

## LESSON 3A—NARRATIVE: WHAT IS ANCIENT STONE TECHNOLOGY?

*Stone technology uses raw materials to provide tools for daily survival.*

**T**echnology is the manufacture and use of tools to cope with daily life. Today, technology includes everything from kitchen knives to computers. It includes the processing and packaging of foods in our grocery stores. It is responsible for our society's ability to land a spacecraft on Mars. Tools make our lives easier, more efficient, and better.

In the prehistoric past, tools gave people the ability to survive, just as they do today. Their needs for food, shelter, safety, and expression were exactly the same as ours. But past technology relied on raw materials that are quite different from those commonly used in our modern world.

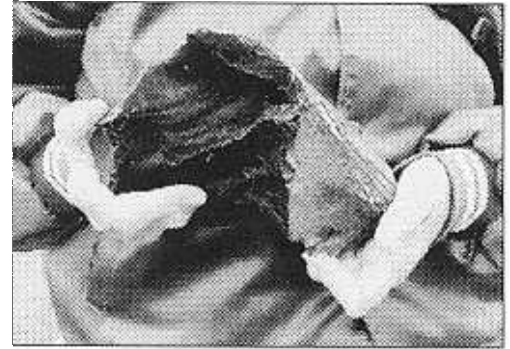
Ancient technology depended heavily upon the use of **stone**. Stone is an **inorganic** material that survives in soil for thousands of years. Stone tools are found in archaeological sites throughout the world, including Montana. Tools made of stone are the most common kind of artifacts studied by archaeologists. The word **lithic** (from the Greek word *lithos*) refers to objects made of stone, as in **Paleolithic**, the Old Stone Age.

The earliest known stone tools in the world were **pebble tools**. They were made by very primitive humans in Africa some two million years ago. They are intentionally broken rocks with edges that indicate that they were used as tools. These early humans used pebble tools for crushing animal bones. About five hundred thousand years ago, more advanced human groups in Europe and Asia depended on the

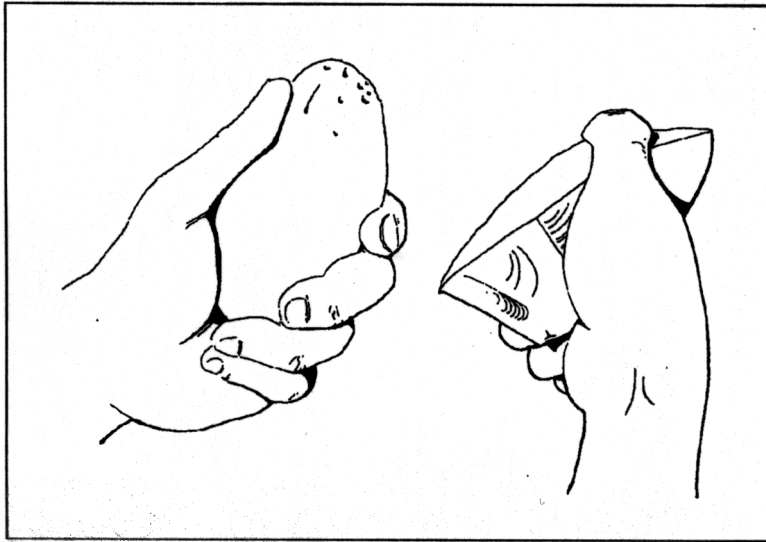
stone **hand-axe**. One end of the hand-axe was shaped into a point. It was used in hunting, food preparation, and many other tasks. Later, prehistoric people made more

refined stone **blade and core** tools, in which long, narrow flakes (blades) were created from a prepared piece of lithic raw material (core). The earliest prehistoric groups who migrated to North America and Montana brought this sophisticated **stone tool technology** with them.

