

Making an Atlatl

Essential Understanding: Early people used scientific principles to create technology.

Guiding Question: How did people hunt?

Activity Description: Students will work in groups to construct an atlatl and fletched dart and then practice throwing at a target.

Objectives:

Students will

- Understand how an atlatl and dart work and the mechanical advantage they provide.
- Discover how early peoples hunted before they invented bows and arrows.
- Recognize the tremendous skill it took to hunt large game in pre-contact times.

Grade Level: 4-8 (adaptable for high school)

Time: 1-2 class periods

Teacher-provided Materials:

- 5/8"-diameter, 48"-long wooden dowels (one per every two students)
- Duct tape
- Scissors
- 1"-diameter, 24"-long pieces of wood (scrap wood or cut a 2x4 lengthwise to make two), one per student
- Hammers
- 1" finishing nails
- 80 grit sandpaper
- 2 big sheets of insulation material to build a target (optional)

Standards

MSSC 4.5 Identify and illustrate how technologies have impacted the course of

history/identify major scientific discoveries and technological innovations and describe their social and economic effects on society.

MSCS 2.6 Identify, build, and describe mechanical systems and the forces acting within those systems.

MSCS 5.5 Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures.

MSCS 6.1 Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples.

Teaching Notes: We recommend that you watch YouTube videos of people throwing and constructing atlatls and that you practice throwing an atlatl before you do this activity with your students. There are MANY videos available. It takes about five minutes of dedicated practice to be able to throw an atlatl (not well enough to hunt, but well enough to demonstrate to your class).

Classroom management skills are vital. Emphasize safety. Have the students who aren't actively throwing their darts sitting down. Make sure everyone has thrown before anyone gathers darts.

Pre-lesson Preparation

1. Learn to fletch a dart using duct tape by watching a YouTube video. You can find good videos by using the search terms "atlatl fletching duct tape" and/or reviewing pictures below.
2. Find a video of an atlatl competition to share with your students.
3. Review photos showing atlatl construction (below).

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Making an Atlatl (continued)

Procedure

1. Share background information about atlatls and their use.

The people who lived in this region began to use atlatls about 9,000 years ago. These dart throwers helped them throw long narrow darts tipped with projectile points much farther than they could throw spears.

The atlatl featured a wooden throwing board in which the dart was placed. Throwing an atlatl is like swinging a tennis racket over one's head and propelling the dart at a target. Ancient hunters had to stand and put their entire bodies into motion to propel the darts. 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 estimate the site's age and chronology—its placement in time. Indigenous people in Montana used the atlatl until about 2,000 years ago. (Have the class figure out how long this technology was regularly used: for 7,000 years.)

Then the bow and arrow (using true "arrowheads") replaced atlatls 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.

Today, atlatl enthusiasts hold contests to test their skill using this ancient weapon. (Text adapted from "What Is Ancient Stone Technology?" *Montana Ancient Teachings*:

A Curriculum for Montana Archaeology and Prehistory. Helena, MT, 1997.)

2. Show a YouTube video of an atlatl competition.
3. Tell students they will be creating darts and atlatls and then participating in a competition of their own.
4. Let them know they will first create a dart. Distribute duct tape, scissors, and dowels (one dowel per two students). Demonstrate how to fletch a dart using duct tape.
5. Have students create duct tape fletching.
6. Have students carve a 1/4"-inch deep circular depression in the fletched end of the dart. (This is where the point of the atlatl will engage the dart.)
7. Allow them to decorate it as they see fit.
8. Have students create the atlatl.
 - a. Distribute wood, sandpaper, and nail to each student.
 - b. Have students use the sandpaper to sand and round the last six inches into a smooth handle.
 - c. At the unfinished end: Have students drive the nail at a 45-degree angle pointing toward the sanded handle.
9. Take students outside to a target. Demonstrate how to throw the atlatl. Line them up so half the class throws at the same time. After everyone in the first group has thrown the dart, gather all the darts and let the second group have a turn.

Discuss physical principles behind the atlatl: The atlatl extends the length of the wrist/hand, increasing its throwing leverage and, therefore, the distance/velocity with which the dart can be hurled. The atlatl works by increasing the radius of rotation of the wrist, from about three inches (eight centimeters) for an unaided throw, to about thirty inches (seventy-five centimeters) for a throw with the atlatl.

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Making an Atlatl (continued)

Imagine the motion of a small wheel within a larger wheel; the radius of the smaller wheel represents the movement of the wrist and the radius of the larger wheel represents the movement of the atlatl. When the same angular rotations are applied at the shoulder, elbow, and wrist, the atlatl increases throwing distance and velocity.

