Archaeology and the Environment: Hunters, Gatherers, & Seasonality

New Lessons for New Mexico Project Archaeology

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Project Goals

The activities in these lessons make a link between human use of the environment and how archaeologists use archaeological evidence and environmental indicators to reconstruct the past. In the lessons, students compare present-day food-procurement strategies with those of past hunter-gatherer societies, examine food availability based on seasonality and environment, and analyze archaeological data to determine subsistence practices at an Archaic time period campsite.

Using These Lessons

These lessons have been prepared for use by educators who have taken workshops through the New Mexico Project Archaeology program. The workshops and the basic lessons in *Intrigue of the Past: A Teacher's Activity Guide for Fourth through Seventh Grades* and *Discovering Archaeology in New Mexico* serve as the background for these four new lessons. With minimal adaptation, Project Archaeology participants from other states may be able to use the lessons as well.

The four lessons in this unit are meant to be used in order. Each lesson relies on the information from previous lessons as background. If used out of order or if activities are skipped, students will be missing critical information necessary for mastering skills and achieving higher levels of critical thinking.

While these lessons primarily focus on the Archaic time period, the hunting-and-gathering lifestyle did not end with the advent of agriculture. It is important that students read *Discovering Archaeology in New Mexico,* Chapters 1 and 2, which cover the Paleoindian and Archaic time periods, as background and Chapter 8, on the Athapaskan Peoples. Vocabulary words are highlighted and defined in the text and sidebars. This background reading consists of 17 pages.

Relation to Project Archaeology Materials

These activities relate to many of the lessons in both *Intrigue of the Past: A Teacher's Activity Guide for Fourth through Seventh Grades* and *Discovering Archaeology in New Mexico*. It is recommended that you use the first eight lessons from *Intrigue* to create a base of knowledge for all other lessons. Specific lessons from Section Two that relate to the information presented here are "Gridding a Site" (Lesson 9), "Artifact Classification" (Lesson 11), "Archaeology and Tree-Ring Dating" (Lesson 12), and "Pollen Analysis" (Lesson 13). From *Discovering Archaeology in New Mexico,* "Times Past" (Lesson 1), "The Spear and the Atlatl" (Lesson 2), and "Let's Eat!" (Lesson 3) relate to the lessons presented here. Also important is the lesson on macrobotanical analysis published in *Project Archaeology: Intrigue of the Past* for New Mexico, Issue Nine, April 1999.

Relation to Educational Standards

In line with other Project Archaeology materials, all lessons are correlated to related subjects, skills, and strategies. Objectives are linked to Bloom's Taxonomy of Educational Objectives. Activities in the lesson are linked to the New Mexico State Department of Education Standards and Benchmarks (Appendix).

Initiating the Unit and Evaluating Student Progress

Prior to initiating this unit, students are to create an "archaeology and the environment" journal. It will contain all notes, forms, drawings, examples, and thoughts. The journal is used to assess student progress and is turned in at the end of the unit for final evaluation. Begin the unit by having students design a folder (one that holds 3-hole-punched paper) with environmental designs, plants, and animals from your area. They might want to draw pictures or use magazine cutouts. Each journal should have the student's name and unit title.

Sponsorship

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Acknowledgments

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Lesson 1
Now and Then

Subjects: social studies, science, language arts, mathematics
Skills: knowledge, comprehension, application, analysis
Strategies: analogy, brainstorming, categorizing, classifying, communication, compare and contrast, computation, discussion, observation
NM Standards and Benchmarks (5–8): see Appendix
Duration: 2 class periods, 45 minutes to 1 hour each
Class size: Any; individual and whole class activities

Related Lessons:
Intrigue of the Past:, Lesson 2, Culture Everywhere. *Discovering Archaeology in New Mexico*: Lesson 1, Times Past

Objectives:
Students will collect and list information on the availability of different types of produce, compare and contrast the relationship between where the crops are grown and the cost to the consumer, discuss resource availability among nomadic hunters and gatherers, and hypothesize how food was processed and stored.

Materials:
Produce and Grain Forms, student journals

Vocabulary:
seasonal round: A hunting-and-gathering way of life in which people follow the seasons, using the different environmental zones to hunt and gather foods and materials needed for survival. The same areas are revisited each year, and frequently, the same camps are used.

Background:
Refer to *Discovering Archaeology in New Mexico,* Chapters 1, 2, and 8, and the *Project Archaeology: Intrigue of the Past* newsletter, Issue Six, September 1997, "A General Chronology of New Mexico."

Setting the Stage:
Have children write down or draw in their journals what they ate for breakfast or their favorite breakfast meal. Then discuss. Where did those items come from before they appeared in the grocery store? Were they grown locally, trucked in from another state, or maybe even imported from somewhere else in the world? Were they fresh, frozen, processed, or stored?

Note: *Unless you want to take the class on a field trip to a grocery store, a homework assignment forms the basis for the classroom activity.*

Procedure:
Distribute the Produce Form and Grain Form provided with this lesson. For the Produce Form, instruct students that they are to write down a type of produce in the first column, the country or state where it was grown in the second, and the price per pound in the last. Often, information on where the food was grown is on the sticker or on the crate that the fruit and vegetables were shipped in. Students may have to interview produce handlers to get this information. To fill out the Grain Form, students collect the information from bags of the grains. Ideally, kids can accompany a parent or guardian on a trip to the grocery store to obtain this information.

Copy the format of the Produce Form and Grain Form either as overhead transparencies or as grids on the blackboard. Make a list of produce, places of origin, and costs based on student information. Discuss the current season and temperatures outside and what foods can be harvested locally. For the grains, discuss serving size and that dried beans and grains (carbohydrates) fill you up and stick with you longer for slow-burning energy. Discuss what foods could be easily stored throughout the year. Introduce the concept of a seasonal round.

Brainstorm ideas and have students write down their thoughts in their journals. What environmental zones do you see outside the window? Can you see desert, grasslands, or mountains? What zones are depicted on a state or regional map? Where would people have followed a seasonal round in the local area? What resources might have been available at different elevations, close to rivers, or in the foothills, deserts, or grasslands?

Closure:
Compare and contrast the foods we eat and how we get them with the foods of early nomadic peoples. Did people have the same dietary needs? How would a lack of proper nutrition affect life span, growth, and development?

Evaluation:
Evaluation is based on participation in discussions and completion of worksheets.