The earliest Montana stone tools are about twelve thousand years old. They are beautiful **spear points**. Stone tool use continued here until about two hundred years ago. Great skill was required to make stone tools. Ancient people selected special kinds of stone that were easy to work, but kept a sharp edge. **Chert** (sometimes referred to as "chalcedony," "flint" or "agate") is such a stone. Raw chert comes in a variety of colors—brown, yellow, red, green, and even blue. A useful quality of chert is that even-sized flakes can be removed from it—in a controlled manner—by carefully striking its edge with another rock or piece of antler. Prehistoric people sometimes baked or heated chert in fire pits dug into the ground. This process of **heat treatment** drew out the water in the rock and made it easier to work. **Obsidian, basalt,** and



This large block of black basalt shows evidence of percussion flaking. It comes from a prehistoric quarry near McAllister in southwestern Montana. *Courtesy Montana Archaeological Society.*



"Knapping" is the process of making stone tools by flaking special kinds of rocks.

Percussion flaking involves using a hammerstone (left hand) to strike a block of stone that can be chipped, sometimes called a "core" (right hand). *Courtesy Kootenai National Forest.*

**porcelanite** are other types of stone used by prehistoric people in Montana. Obsidian and basalt are volcanic in origin and are usually black in color.

Many kinds of raw **toolstone** are found throughout Montana. A **quarry** is a specific place where people obtained this toolstone. Prehistoric people often traveled great distances to collect particular kinds of toolstone. One of the places they got obsidian, for example, was Obsidian Cliff in Yellowstone National Park. But these early people also gathered other toolstone, especially chert, on mountainsides and in riverbeds wherever they encountered it in Montana.

The crafting of stone tools by carefully removing pieces of material is called **knapping**, or sometimes "flintknapping" (even though other stones besides flint were used). Prehistoric people used a fist-sized rock called a **hammerstone** to craft raw stone into tools. With a hammerstone or large piece of antler, prehistoric **flintknappers** carefully chipped away excess material like modern-day sculptors. This is called **percussion flaking**. It gave a rough shape to the

tool. Then the flintknappers used antler tools in **pressure flaking** the stone into a finished, sharp tool. If a piece of flint broke in the wrong place while being worked, it was either reworked or discarded. Archaeologists find waste flakes or "chips" at sites where ancient people knapped stone. Many primitive-looking tools found near quarries were probably made by children or adults who were just learning to make stone tools.

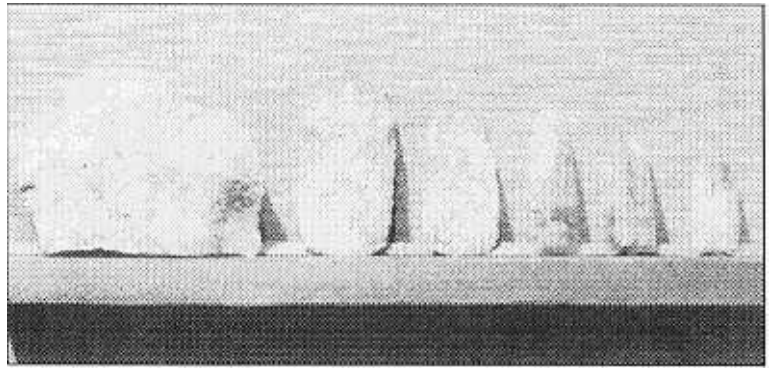
Some stone tools were designed specifically for hunting, butchering, hide working, or cutting. Others served multiple purposes. Unshaped flakes of chert and obsidian were often used for a single task, and then discarded. Hunting weapons required stone **projectile points**, often called "arrowheads." Stone projectile points were **hafted**, or tied with **sinew**, onto a wooden shaft. The earliest people in Montana used **spear points** from twelve thousand to nine thousand years ago. These hunters needed to get very close to animals in order to kill them with a spear. Some archeological sites with very old spear points have been found in Montana. These include the Anzick Site near Wilsall, the Mill Iron Site near Broadus, and the McHaffie Site near Helena.

About nine thousand years ago, Montana's prehistoric groups began to use the **atlatl**, or dart thrower, to throw long narrow darts tipped with projectile points. The atlatl featured a wooden throwing board in which the dart was placed. Throwing an atlatl was like swinging a tennis racket over one's head and propelling the dart at a target. A hunter had to stand and put his entire body into motion to propel

the dart. Because it had a much greater range than earlier weapons, the atlatl allowed hunters to distance themselves from their prey, making hunting much safer. Parts of atlatls have been found in a few cave sites in Montana, but usually only the stone tips have been preserved. Prehistoric people made stone atlatl projectile points of many shapes. Some styles relate to particular time periods. Depending on the style or styles found at a particular site, archaeologists can then estimate the site's age and **chronology**—its placement in time. Today, atlatl enthusiasts hold contests to test their skill using this ancient weapon.

