

Archaeology: From Map to Museum

LD9: Flintknapping and Stone Tools

Introduction: The production of stone tools is an activity that first appeared at the dawn of human culture. Because of the virtually indestructible nature of the materials used -- mainly flint, chert, and obsidian -- the residues of human stone tool production and use can be preserved for literally millions of years. As such, we have stone tools and related evidence ranging in age from the earliest hominid toolmakers of East Africa at some 2.5 million years ago through to the stone tool users of today. This exercise will engage you directly in the production and interpretation of stone tools, and as such, you will leave this exercise with that experience necessary to understand the lithic reduction process and the complexities of stone tool manufacture.

Directions: This Lab Deliverable will entail two to three meetings during which time you will be (a) introduced to the means by which stone tools were crafted by ancient societies (Session 1: via video and a hands-on demonstration by your instructor), and (b) via a hands-on stone tool experiment, artifact mapping, and collection and quantification (Sessions 2-4). Because we will require a space adequate to the task of producing and documenting stone tool production, Sessions 2-4 of this Lab Deliverable may require the use of the Archaeology Lab located in Building 58, Room 137. See "Stone Tools" database under "Site Catalog Tool" drop-down list at <http://wireless.archaeology.csumb.edu> for data entry portion of this exercise. You may require a User Name and Password to access the Wireless Site Catalog Tool.

Session 1: Introducing Stone Tools

1. Carefully review the "Flintknapping" video by Dr. Bruce Bradley and the "Ancient Cultures and Modern Chemistry" ([ChemLab](#)) video. Be prepared to take detailed notes (for posting to the Online Journal and submission with your final portfolio) of the demonstration and the methods described. Your description should be detailed enough to allow another person to use your notes to learn about stone tool production methods. You should prepare responses to the following questions based on both the video and the demonstration:

- ? Briefly identify and define the following flintknapping methods: (a) hard-hammer percussion, (b) soft-hammer percussion, (c) indirect percussion, and (d) pressure flaking.
- ? Be prepared to discuss why each of the aforementioned methods was used. In other words, when and why would an ancient stone tool manufacturer employ "hard-hammer percussion versus soft-hammer," or "indirect percussion" versus "pressure flaking"?
- ? What two primary considerations regarding the "physics" of stone tool production need to be taken into account for the proper production of stone tools?
- ? How do archaeologists go about distinguishing tool types one from the other? How do archaeologists go about identifying the function of stone tools from archaeological sites?
- ? How does "experimental archaeology" figure into the study of stone tools? What value and insights are offered by experimental archaeology in so far as the interpretation and study of stone tools is concerned?

2. After the video review and discussion, your professor will provide examples and a hands-on demonstration of the types of materials and tools used in the production of stone tools. You should prepare notes based on your observations and your professor's demonstrations of the tools and techniques noted.

Sessions 2-4: Creating and Interpreting Stone Tools

Part One: You may be asked to meet at the Archaeology Lab in Building 58 (TBA). Upon arrival at the lab location, we will first work as a group to rearrange the lab space so as to accommodate the requirements of the flintknapping demonstrations. Be prepared to assist with the moving of furniture, including tables, and with the layout of gridded tarps and stone tool kits and resources (Note: If the demonstration is held on the campus Quad, then setup will be all that is required). The exercise will begin with a brief discussion and overview of primary methods to be demonstrated. Once the lab space has been prepared, and the introductory overview completed, your professor will initiate the flintknapping demonstration.

Caution: Obsidian glass is very sharp and great caution must be taken with its handling. If you do not feel comfortable with the idea of handling the sharp obsidian glass, or attempting to produce the sorts of tools used in this experiment, you are welcome to refrain from direct participation in that portion of the exercise that would entail your direct participation in the production of stone tools. You will however be required to produce notes on your observations and wear goggles and leather gloves at all times during the exercise.