PRODUCE FORM

NAME _____ DATE _____

What season is it now? (Circle one) Summer Fall Winter Spring

TYPE OF PRODUCE	WHERE WAS IT GROWN? and WHAT SEASON IS IT THERE? (Northern and southern hemispheres are opposite.)	COST EACH or COST PER POUND
EXAMPLE asparagus	Mexico Northern hemisphere winter	$3.98 per pound

GRAIN FORM

NAME _____ DATE _____

GRAIN	SERVING SIZE	COST PER POUND	COST PER SERVING *(Divide the cost per pound by the number of servings)*
RICE			
BARLEY			
POPCORN			
DRY RED BEANS OR PINTO BEANS			
AMARANTH			

What is the relationship between how far away the plant is grown and its cost?

What is the relationship between seasonal availability and cost?

What foods could be stored for future use?

How would you preserve them?

What container would be used to hold the foods?

Lesson 2
Wild Things, Puzzle of the Past

Subjects: social studies, science, language arts
Skills: knowledge, comprehension, application, analysis, synthesis
Strategies: composing, reading, writing
NM Standards and Benchmarks (5–8): see Appendix
Duration: 2 class periods, 45 minutes each
Class size: Any; individual activities

Objectives:
Students will read an essay, develop a vocabulary list, use the information to complete the crossword puzzle and/or word search, and then use the vocabulary to create their own essay.

Materials:
Information provided with lesson, journals, one copy of the crossword puzzle and/or word search per student, dictionaries

Vocabulary:
Words in essay

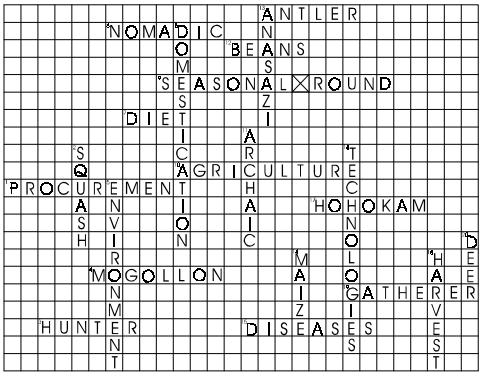
Procedure:
Hand out the essay "Wild Things: Puzzle of the Past" for students to read. As students read the essay, they should make a list in their journals of the words that are highlighted and write tentative meanings based on the context of the words used in the essay. The words that are highlighted in the essay are the same words used in the puzzle and word search. They are also words that will be encountered throughout the unit and will be used by the students when writing up their findings in the final activity.

In addition to the highlighted words, there are four words in the puzzles that are not in the story. These are "deer," "antler," "season," and "harvest." These words are clues to the final lesson on seasonality and subsistence. Students should write down the four words in their notebooks. Other clues will be presented in other lessons to help students understand the purpose of the unit in general and the final lesson.

Closure:
Students write an essay using at least 12 of the words from the puzzle to demonstrate understanding of the meaning of the words. Include all projects in journal.

Evaluation:
Evaluation is based on completion of the vocabulary list, puzzle, word search, and essay.

Crossword Key:



Word Search Key:

Wild Things
Puzzle of the Past

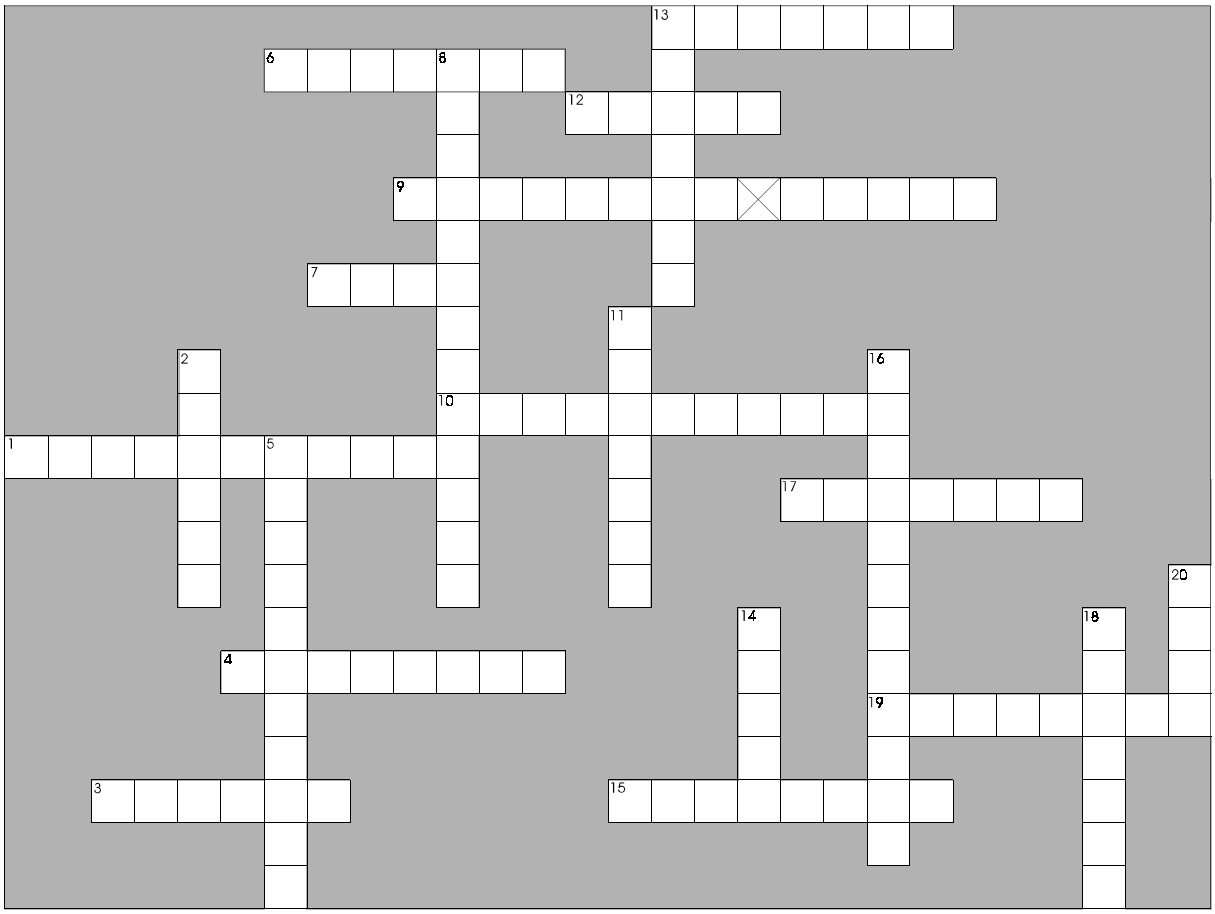
Today, we purchase most of our foods from grocery stores. We can eat tomatoes, grapes, bananas, and even corn on the cob all year round. But where does the food come from? Grocery stores obtain produce from various suppliers around the world. Without too much trouble, we can eat seafood and fish from an ocean hundreds of miles away, apples from Washington State, peaches from Georgia, chicken from Arkansas, asparagus from Mexico, and kiwis from Australia. Most items are available year-round. Somewhere in the world, it is harvest time. The vast majority of plant foods we eat today are grown in orchards and fields. Animals are raised on farms, ranches, and in feedlots. We no longer must rely on wild plants and animals to survive.