Prehistoric people in Montana used the atlatl until about two thousand years ago. Then the **bow and arrow** (using true "arrowheads") replaced it as the preferred hunting weapon. The bow and arrow had advantages over the atlatl. This new weapon could shoot longer distances with greater accuracy. And it required less movement by the hunter, making it less likely that the animals being hunted would be startled and run away. Montana Indians continued to use the bow and arrow until the late 1800s, even after guns were introduced.

Most projectile points and other stone tools that people find today were not lost by prehistoric people. They were thrown away and replaced when they were no longer usable. Projectile points were used like pencils are today. When a pencil point breaks, it is not thrown away. It is resharpened



and used again and again. Ancient hunters also resharpened and reshaped their points until they were beyond repair. Only then did they throw the points away.

Stone tools served many purposes. When a game animal was killed, ancient people used stone **butchering knives** and sharp flakes to cut up the animal. They used stone **scrapers** to clean animal hides. And they used **stone drills** to make holes in wood, bone, and leather. Archaeologists have many technical names for the various types of stone tools.

Because stone is an inorganic material—that is, it does not decay easily—stone artifacts are more abundant than other types of prehistoric artifacts. Remember, if you find an artifact, it is best to leave it in place. If you find an artifact on public land that you think an archaeologist should know about, call your local Forest Service or Bureau of Land Management office, or the State Historic Preservation Office (SHPO) in Helena. Professional archaeologists who work for these organizations study and protect ancient sites.

How to make a projectile point: Select a piece of chert, obsidian, or any other fine-grained stone that, when broken, exhibits a conchoidal fracture (a technical term meaning that it breaks just right!). Strike the stone with a harder stone to break off a large flake, or relatively flat piece like the one on the left. Then shape the flake by chipping off smaller flakes from the sides and surfaces with a rock, a bone fragment, or an antler tip. To finish the point, chip the sides finely to create sharp edges. As a final step, Clovis points were "fluted" by popping a flake off the two faces to make a shallow channel. This point can be fastened directly to a wooden shaft with sinew (animal tendon) and natural glue. *Flintknapper, Alan Stanfill, 1987. Courtesy Montana Historical Society.*

## LESSON 3A—VOCABULARY: WHAT IS ANCIENT STONE TECHNOLOGY?

atlatl \_\_\_\_\_  
\_\_\_\_\_

basalt \_\_\_\_\_  
\_\_\_\_\_

blade and core \_\_\_\_\_  
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bow and arrow \_\_\_\_\_  
\_\_\_\_\_

butchering knives \_\_\_\_\_  
\_\_\_\_\_

chert \_\_\_\_\_  
\_\_\_\_\_

chronology \_\_\_\_\_  
\_\_\_\_\_

flintknapper \_\_\_\_\_  
\_\_\_\_\_

flintknapping \_\_\_\_\_  
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hafted \_\_\_\_\_  
\_\_\_\_\_

hammerstone \_\_\_\_\_  
\_\_\_\_\_

hand-axe \_\_\_\_\_  
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heat treatment \_\_\_\_\_  
\_\_\_\_\_

inorganic \_\_\_\_\_  
\_\_\_\_\_

knapping \_\_\_\_\_  
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lithic \_\_\_\_\_  
\_\_\_\_\_

