

Teacher's Corner: Archaeology for the Classroom

by Pamela Ashmore and Timothy Baumann

The Center for Human Origin and Cultural Diversity (CHOCD) at the University of Missouri, St. Louis, represents a model collaboration between a college of arts and sciences and a college of education. Faculty, graduate students, and undergraduate students from the Division of Teaching and Learning and the Anthropology Department worked together to develop a program that uses state-of-the-art pedagogy to bring anthropological content to the K-12 classroom. The specific program described here focuses on archaeological content and activities in the pre-collegiate classroom.

Program Rationale

Teachers working at all grade levels, but especially those working with middle and high school students, have expressed the need to find interesting and innovative approaches to inspire and maintain student interest in math and science. It seemed probable to us that if we could get archaeology-based content into the classroom that students would be more readily engaged and interested in pursuing math and science-based activities. The National Science Education Standards for content in grades 5-8 stress the need to "think critically and logically to make the relationships between evidence and explanations" (National Resource Council, 1996, p.145). The recommendations of the Missouri K-16 Coalition underscore that "middle school mathematics teachers should be provided with ongoing professional development that will help them move from teaching mathematics as 'calculation' to incorporating more higher order mathematical reasoning and algebraic thinking into the classroom" (Missouri K-16 Coalition, 1999, p.10). Archaeology has the potential to address both of these educational goals. The holistic nature of archaeological investigation lends itself well across the content area and to a team teaching approach for a particular grade level.

The Field School

During the summers of 2000 and 2001, the CHOCD implemented an archaeological field school specifically designed for teachers. Funding for these programs was obtained through grants from the Eisenhower Professional Development Program of the Missouri Coordinating Board for Higher Education. The underlying philosophy of the grant proposals was as follows: by providing teachers with first-hand experience in scientific research, including excavation methods and laboratory procedures, and by modeling effective teaching strategies, the teachers could more effectively translate and infuse archaeology-based content into their classroom teaching. To ensure enrollment in the programs, we established partnerships with specific local school districts. Decisions about which school districts to approach were based on several factors. We identified 1) schools that had requested Timothy Baumann as a guest lecturer for the classroom, 2) districts that had poor test scores in the areas of math and science, and 3) teachers from previous associations who had demonstrated a willingness to try new approaches. The grant covered program expenses for the teachers who received three graduate credit hours once the program had been successfully completed. The teachers paid a nominal registration fee if they desired the credit hours.

The field school program schedule was as follows: a day-long orientation held at the university before the end of the academic year; and two weeks of field work in July, held five days a week, eight



hours a day. Two weeks after the field school, the teachers handed in their preliminary lesson plans. During the orientation, we introduced teachers to the field of archaeology, presented an overview of the sites where the excavations would be conducted, addressed teachers' needs and concerns regarding their participation in the program, and defined program requirements. Meetings with the teachers were held throughout the following academic year and the participants were required to implement an archaeology-based lesson plan in their classroom to be observed by either Baumann or Ashmore. To reduce the demands placed on the teachers conducting this lesson plan, we offered as much assistance as possible.

During the summer 2000 and 2001 field schools, teachers were exposed to both historic (Arrow Rock) and prehistoric archaeology (Cahokia Mounds), respectively. When housed at Arrow Rock, we spent three days at Cahokia and when housed at Cahokia, we spent three days at Arrow Rock. Throughout the field schools, we conducted a series of late afternoon workshops, demonstrating various ways archaeological content can be incorporated into classroom teaching.

Arrow Rock

The summer 2000 field school took place at Arrow Rock, Missouri, a bustling river town community in the 1880s where Conestoga wagons set forth on the Santa Fe Trail. The town had a significant African American community, and our goal was to identify the contributions and activities of the members of this community.