People lived on this continent at least 8,000 years prior to the introduction of **agriculture**. Even with the introduction of the **domestication** of **maize**, **beans**, and **squash**, some cultures chose to maintain a **nomadic hunter-gatherer** lifestyle. Agriculturally based societies, such as the **Hohokam**, **Anasazi**, and **Mogollon** in the areas now known as Arizona and New Mexico, grew out of the nomadic **Archaic** hunter-gatherer tradition. Even the Hohokam, Anasazi, and Mogollon, while living in large winter villages and farming, maintained their pattern of seasonal plant and animal **procurement**. The archaeological sites that were once their temporary camps dot the landscape.

A hunter-gatherer diet includes a wide variety of plants and animals obtained from different parts of the environment during different seasons of the year. The pattern of wandering to obtain food is called a **seasonal round**. It is not random. Prehistoric people knew exactly where they were going and what they were after. To gather the food required for their day-to-day existence and to store some for later use, people had to think ahead and use their knowledge of the seasons and the **environment**. They also had to have the **technologies** for creating the tools they needed to capture, kill, and process game and to gather, process, and store wild plants. Knowledge of a region and what it offered was vital to the survival of nomadic people.

A group's **diet** was restricted by what was readily available from the surrounding environment. It was important to eat food from all the food groups that provide the protein, fiber, minerals, and vitamins necessary to thrive and grow. Along the Rio Grande and up into the mountains, people harvested everything from cattails and watercress to piñon nuts and cactus fruit. People have always had the same nutritional needs. Not eating meat and a wide variety of fruits, grains, and vegetables caused many people to suffer nutritional **diseases** related to poor diets. Today, we can go to grocery stores and purchase foods throughout the year or even take vitamin supplements. In the past, people had to rely on what was available in nature.

NAME _____ DATE _____



ACROSS

1 The process of gathering and bringing together.

3 The person who brings home the meat.

4 Prehistoric peoples of western and southern New Mexico.

6 People who wander are _____.

7 We need to eat a balanced ____.

9 Follow summer, fall, winter, spring to different places to get food.

10 The science of farming.

12 Kidney, black, pinto, Anasazi.

13 They grow on the top of the deer's head.

15 Measles, chicken pox, influenza.

17 Prehistoric people who lived in the Sonoran Desert of southern Arizona.

19 The person who brings home wild plants.

DOWN

2 Pumpkins, zucchini, summer, acorn.

5 The plants, animals, geology, and air all around make up the _____.

8 The process of making "wild" into "tame" under the care of people.

11 The time after Paleoindians and before the Hohokam, Anasazi, and Mogollon.

13 Prehistoric peoples of northern New Mexico and the Four Corners area.

14 Another word for corn.

16 Tools, shelter, and other means of survival.

18 The time of gathering plants in the fall.

20 Doe a ____.

WORD SEARCH

Name _____ Date _____

W O C B A T Q Y S E I G O L O N H C E T I
A M O G O L L O N G S D F G H J O K L P A
S D F G H J K L Z A X D I E T V H B N R M
Q E W E P A H U N T E R M S F G O H C J K
L Z A X C R N C B H N M Q W E R K H T D Y
E I O S P A O S D E I Z A S A N A F G E H
R K L Z O X I C C R V B N M Q I M E R E T
U U I O P N T A U E S D F G C H J K L R Z
T C V B N O A M Q R W E R T Y U I O O P A
L S D F G H C H J K E N V I R O N M E N T
U E Z X C V I N M Q W M E E R T Y A U H I
C S H J A N T L E R S K E L A E T I I A O
I A D S A M S N B V C X S N A E B Z W R Q
R E O I U Y E T R R E W Q L T K J E G V F
G S C I D A M O N S Q U A S H T T R Y E D
A I F G H J O K L P O I U Y T R E W Q S L
K D J H G F D N U O R L A N O S A E S T D

Words are hidden right to left, left to right, top to bottom, bottom to top, or on an angle from top to bottom or bottom to top.

WORDS

AGRICULTURE, ANTLERS, ARCHAIC, ANASAZI, BEANS, DEER, DIET, DISEASES, DOMESTICATION, ENVIRONMENT, GATHERER, HARVEST, HOHOKAM, HUNTER, MAIZE, MOGOLLON, NOMADIC, PROCUREMENT, SEASON, SEASONAL ROUND, SQUASH, TECHNOLOGIES

Lesson 3
The Seasonal Round

Subjects: social studies, science, language arts, math, art
Skills: knowledge, comprehension, application, analysis, synthesis, evaluation
Strategies: analogy, categorizing, classifying, communication, compare and contrast, computation, discussion, drawing, reading, sequencing, writing
NM Standards and Benchmarks (5–8): see Appendix
Duration: 2–3 class periods, 45 minutes each
Class size: Any; individual and group activities

Related Lesson:
Discovering Archaeology in New Mexico:
Lesson 3, Let's Eat

Objectives:
Students will research, draw, and describe a specific plant from an environmental zone; categorize data by seasonal availability, food group, and use; and predict the amount of stored food stuffs that would have been needed to survive the winter.

Materials:
3-×-5" cards in 4 colors (each environmental zone will be a specific color); one 3-×-3' sheet of bulletin-board paper; transparent tape; stopwatch; journals; 1-lb. bag of brown rice; two ¼ teaspoons; and one brown paper lunch bag; if available, examples of acorns, walnuts, amaranth, prickly pear cactus pads (*nopalitos*), rice grass plant and seeds.