obsidian \_\_\_\_\_  
\_\_\_\_\_

**LESSON 3A- VOCABULARY: WHAT IS ANCIENT STONE TECHNOLOGY? (CONTINUED)**

Paleolithic \_\_\_\_\_

pebble tools \_\_\_\_\_

percussion flaking \_\_\_\_\_

porcelanite \_\_\_\_\_

pressure flaking \_\_\_\_\_

projectile points \_\_\_\_\_

quarry \_\_\_\_\_

scrapers \_\_\_\_\_

sinew \_\_\_\_\_

spear points \_\_\_\_\_

stone \_\_\_\_\_

stone drill \_\_\_\_\_

stone tool technology \_\_\_\_\_

technology \_\_\_\_\_

toolstone \_\_\_\_\_

## LESSON 3A—ARCH ACTIVITY: TOOL TIME

**Grades:** 3–8

**Time:** 50 minutes

**Content Area:** science, history, and writing

**Who:** whole class and small group

**Materials:**

Technology Tool Kit (optional)

pencils

draft paper

Arch Journal

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### OBJECTIVE AND OUTCOME

- Students will learn how ancient people used natural resources as tools to adapt to their everyday world.
- Students will examine prehistoric tools (from the Technology Tool Kit or pictures of tools if kit is unavailable) and will write down modern analogs to prehistoric tools.
- Students will compare the function of prehistoric tools with their modern-day counterparts.

### ACTIVITY

1. Divide the class into four groups. Instruct each group to select a writer and a presenter. Pass out artifact collections (or pictures) to each group. Give each group a certain class of artifacts (i.e. one group receives flintknapping tools—Artifact Group 1; another hunting tools—Artifact Group 2; another receives butchering and hide processing tools—Artifact Group 3; and the other group manufacturing tools like drills and awls—Artifact Group 4).

2. Have each group look at the artifacts for 5–10 minutes and determine how they might be used. Have them write down on paper the function of the artifacts. Also have them brainstorm what tool we use today with the same function. If we don't have a tool today that compares, have them figure out why not and write it down.

3. Have groups trade artifacts (or pictures) until each group has looked at all four artifact classes.

4. Have each group present their conclusions about what/how the artifacts in one of the groups were used. Also have them talk about modern analogs. Discuss.

5. Once the class discussion has ended, have students write—in their Arch Journal—their conclusions about how prehistoric tools were used and what they learned from this activity. Have them list their conclusions by artifact classes.

### EXTENSIONS

3–5:

- Research vocabulary.