Teachers were exposed to a variety of archaeological sampling procedures and excavation techniques at two different sites—the site of an Emancipation Day picnic located alongside an old speakeasy and the grounds of the early twentieth century African American school house. Teachers learned how to work with a transit, how to establish a sampling grid to conduct post hole testing, how to excavate units, and how to keep records. Teachers also spent time in the lab washing, sorting, and re-bagging artifacts and floral and faunal remains, conducting preliminary inventories, and processing flotation samples. An added feature of the field school program was the opportunity

for the teachers to work alongside college students who had enrolled in the Department of Anthropology's summer archaeology field school program.

At Arrow Rock, we combined teachers from the Greater St. Louis urban area with those who work in rural school districts. This allowed for the additional sharing of teaching strategies and challenges. Teachers were strongly encouraged to develop a photographic record of all aspects of the archaeological excavation in such formats as bulletin boards, overheads, slides, pictures, posters, or materials for power point presentations for the classroom. What most impressed and surprised the teachers about the excavation process were the extent of required notes, the diversity of record keeping forms, and the repetition of the identification of location.

Cahokia Mounds

The 2001 field school was housed at Cahokia Mounds State Historic Site in Illinois, the largest prehistoric site north of Mexico. In this field season we were looking for evidence of the western wall of a large fortification fence or palisade that was built and rebuilt at least four times, circa A.D. 1175-1275. Excavations focused on the identification of wall trenches, post holes and bastions.

Archaeology Lesson Plans

The efforts of 34 teachers over the last two years has resulted in the production of 68 lesson plans that range across the various content areas and encompass grades 2-12, including special education students. Archaeological content was introduced within the following content areas: math, science (biology and earth science), social studies, communication arts, and art. For each year's project, a Resource Activity Book was assembled and distributed to all participants. These books contain complete instructional materials needed to implement any of the lesson plans. Half of the lesson plans have been field-tested in classroom situations, and any revisions made are included in the final format of these plans. All lesson plans are linked to either the Missouri Show-Me Knowledge and Performance Standards, or the Illinois Learning Standards. Two lesson plans are described below.

Observations and Recommendations

Based on student comments, assessments of student performance, and observations by project staff, the teachers' lesson plans have been well received in the classroom. Student comments indicate that they find the content interesting and the activities fun. We too have observed the obvious engagement and investment of students in the various activities. Lesson plan quiz scores are high and teachers acknowledge that the students are learning the content. However, the teachers have also voiced concerns regarding the time constraints under which they must operate to conduct oftentimes highly involved hands-on activities in their classrooms. They also describe the difficulties in either having their efforts not totally supported by their administrators or, most commonly, that they do not have time to teach anything not specifically covered in either state or national standardized assessments.

Although we acknowledge the reality of the environments in which teachers work and the validity of their concerns regarding implementation, we assure teachers they are teaching more than content. Implicit in the methodologies associated with archaeology is the promotion of critical thinking skills. Archaeology-based content can successfully promote critical thinking skills that we believe will improve the performance of students on standardized exams. Based on the results of these two programs, it is our observation that, in addition to increasing knowledge of past events, archaeology-based content successfully enhances math and science literacy in the K-12 classroom.

CLASSROOM ACTIVITIES

Reconstructing Pots Activity (grade 6)

Show Me Standards M2, FA1

Goals: Students will calculate the diameter of a ceramic artifact and model the process of reconstruction.

Objectives: Students will work in teams to distinguish different ceramic types, calculate diameter, inventory pieces, reconstruct vessels, assess function, and draw their ceramic artifact.

Materials needed:

Black markers, white glue, plain paper, lined paper, colored pencils, regular pencils, copies of diameter chart, straight rulers.

Terra cotta flower pots of various colors

Stoneware cups of various colors

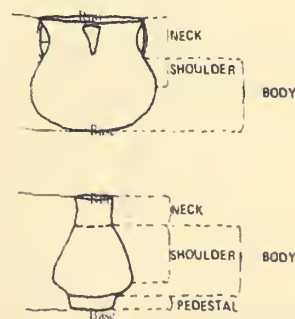
(Each cup or terra cotta pot should be a different color and the number of items needed is dependent on the number of groups).