Vocabulary:
No new vocabulary

Setting the Stage:
Discuss the environmental zone in which the school is located. Post or hand out the list of plants available within each environmental zone. Discuss the plants and the parts ingested by people. Discuss what can be stored for use (nuts, grains, cactus buds) and what must be used fresh (some fruits and greens).

Procedure:
Part 1. Divide the class into four groups, one for each of the environmental zones. Hand out the seasonal-round chart, a list of the environmental zones and usable plants, and a set of same-color 3-×-5" cards to each group. Each group will list the plants for their environmental zone on the seasonal-round graph. Each student will then pick one plant to research. The information should be written on one side of a 3-×-5" note card and a scientific drawing of the plant goes on the other. Information should include common and scientific name of the plant, location of where it grows within its environmental zone, a description of the plant, and information on uses or dangers associated with the plant.

When complete, the cards are laid out on a table or taped to the bulletin board by season and grouped by environmental zone. Discuss what a group of people would have to do to take advantage of all of the resources in all of the zones in order to eat fresh foods and obtain enough for storage through the winter and early spring. (Introduce the concept of groups splitting up to locate resources, and coming together to trade and share.)

Part 2. Calculating winter storage. Tape a 3'-square piece of bulletin-board paper to the floor. Pour the contents of a 1-lb. bag of brown rice onto the paper. Spread the rice evenly across the 3' square. Divide the group into two groups, and line the two groups up at opposing sides of the paper. Two students at a time will each use a ¼ teaspoon to scoop up rice and pour it into a single paper lunch bag. Alternatively, fingers can be used to pick up rice. If this method is used, students should use their thumb, first, and second fingers in a pinching or picking motion to pick up the rice. The teacher times each pair for 30 seconds. Students should count the

number of spoonfuls they put into the bag and mark them on a piece of paper or the board.

Find the average number of spoonfuls or pinches gathered per minute. To find minutes, take the total number of students times 30 seconds, divided by 60 to find minutes. Add the number of spoonfuls or pinches of rice gathered. Divide this number by the number of minutes to find out how many spoonfuls or pinches were gathered per minute.

Note the average serving size on a bag of rice (¼ cup) and calculate the number of servings per bag of dry, uncooked rice. How many teaspoons in a ¼-cup serving? Calculate the number of servings that the class gathered in the paper bag. How long did it take to gather this number of servings? Have all students write the answers on a page in their journals.

Story Problem:
There are 12 people in the group of hunters and gathers. If people ate one ¼-cup serving per day over the course of the winter and spring (5 months, November through March [calculate the number of days]), how many cups of rice would they need to store from the harvest? How much would it weigh? Using your classroom calculations, how long would it take them to gather the rice? How many 8-hour days?

Closure:
Discuss
Q: Was there a difference in the amount of rice gathered by students in the beginning vs. at the end of the gathering time?
A: The collection of rice should have slowed as the availability of rice across the paper decreased. This relates to the potential drop in resources due to overuse of an area or natural impacts.

Q: Would a similar phenomenon occur when gathering seeds in the wild?
A: Late in the season or if an area has been overused, the harvest will be limited. If entire plants are harvested, the people may have to wait several years before being able to gather those resources again.

Q: How would food gathering and storage capabilities limit the size of a group of hunters and gatherers?
A: Plant resources might support a small group but not a large group. Extra people would have to leave the group or all would suffer, or the group would have to move around from area to area more quickly. Taking time to make containers for long-term storage would take away from time available for food gathering. When would be the best time to make storage containers? (During months when few plant resources would be available.) Where would the new storage containers be stored? Prior to the use of pottery, prehistoric peoples used baskets for storage and cooking. Before you gathered the seeds, you would have had to make the container.

Evaluation:
Evaluation is based on completion of cards, accomplishment of group and individual tasks, completion of seasonal-round exercise, completion of math, and journal entries.

Mountain Zone

	SPRING	SUMMER	FALL	WINTER	ALL YEAR
Ponderosa pine					inner bark
Oak			nuts		
Yucca	flowers	fruit			
Cactus	buds	fruit	fruit		pads
Gooseberries		fruit	fruit		
Wild strawberries		fruit	fruit		
Wild rose			hips		
Choke cherries		fruit	fruit		

Piñon-Juniper Zone

	SPRING	SUMMER	FALL	WINTER	ALL YEAR
Piñon pine			nuts		
Oak			nuts		
Juniper		berries	berries	berries	
Three-leaf sumac		berries	berries		
Yucca	flowers	fruit			
Cactus	buds	fruit	fruit		pads
Goosefoot	greens	seeds	seeds		
Amaranth	greens	seeds	seeds		
Dropseed grass		seeds	seeds		
Rice grass		seeds			
Wild onion	greens/bulbs	greens/bulbs			
Coyote gourd			seeds	seeds	

