

3. Making latex molds of rock art should only be done by professionals if the rock art is going to be destroyed by construction or development.

4. Building fires nearby can cause serious damage from smoke and high temperature.

5. Taking it home. Some selfish people steal rock art by using rock saws and chisels.

6. Chalking is harmful to the rock art, and makes it impossible to use new methods of dating the figures.

7. Re-pecking or re-painting a difficult-to-see image doesn’t restore it, but rather destroys the original.

8. Defacement. Insensitive people often paint their names over rock art, or shoot bullets at it. Defacement is a sign of disrespect for other cultures.

9. Tunnel vision. People like rock art so much, they often forget to watch where they are walking and may trample or damage important artifacts.

10. Removal or rearrangement of artifacts destroys archaeological data. Artifacts should be left where they are found. While it is okay to pick up and look at most artifacts, you should not make piles of artifacts at the site or take them home.

11. Disturbance of the ground. Any digging at an archaeological site is not allowed. Even too many visitors walking around may damage an archaeological site. Visitors should tread as lightly as possible, especially on loose slopes and under rock overhangs. Driving off of designated roads may also damage archaeological sites.

(Adapted from Hurst and Pachak, 1989, pp. 25-26).