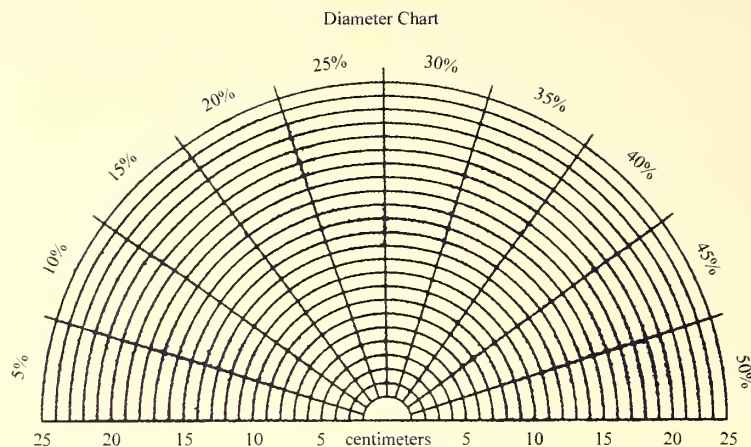
Set up:

Prior to class, the teacher carefully breaks the ceramic items (make sure the pieces are not too small or too sharp) and mixes the sherds together in a box.

1. Introduce the idea that many artifacts are often found in pieces and archaeologists need to put them back together (reconstruct) in the lab. Pieces of pottery, called sherds, are common from both historic and prehistoric sites. Ask students: Why do you think that things like pots are often found in pieces? Using geometric relationships, archaeologists are sometimes able to reconstruct pots from pieces (even if some pieces are missing) to determine the original size and shape of a vessel. It is almost like putting together the pieces of a jigsaw puzzle! Ceramic pots are made up of several sections.

Vessel Parts





(Use the diagram on the previous page to draw the illustration of a vessel on a board or use as an overhead). The top of the vessel is called the rim, under the rim is the neck, under it the shoulder, and the body of the pot sits on the base. The base may be in the form of a pedestal (a platform that the pot sits on). If the students have just a rim piece, they can use a diameter chart (above) to figure out from the size of the curve of the rim piece how big the vessel opening was. From the chart, students also can estimate the percentage of the entire rim that their piece represents. They are now going to work to reconstruct a pot that will be assigned to their group. They will have to work together to identify the elements of the pot just identified and then use a diameter chart to calculate the diameter of the top (rim) of the pot. The diameter chart can be put on an overhead projector.

2. Divide students into archaeological teams of three students each.

3. Assign a particular terra cotta pot or stoneware cup (i.e. Stoneware Blue) and letter to each team.

4. Have each team retrieve the appropriate pieces of their pot or cup from the box.

5. Using black markers, ask students to label the pieces with their assigned letter plus a sequential number.

For example, the group assigned letter A will number their pieces A-1, A-2...

6. Students should sort pieces by rim, base, and body.

7. Next, have students inventory their ceramic pieces and list them on the inventory sheet.

8. Using the diameter chart, have each student calculate the diameter of their vessel using three different rim pieces (either the inside or outside of the curve of the rim piece should be matched to a curve on the diameter chart). Also have each student determine the % of the vessel their rim piece represents as indicated by the diameter chart.

NOTE: A diameter chart can be made by using a protractor and drawing concentric circles 1 cc apart. If a half circle is used, as is shown in this diagram, then the calculation is based on the radius of the opening to calculate the diameter, the value of the radius has to be doubled. Diameter gauges can be ordered from www.archaeogear.com

9. Have the students reconstruct their vessel using white glue.

Inventory Sheet

	Number of Pieces		
Sherds			
Handles			
Bases			
	<i>List each rim Separately</i>	Diameter (rim)	% of Vessel (rim)
Rim 1	1		
Rim 2	1		
Rim 3	1		
Rim 4	1		

10. Have each student draw their reconstructed vessel and write a description of it. This should include color, mention of any design elements, and measurements of its size (height and diameter of top). Students can then write a story that describes what their pot was used for (its function).