Desert Grassland Zone

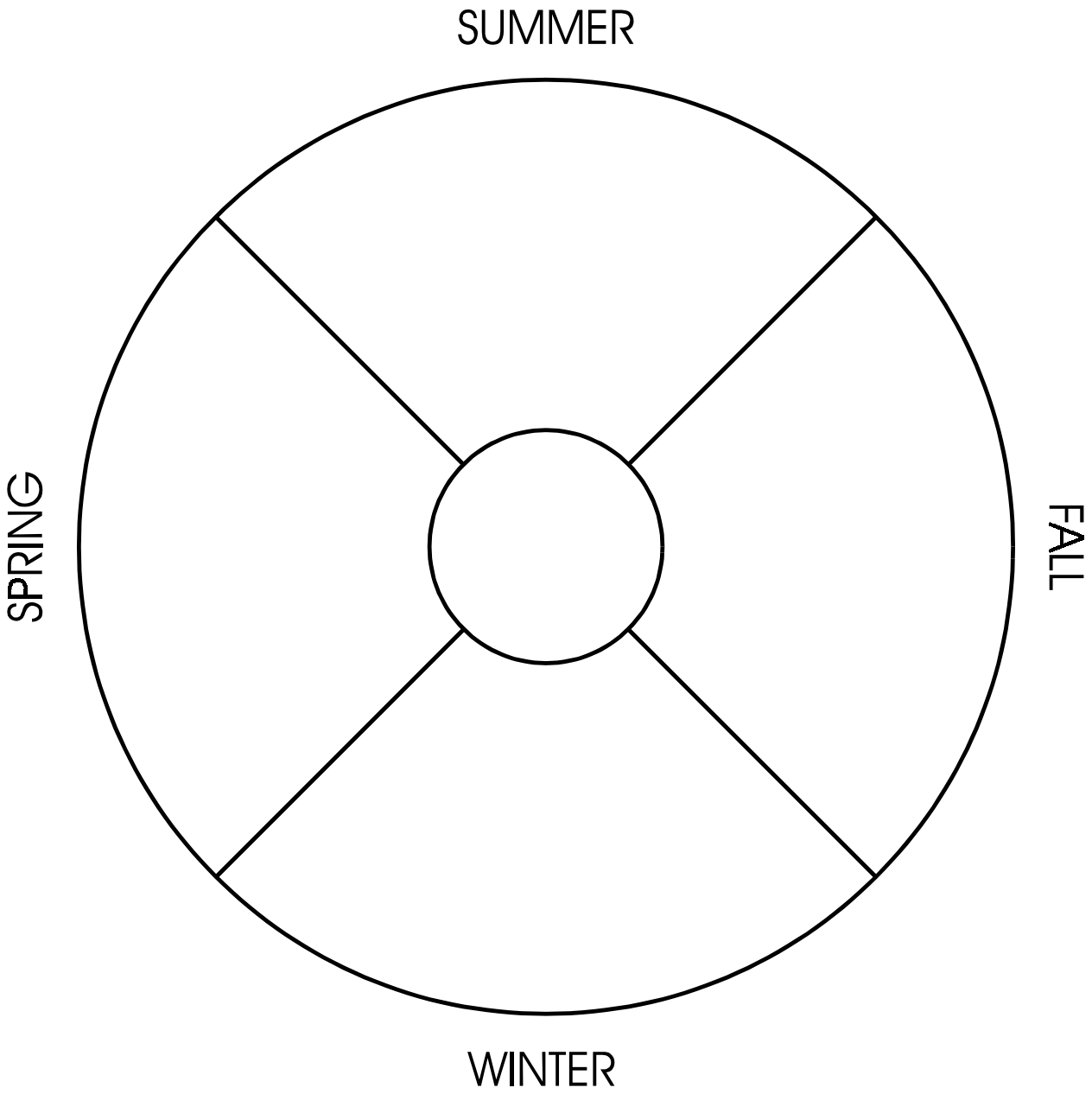
	SPRING	SUMMER	FALL	WINTER	ALL YEAR
Mesquite	flowers	flowers	seed pods		
Yucca	flowers	fruit			
Cactus	buds	fruit	fruit		pads
Goosefoot	greens	seeds	seeds		
Amaranth	greens	seeds	seeds		
Dropseed grass		seeds	seeds		
Rice grass		seeds			
Sunflowers			seeds		
Wild onion	greens/bulbs	greens/bulbs			

Rivers and Swamps

	SPRING	SUMMER	FALL	WINTER	ALL YEAR
Walnut			nuts		
Wild grape		fruit			
Wild strawberry		fruit	fruit		
Arrowroot					roots
Cattail	young flower stalks, pollen	seeds			roots
Watercress	greens	greens	greens		

Name _____ Date _____

Environmental zone _____



Lesson 4
Analyzing Seasonality

Subjects: social studies, science, math, language arts, art
Skills: knowledge, comprehension, application, analysis, synthesis, evaluation
Strategies: categorizing, classifying, communication, compare and contrast, computation, discussion, drawing, reading, sequencing, writing
NM Standards and Benchmarks (5–8): see Appendix
Duration: 2–3 class periods, 45 minutes each
Class size: Any; individual and group activities

Related Lessons:
Intrigue of the Past: Lesson 3, Observation and Inference; Lesson 9, Gridding a Site; Lesson 11, Artifact Classification; Lesson 13, Pollen Analysis

Objectives:
Students will collect data and interpret archaeological evidence from a prehistoric campsite, speculate on the season of occupation, and reconstruct and interpret associated activities.

Materials:
Information provided with lesson, journals, paper, pens, and pencils

Vocabulary:
biface: A tool that has been flaked on two sides.
core: The stone from which the flakes and tools are removed.
faunal remains: Animal bones.
flake: A piece of stone removed in the process of making a stone tool. Debris.
ground stone: A stone tool such as a mano or metate created by pecking and used for grinding foods and minerals.
lithic: A sharp-edged stone tool or debris from creating a stone tool.
macrobotanical analysis: The study of plant remains.
palynology: The study of pollen.
uniface: A tool that has been flaked on one side.

Setting the stage:
Write on the board the following dishes: a whole roasted chicken, fresh farm-picked corn on the cob, wild rice, and early harvest apple pie. Discuss the following:

Q: What would show up in the garbage from the food preparation process?
A: Corn husks and stems, apple peels, cores, and seeds.

Q: What would show up in the garbage after the meal?
A: Corn cobs, chicken bones, gristle and fat, plate scrapings.

Q: What would decompose if left undisturbed in the ground for 1,000 years?
A: Corn husks, stems, apple peels, cores, gristle, fat, plate scrapings.

Q: What might be preserved in a desert-like environment?
A: Corn cobs (maybe), corn kernels (maybe), apple seeds, chicken bones.

Q: What foods might indicate the season in which the meal was eaten?
A: Corn and apples. The season would be late summer.

Procedure:
Photocopy the excavation summary notes, the artifact catalogs, the artifact drawings, and the archaeological site map. Divide the class into groups of 4–6 students. Each group receives a set of data.

Step 1. Analyzing the Data
Each group analyzes the data to deduce the activities that took place at the site, the season in which they occurred, and the age of the site. Students begin by reading the Excavation Summary page. The statements on this page fall into

the observation or inference category. Have students divide a sheet of paper into two columns. The column on the left is to be labeled "Observations." The column on the right is to be labeled "Inferences." As they read the notes, students are to write the sentences in the appropriate column. For example, in the observation column, students should list, "In the northwest portion of the site is an oval grouping of rocks." From the same paragraph, in the inference column, students should write, "The stone circle may be a house. The stones may have held the poles in place, and the larger opening to the southeast may have been the doorway." The artifact catalog pages will also assist with defining activities, as they list specific data for materials.