Part Two: Because you will be handling very sharp obsidian glass and waste flake materials, you are required to wear leather gloves and goggles at all times during the conduct of the lab exercise. In order to avoid the possibility of injury related to the sharp glass shards resulting from the experiments, please follow your instructor's directions and precautions closely and without fail. Appropriate clothing, particularly pants and long-sleeved shirts are advised in this instance. *Finally, do not attempt to wipe splinters off of your clothing with your bare hands as this may result in small cuts.* In order to complete with the requirements of the exercise, you will complete the following:

1. During the lab exercise, you will first observe your professor's flintknapping demonstration and produce handwritten notes of any and all methods used and discussed in the demonstration. At the end of each day of the demonstration, you will be required to collect, sort, count, and weigh the lithic materials deposited within each 20 cm by 20 cm unit outlined on the gridded tarp used for the demonstration. Your selection of each individual unit will require a random sampling procedure. As groups, you will submit your counts, weights, and via the Wireless Site Catalog Tool located at http://wireless_archaeology.csumb.edu. General interpretations of your groups Unit collections will be posted to the Discussion Forum located at <http://archaeology.csumb.edu/phpbb2/>. See Database Flintknapping Codes handout for data entry format and types.
 - a. In consultation with your respective group, please conduct a random sampling of lithic materials by 20 x 20 cm unit area. You may use Unit numbers provided for that purpose. At the outset, each group should select at least five individual units for sampling.
 - b. Having selected your five units, please collect any and all lithic debris from within the confines of the 20 x 20 cm unit as indicated on the tarpaulin used to create the debris field. You may use blank catalog cards to facilitate the collection of the smaller items.
 - c. You may approximate the total count of items less than 1 centimeter in size. Where an individual flake or other lithic artifact falls on a grid line, please assume that the item should be assumed to associate with that unit within which at least 51% of the artifact lies.
 - d. Use the attached form to document your counts and weights of lithic debris collected at the end of each demonstration.
 - e. All lithic and flake debris should be categorized by size. Your collections and counts should subdivide materials by centimeters: For example, category 1 would consist of any and all material less than 1 centimeter in size; Category 2 would consist of all material ranging in size from 1 to 2 centimeters, 2 to 3 centimeters, etc. (<1 cm; 1.1-2.0 cm; 2.1-3.0 cm; 3.1-4.0 cm...)

- f. Upon having counted your specimens, place them in individual zip lock bags provided for that purpose. Each bag should include documentation rendered in felt marker with the following information: Group Name or Number; Date of Collection; Size Range of Specimens; Weight of Specimens; and most importantly, Unit Number (e.g., A12, D2, L14, etc.)
 - g. Upon completing the paper copy of your catalog of lithic specimens recovered during each demonstration project session, you are then to assign one member of your group to enter any and all data collected into the electronic form provided for that purpose. The names of all student participants in your respective group or team should be included within the table in this instance.
 - h. Wireless PDA's will be provided for data entry where wireless networking is available.
 - i. A key task will be to produce a graphing or visualization of the data in bar chart, pie, or other graphic format. Your challenge is to select the type of visualization and the categories necessary to appropriately display your results. Upon completing your weekly graphing of the data, you are to forward your graphs and charts to Professor Mendoza at week's end.
2. Upon completion of your Professor's demonstration, you will then be given an opportunity to experiment with samples of the lithic material used in production if you so choose. If you choose not to participate in the stone tool production exercise, you may observe and document your professor's production of stone tools through the course of that and following sessions. If you choose to participate in the stone tool exercise, please be prepared to complete at least one example of at least three of the following tool types:
- ? Primary Flake
 - ? Blade Tool
 - ? Unifacial Tool
 - ? Bifacial Tool
 - ? Scraper
 - ? Knife
 - ? Projectile Point

Part Three: Please be prepared to respond to the following questions regarding your experience with observing and or participating in stone tool production:

1. How were the tools created? If called upon to describe the process entailed in their production, how – and at what point in the process -- would you start your narrative and explanation?
2. How might the production of the artifact in question have served to enhance the survival of the groups or individuals involved in the production process?
3. What social, cultural, economic, ritual, and political associations inform our understandings of the artifacts and their production? How might our preconceptions about technology serve to inform or misinform our valuation and appreciation of the cultures that produced the artifacts in question?
4. Drawing on the form and function of the artifacts created, how do you believe said tools or artifacts were used, and how do you know this for a fact?
5. Why were such tools created in ancient societies, and why are they so dominant in much of our pre-historic past? Why might stone tools continue to be so dominant in many tribal and non-Western contexts?
6. What material types were used in the production process and what does such material tell us of cultural interaction and trade? What does this same material tell us of the geology of California and the West?
7. Finally, how does the artifact's respective form or shape provide clues to the interpretation of its original use and intent?