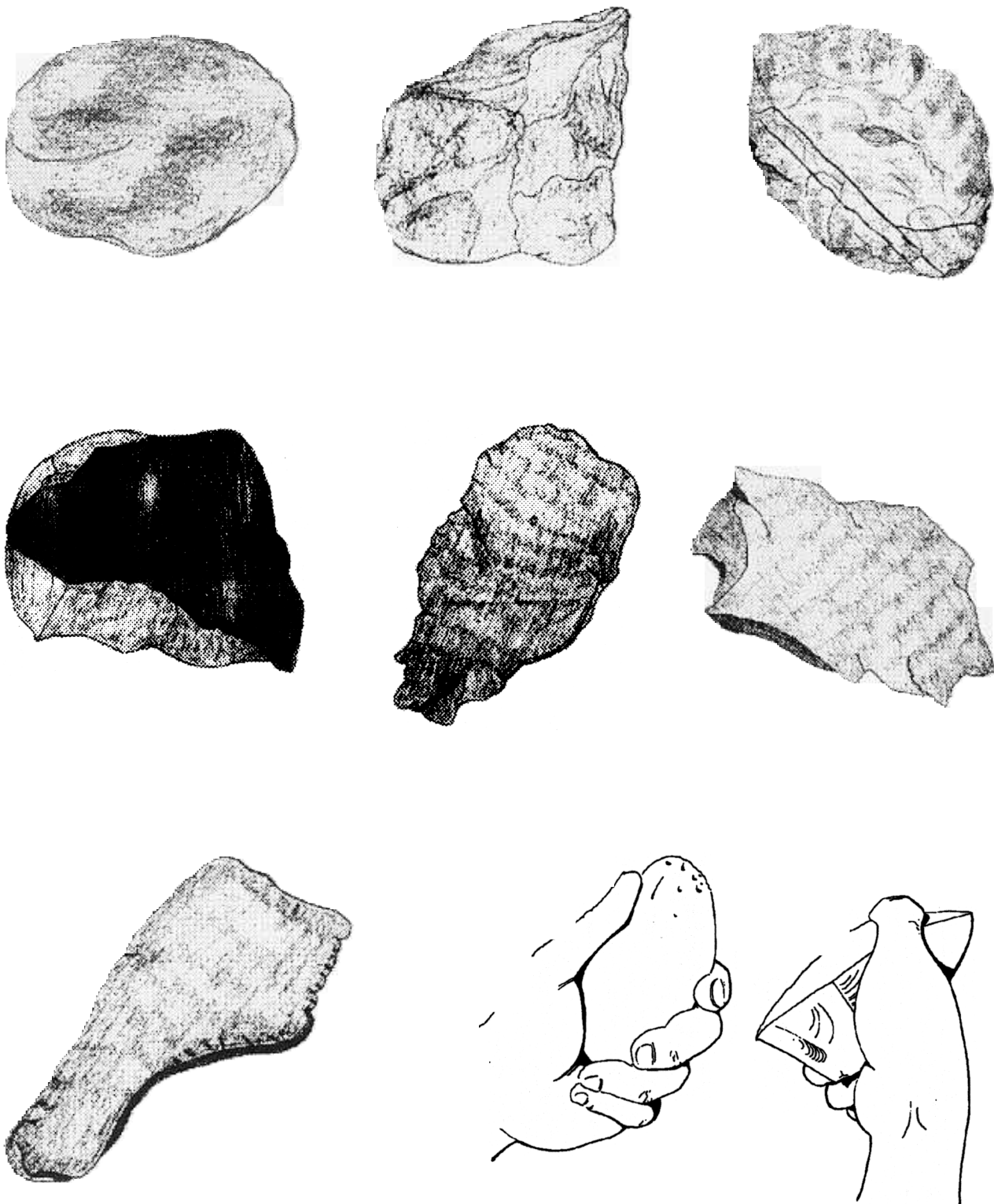
See: Lesson 3A—Vocabulary

6–8:

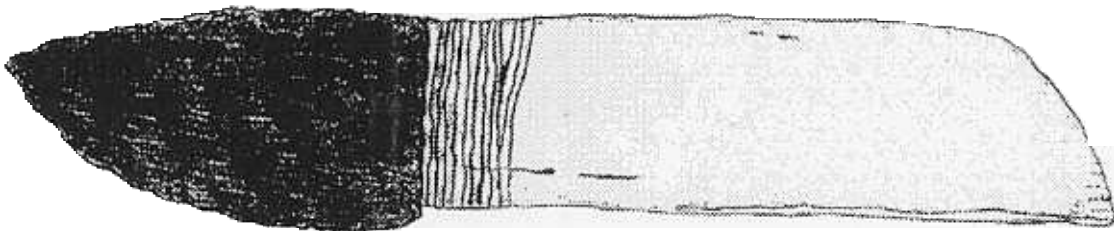
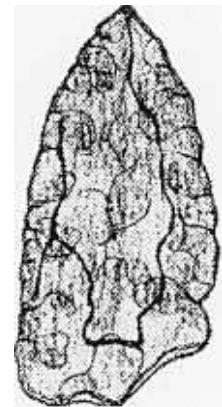
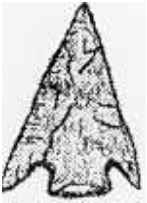
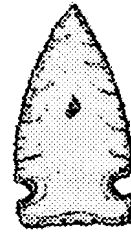
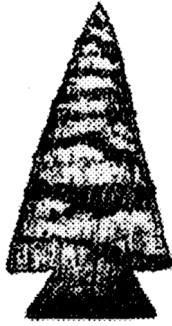
- Challenge students to place the projectile points in rough chronological order based on the information provided in the narrative. Have them determine whether the points were used with spears, atlatls, or the bow and arrow. Have them assess which technology is the oldest and which is the most recent. Challenge students to read about archaeological sites and the kinds of stone tools found at them.

See: *Montana Archaeology Education Resource Catalog*: Student Reading List.