The next piece of paper is also divided into two columns, one column listing possible activities and the second column listing evidence. Activity categories should include cooking, food processing, food storage, sleeping, tool making, and meat processing or butchering.

The third piece of paper will list the information related to seasonality of the site. Students will use the Excavation Summary; artifact catalog pages for faunal, macrobotanical and pollen remains; the information on seasonal use of plants that was supplied; and the seasonal round information that they put together during Lesson 3. For this portion of the analysis, students should divide a page into 6 columns. The first is for listing the mactobotanical and pollen remains. The second through fifth columns name the seasons—spring through winter. In the last column, students will indicate if the food would have been used fresh or stored. Determining seasonality uses the process of deduction.

Step 2: The Final Report
The final step of the analysis process involves writing the final report. Depending on your preference, students may complete individual reports based on the analysis, or they may produce group reports. This activity may also be done as a class project.

Step 3: A Reconstruction of the Site
What did the site look like when it was occupied? The site map can be used to produce a scaled drawing of the camp when it was occupied. Students use the data from the illustration, along with the observations and inferences they have listed, to draw a day in the life of hunters and gatherers at a temporary camp.

Closure:
Discuss where the people might be during the rest of the year. How could you tell if this site was used more than once? Why is it important to know the season during which a site was occupied? How can the study of archaeology and patterns of past occupation help us today and in the future?

Evaluation:
Evaluation is based on journals, class participation, analysis records, final reports, and reconstruction drawings.

Story of the Site: (answer)
Essential information for determining the season in which a site was occupied:
- male deer cranium without antlers
- cactus buds
- unpollinated cattail fruit
- yucca

The site represents a temporary camp that was used during the late spring to early summer. The people who occupied this site spent time gathering and processing cactus buds. While at the camp, the people butchered, processed, and ate a deer. They also ate some rabbit. The ring of rocks would have held posts for a structure. The structure was used for storage and maybe sleeping. The mano and metate outside the door of the structure were used to grind seeds. The ring of rocks with charcoal in the northeast part of the site represents a hearth that was used to cook the meat and the cactus buds. A tool-making area was located just south of the fire hearth.

EXCAVATION SUMMARY NOTES

Site Number: *to be assigned* Site Name: *the Cactus Spine site*
Site Type: *temporary camp* Site Age: *Archaic*
Datum: *southwest corner of units*
Project Directors: *Doug Trench and Carrie Rox*

The field portion of this project began on Monday, June 5, and was completed on Friday, June 16, 2000. A field crew of 10 individuals excavated what appeared to be a small temporary camp. (Hopefully, use and seasonality can be determined during analysis.) The site received its name from the abundance of cactus both on the site and in the surrounding area. Care was taken when clearing the site for excavation. (The tweezers in the first aid kits were very popular.)

Surface artifacts indicate that the site covered an area approximately 6 m in a north-south direction by 8 m in an east-west direction. The former ground surface itself averages 20–30 cm below the current ground surface. Minimal disturbance from roots and rodents occurs throughout the area.

Three major features were located. In the northwest portion of the site is an oval grouping of rocks. The rocks are of moderate size (20–40 cm in diameter). Clusters of 2 and 3 rocks are evenly spaced around the oval, but there is a slightly larger opening to the southeast. This feature may represent the foundation of a temporary dome-shaped structure. The stones may have held the poles in place, and the larger opening to the southeast may have been the doorway. The surface of the ground inside the structure was covered with small flecks of charcoal and some ash, making the soil a bit lighter and grayer than the surrounding sediment. (Several soil samples were taken around the site area.)

The second feature that was located was the fire hearth. It consists of a circle of fire-cracked rocks approximately 1 m in diameter. The inside of the circle was filled with charcoal chunks, burnt organic matter, and ash. (A soil sample was taken for macrobotanical analysis.)

The third feature is a large scatter of faunal remains. A large rock measuring nearly a meter across was located along the southern edge of the scatter. Several unifacially and bifacially flaked stone tools were found along with the bones. The bones, although highly fragmented, appear to be of an Odocoileus hemionus. This needs to be confirmed in the laboratory.

In addition to the three large features, there are two possible activity areas. The first may be associated with grinding stones located between the circular rock feature and the fire hearth. The second is a scatter of lithic debris just south of the hearth. Eight soil samples were taken for macrobotanical and pollen studies.

Background Information for Materials Found On-site

Lithics:

Bifaces are hunting points such as arrowheads and spear points. Knives also are generally bifacially worked. **Unifaces** are tools that have been flaked on one side. Thin ones can be used as knives. Chunky ones with steep edges are generally scrapers, used for removing the animal hide from the meat. Residue analysis can be performed on lithic tools to determine what the tool was used for. **Lithic debris** is the waste material left over from making stone tools—flakes, chips, and unusable chunks of stone.

Ground Stone Tools:

Ground stone tools are produced by grinding or pecking. They have a rounded shape and are used for grinding seeds, plant materials, or minerals, or to pulverize bone. They are made from coarse-grained and holey or porous materials such as granite or basalt. The most common ground stone artifacts include **anvil stones**, usually large, flat stones on which materials are placed and cracked or mashed with a hand stone; **grinding slabs** or **metates**, used for grinding seeds, corn, minerals, or plants; hand stones or **manos**, used in combination with grinding slabs; **mortars**, stone bowls used with a **pestle** for grinding seeds and plant parts; and pestles, handheld baton-shaped stones used to mash and grind materials in stone bowls.

Faunal Remains:

Faunal remains are animal bones that indicate that hunting, butchering, or cooking took place, depending on the types of tools present. Archaeologists may be able to determine what season the site was occupied by examining the faunal remains. If very young animals are present, the site would have been occupied in the spring. If the remains of a male deer were found, the presence or absence of antlers would indicate the time of year that the deer was killed.

Botanical Remains:

The environment and plants used by people on-site are determined by looking at the pollen and botanical remains. Soil samples are taken from specific locations on-site. These samples are later processed in the laboratory. Palynologists and macrobotanical analysts may be able to determine seasonality and storage capabilities by looking at the pollen and botanical remains.