Excavation of Room ____ (Grade 7)

Show Me Standards MA2, SS7

Goals: Students will properly measure and grid artifacts in a unit. Based on the kinds of artifacts and their patterning in a unit students will interpret human behaviors.

Objectives: Students will work in archaeological units to map the location of artifacts located within an excavation unit. Students will make assessments as to the type of activity that might have occurred in their unit.

Materials Needed:

Yardsticks, masking tape, photocopies of pictures of artifacts, graph paper, rulers, pencils, and copies of a worksheet.

Set up:

Before class, mark the classroom floor with masking tape in rectangular units of 2'x3', one unit for each group of students. Inside these units tape pictures of artifacts (flakes, projectile points, ceramic sherds, worked shells, and/or bones). Pictures of artifacts can be easily found in issues of *National Geographic* magazine. Try to select artifacts from a particular culture *i.e.* Navajo of the Southwest and also try to create a pattern with the artifacts, such as flakes in the same section as stone tools.

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1. Explain to the students that artifacts can be pretty to look at (have pictures to show), but that we really need to know about the physical distribution (location) of artifacts in time and space. When archaeologists find artifacts, they need to know precisely where in the excavation unit the artifacts are located. Ask the students to think about a police detective who is trying to solve a robbery case. The detective needs to look for clues at the crime scene and needs to see where everything was when the crime was committed. These clues might enable the detective to find the evidence needed to solve who committed the crime and when.

Archaeologists attempt to figure out how people of the past used a particular place. What activities did they engage in? How did they live their lives? The evidence for this is, in part, to be found in the artifacts that have been left behind. The types of artifacts and the pattern of how they are laid out in space will help archaeologists to determine what types of activities occurred in specific locations. Archaeologists have to be able to recreate on a piece of paper in the lab where all of the artifacts in their excavation unit were found. Show students on the board or overhead how to measure the location of an artifact in a unit.

NOTE: To gauge (measure) an artifact in your archaeological unit, measure from the edge of the unit to the artifact. Measure the distance from the northern edge of the unit to the closest edge of the artifact. On the graph paper make a mark where that distance would be. Next measure from the eastern edge of the unit to the closest edge of the artifact and make a mark on the graph paper where that would be. Continue until you have a mark for all sides of the artifact. Finally look at the artifact and draw within your marks the shape of the artifact. See diagram below.

2. Explain to the students that their classroom has been turned into an archaeological excavation. Students will work in groups of two to four.

3. Each group will identify the northern "wall" of their unit. Using rulers, students will measure the unit and the location of the artifacts and draw them on their graph paper. One inch will represent one square.

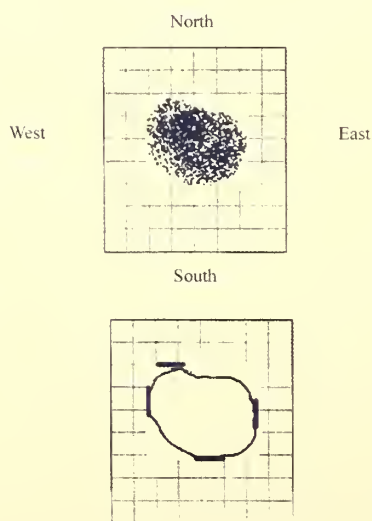
4. Students will label each artifact on their graph paper.

5. Finally, they will write the names of their group members and answer the following questions on their worksheet:

Room ____ Excavation

1. What kind of artifacts did you find in your unit? What did you notice about the locations of the artifacts in your unit? Are they spread out or are they all together?

2. What do you think the artifacts were used for? What kind of activity do you think went on in your unit? Why do you think this?



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Further Reading

Amarento, Beverly J. et al. 1997. *A Message of Ancient Days*. Houghton Mifflin.

Joukowsky, Martha. 1980. *A Complete Manual of Field Archaeology: Tools and Techniques of Field Work for Archaeologists*. Prentice Hall.

U.S. Department of the Interior Bureau of Land Management. 1996. *Intrigue of the Past: A Teacher's Activity Guide for Fourth through Seventh Grades*. Bureau of Land Management.

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