**LESSON 3A—ARCH ACTIVITY: TOOL TIME**  
**GROUP 1**

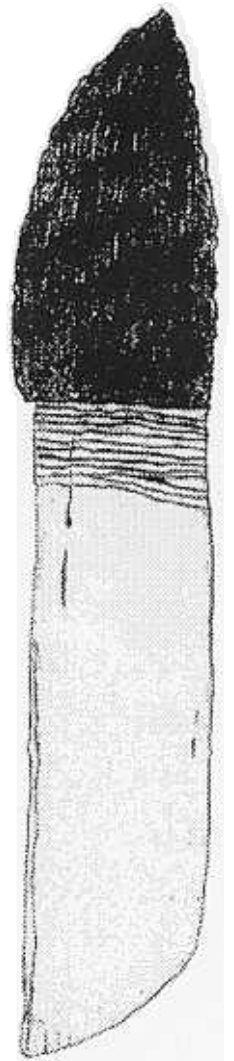
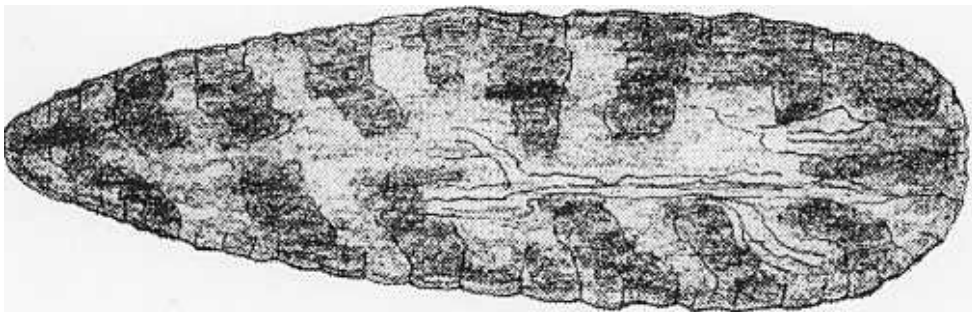
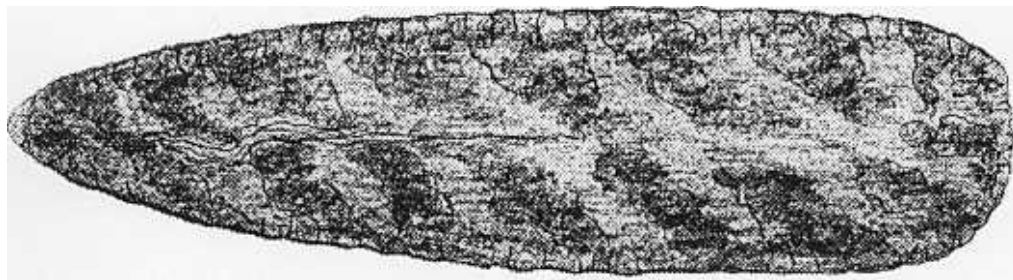
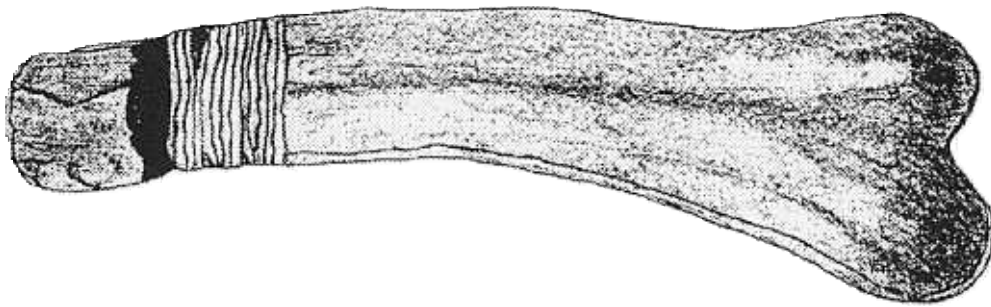


**LESSON 3A—ARCH ACTIVITY: TOOL TIME**  
**GROUP 2**





**LESSON 3A—ARCH ACTIVITY: TOOL TIME**  
**GROUP 3**



**LESSON 3A—ARCH ACTIVITY: TOOL TIME**  
**GROUP 4**