Lithic Catalog

Unit	Quad	Tools	Flakes	Cores	Comments
0N/0E	NW	0	1	0	utilized flake
0N/1E		0	0	0	
0N/2E	N½	2	3	0	utilized flakes, bifaces
0N/3E		0	0	0	
0N/4E		0	0	0	
0N/5E		0	0	0	
1N/0E		0	0	0	
1N/1E		0	0	0	
1N/2E	NW	1	2	0	1 uniface, 1 biface
1N/3E		0	0	0	
1N/4E	SW	0	5	0	3 utilized flakes
1N/5E		0	0	0	
2N/0E		0	0	0	
2N/1E		0	0	0	
2N/2E		0	0	0	
2N/3E	E	0	5	0	
2N/4E	all	1	36	1	hammer stone, core and debris
2N/5E	all	1	16	0	biface fragment, debris
3N/0E		0	0	0	
3N/1E		0	0	0	
3N/2E		0	0	0	
3N/3E		0	0	0	
3N/4E	SW	0	7	0	
3N/5E		0	0	0	
4N/0E		0	0	0	
4N/1E		0	0	0	
4N/2E		0	0	0	
4N/3E		0	0	0	
4N/4E		0	0	0	
4N/5E		0	0	0	

Faunal Catalog

Unit	Quad	Rabbit	White-Tail Deer	Rodent	Comments
0N/0E	NE	2	9	0	
0N/1E	N½	3	33	2	long bone fragments
0N/2E	N½	1	25	5	rodent burrow under rock
0N/3E	NW	0	11	0	
0N/4E		0	0	0	
0N/5E		0	0	0	
1N/0E	E½	3	8	0	
1N/1E	all	0	27	1	
1N/2E	all	0	38	0	cranium fragments
1N/3E	all	0	21	0	
1N/4E	W½	0	9	0	
1N/5E		0	0	0	
2N/0E		0	0	0	
2N/1E	SE	0	0	0	
2N/2E	SE	0	10	0	
2N/3E	SW	0	3	0	
2N/4E		0	0	0	
2N/5E		0	0	0	
3N/0E		0	0	0	
3N/1E		0	0	0	
3N/2E		0	0	0	
3N/3E		0	0	0	
3N/4E	SE	0	11	0	fragments burnt
3N/5E	SW	0	6	0	fragments burnt
4N/0E		0	0	0	
4N/1E		0	0	0	
4N/2E		0	0	0	
4N/3E		0	0	0	
4N/4E		0	0	0	
4N/5E		0	0	0	

Ground Stone Catalog

Unit	Quad	Hand Stone	Grinding Slab	Anvil Stone	Comments
0N/0E		0	0	0	
0N/1E		0	0	0	
0N/2E	center	0	0	1	whole stone associated with bone
0N/3E	NW	3	0	0	fragments
0N/4E		0	0	0	
0N/5E		0	0	0	
1N/0E		0	0	0	
1N/1E		0	0	0	
1N/2E		0	0	0	
1N/3E		0	0	0	
1N/4E		0	0	0	
1N/5E		0	0	0	
2N/0E		0	0	0	
2N/1E		0	0	0	
2N/2E		0	0	0	
2N/3E		0	0	0	
2N/4E		0	0	0	
2N/5E	NW	0	2	0	
3N/0E		0	0	0	
3N/1E		0	0	0	
3N/2E	NW	1	0	0	whole stone
3N/3E		0	0	0	
3N/4E		0	0	0	
3N/5E		0	0	0	fragments in fire ring
4N/0E		0	0	0	
4N/1E		0	0	0	
4N/2E		0	0	0	
4N/3E	SW	0	1	0	whole stone; pollen sample taken
4N/4E		0	0	0	
4N/5E		0	0	0	

Palynology

Unit	Quad	Pollen Grains			Comments
		Cactus	Yucca	Amaranth	
0N/2E	SE	X	O	O	Sample 1
1N/0E	SE	X	O	O	Sample 2
1N/1E	SE	X	O	O	Sample 3
2N/4E	NW	X	O	O	Sample 4
3N/2E	NW	O	O	X	Sample 5, from under mano
3N/3E	NW	O	X	X	Sample 6, from under metate
3N/4E	NE	X	O	O	Sample 7, from hearth
4N/0E	SE	O	X	X	Sample 8, from ash stain in rock feature