The entire undertaking is a complex mechanical action involving three fulcrums (shoulder, elbow, and wrist) and two levers (forearm and atlatl). It increases the mechanical advantage of the atlatl over throwing with the arm about six to one. If you can throw a dart forty-five feet (fifteen meters) with your arm alone, you could throw it about the length of a football field (ninety-one meters) with the atlatl. (Adapted from “The Mathematics of the Atlatl,” Nishikawa & Ratliff, 2001; “Investigating the Physics of the Atlatl,” Davis, 2010.)

Extensions

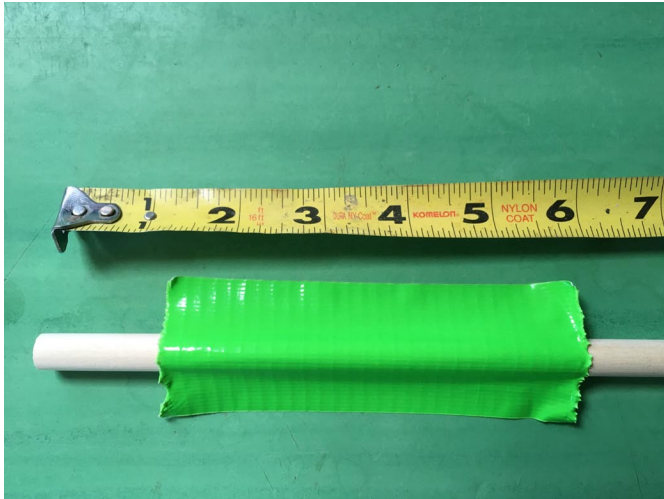
Have students use a large protractor to determine the best throwing angle for the longest distance.

If you have time, you can make the darts and atlatls more authentic by using traditional materials (sinew, red osier dogwood, feathers, etc.).

Making Atlatls and Darts

Making a Dart with Duct Tape Fletching

Step 1: Place first piece of duct tape.



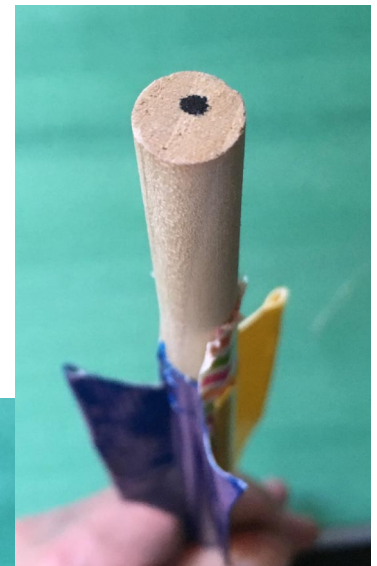
Step 4: Shape duct tape using scissors.



Step 2: Place second piece of duct tape.



Step 5:
Mark place to carve out dart.



Step 3: Place third piece of duct tape.



Step 6:
Finished dart.
(The hole is where the dart will fit into the atlatl.)

Making the Atlatl

Step 1: Gather tools.



Step 3: Sand handle.



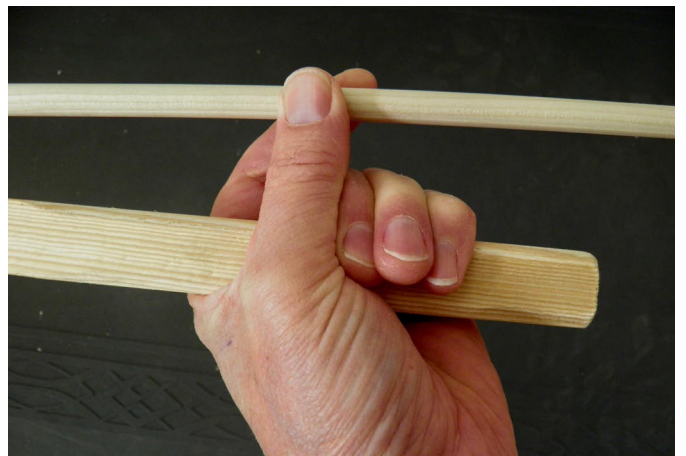
Step 2: Place screw or nail (this is what the dart will fit onto).



Step 4: Fit the dart nock to the screw or nail.



Step 5: Show proper hand position.



Finished Atlatls

Student-made atlatl with dart



Traditional atlatls (without darts)