Key: X = present; O = absent

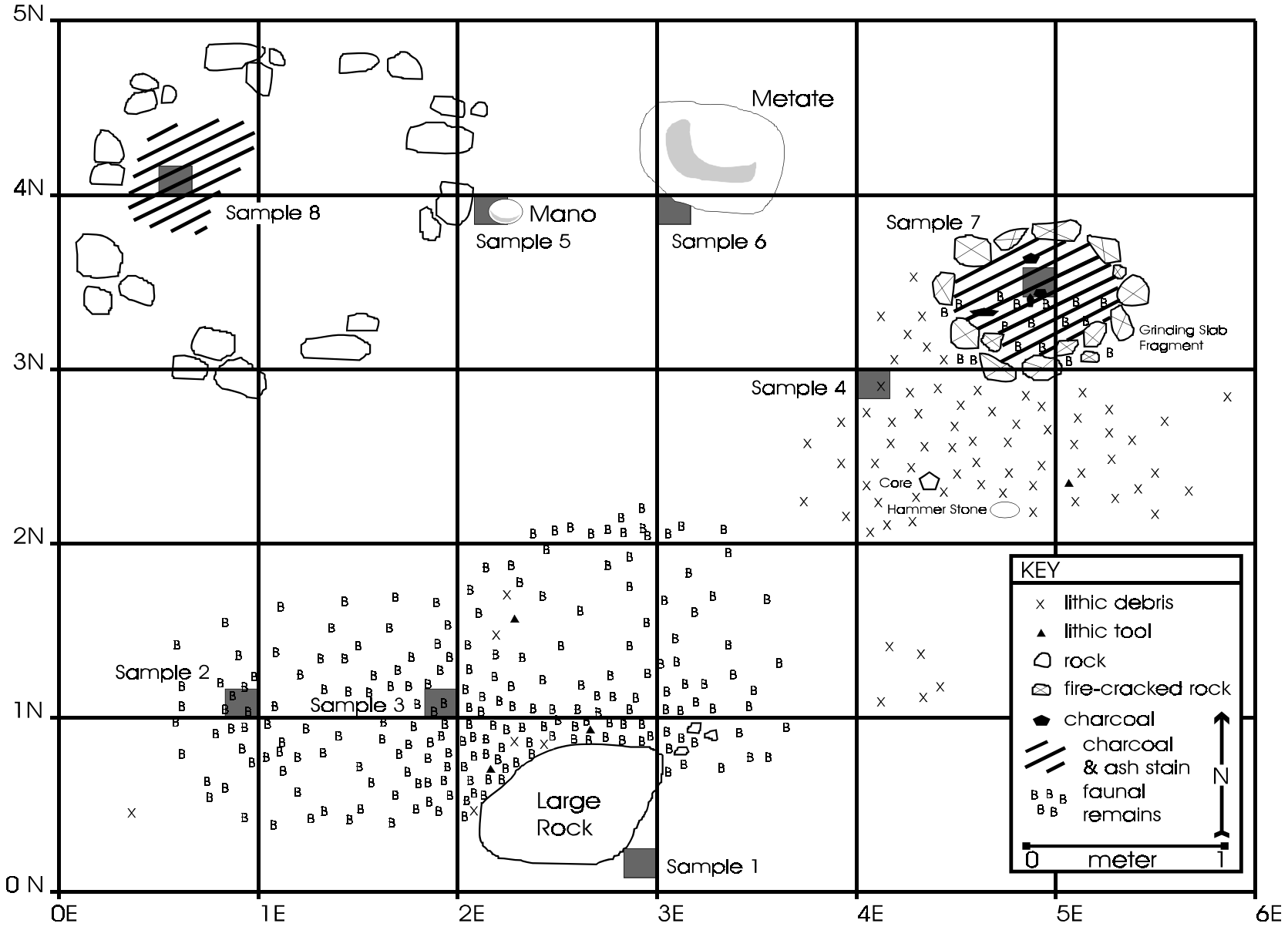
Macrobotanical Analysis

Unit	Quad	Botanical Remains			Comments [a]
		Cactus Buds (Buds)	Cattail (Unpollinated Fruit)	Rice Grass (Seeds)	
0N/2E	SE	O	O	O	Sample 1
1N/0E	SE	O	O	O	Sample 2
1N/1E	SE	O	O	O	Sample 3
2N/4E	NW	O	O	O	Sample 4
3N/2E	NW	O	O	X	Sample 5, from under mano
3N/3E	NW	O	X	X	Sample 6, from under metate
3N/4E	NE	X	X	X	Sample 7, from hearth
4N/0E	SE	O	O	X	Sample 8, ash stain in rock feature

Key: X = present; O = absent

[a] All samples are burnt or charred.

Archaeological Site Map



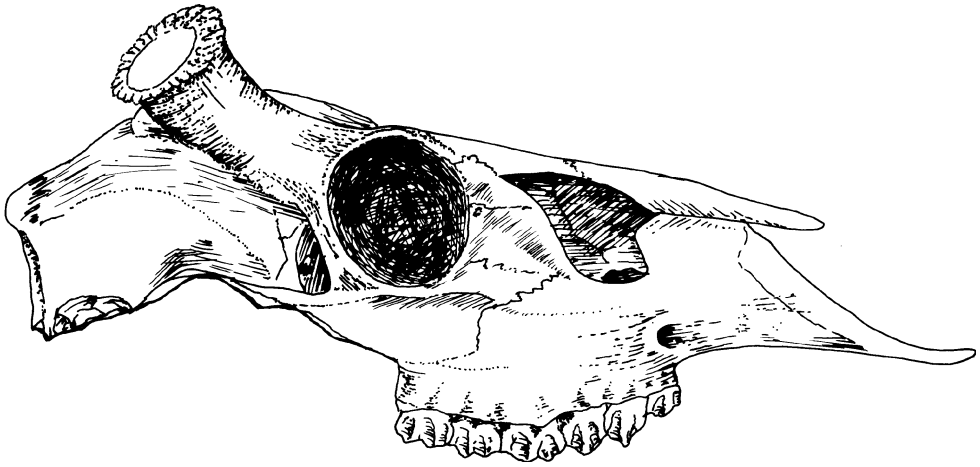
Illustrations of Diagnostic Lithic and Faunal Materials

Unit 0N/2E

Hunting Point
(actual size)

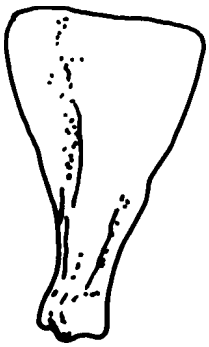
Knife Fragment
(actual size)

Unit 1N/2E

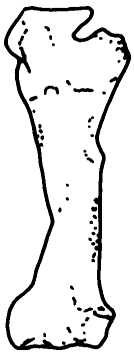


Deer cranium missing back and lower portions *(not full size)*

Unit 0N/1E



Scapula
(not full size)



Humerus
(not full size)

Femur
(not full size)

Appendix

Correlation of Lessons with the New Mexico State Department of Education Standards and Benchmarks for Grades 5–8

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
Social Studies	1a, 10g, 11a, 11c, 12a, 12b, 12c, 12d, 12e 13a	3a, 12d	3a, 3b, 4d, 10g, 12a, 12b, 12c, 12d, 12e, 12f, 12g, 12h	3a, 4d, 10g, 11a, 11c, 12a, 12b, 12c, 12d, 12e, 12f, 12g, 12h, 13a
Science	2a, 5a, 5b, 6a, 6b, 6f	1a, 6b	1a, 1b, 2a, 2c, 5a, 5b, 6a, 6b, 6d, 6e, 6f, 6g	1a, 1b, 2a, 2b, 2c, 5a, 5b, 6a, 6b, 6c, 6d, 6e, 6f, 6g, 6h
Language Arts	1a, 1b, 2a, 3a	1a, 1b, 1c, 1d, 2a, 2b, 2c, 3a	1b, 1c, 1d, 2a, 2b, 2c, 3a	1b, 1c, 1d, 2a, 2b, 2c, 3a
Mathematics	1a, 1b, 1e, 2a, 2e, 3a		1a, 1b, 1e, 2a, 2b, 2d, 2e, 3a, 3c, 3d, 4a, 7a, 9c	1a, 1b, 1c, 1d, 1e, 1f, 2a, 2b, 2d, 2e, 3a, 3c, 3d, 4a, 4b, 5d, 7d, 10b
Visual Arts			2	2