“Arlington Springs Man”

Resource Summary: Students begin by reading the article and marking the text. Students then watch the video segment and engage in a class discussion and personal reflection. Next students use information from the article and video to create a “One-Pager” as a summative representation of their learning.

Subject Areas: Geoscience Processes, Fossils, Relative and Absolute Dating

Grade Level Range: 7th-8th Grade

Standards:

MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Resource Provided By: Kalley Ridgway, 7th Grade Science, La Colina Junior High, Santa Barbara Unified School District

Resource Details:

*Lesson designed to follow a learning segment on fossils and relative/absolute dating. Plan is divided into a 3-day learning segment (150 minutes total).

Day 1: Students start by watching the 9 min. video segment: *Arlington Springs Man* (https://channelislands.squarespace.com/tales/arlington-springs-man). Students are provided with questions to answer while watching the video.

Question ideas:

- Why is it helpful to paleontologists that the Channel Islands have no burrowing animals?
- Where did pygmy mammoths come from? How did they get on the islands?
- When do they believe pygmy mammoths disappeared?
- Who was given the nickname “The Last of the Bone Hunters”?
- Orr’s fossil discovery was found how many feet below the surface? What was he able to assume because of this?
- What tests were done to determine the age of the Arlington Springs Man’s bones?
- How old were the bones?
- Why was finding a human bone dated the same age as the Clovis site in South America so significant?
- How did scientists originally believe the Americas were colonized?
- How do scientists now believe humans came to the Americas? What is the kelp highway?
- What is said to be the “new frontier”? Why?

The video is followed by a class discussion about these questions. Next students take 5-7 minutes to write a personal reflection about the video. You can prompt them with questions like: What new information did you learn? What did you find most interesting? What did you find shocking or strange?

Day 2: Students are each given a copy of the article “Arlington Springs Man.” Article is read together as a class (call on/ask for volunteer readers for each paragraph). As they read, students mark the text by: numbering the paragraphs, circling unknown words, boxing key terms/names/places, and underlining important sentences. Teacher facilitates class discussion along the way to help clarify statements and elaborate on key points.

Students are then given directions on how to create a One-Pager using the information gathered from the article and video. (See directions on One-Pager document attached) Students use remaining class time to start working on One-Pagers.

Day 3: Students complete their One-Pagers and share their final products with their classmates during last 10 minutes of class.

Arlington Springs Man

By John R. Johnson, Ph.D.
Santa Barbara Museum of Natural History

Mark the text:

- # the paragraphs
- circle unknown words
- box key terms/names/places
- underline important sentences

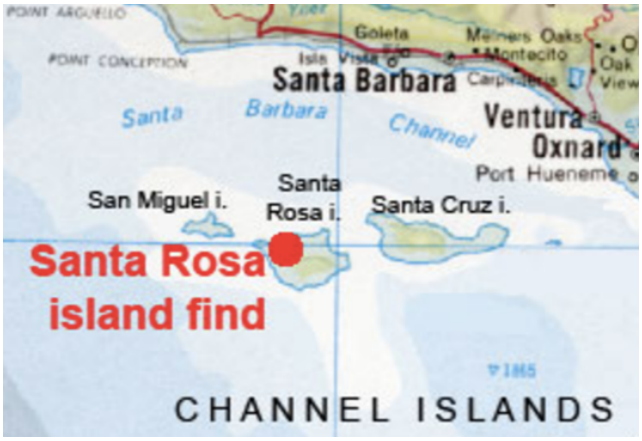
Background:

When archaeologist Phil C. Orr's discovered human skeletal remains eroding from the side wall of Arlington Canyon (Santa Rosa Island) in 1959, he recognized their significance for shedding light on the earliest human visitors to the Channel Islands. At that time, radiocarbon dating techniques were still being developed so that determining an accurate age for the human bone protein was not possible. Nonetheless, Orr realized that the bones, buried 37 feet below the existing ground surface, came from sediments dated to the end of the Pleistocene. His article regarding this momentous discovery was published in *Science*, our nation's leading scientific journal. Recognizing that future improvements would allow a more accurate assessment of Arlington Man's age, Orr jacketed the block of earth containing the bones with plaster and brought them to the Santa Barbara Museum of Natural History for long-term storage.


Phil Orr, 1959

In 1987, long after Orr's retirement, advances in bone protein analysis and radiocarbon dating made direct dating of collagenous amino acids possible in Arlington Man's femur. Don Morris, newly installed as Channel Islands National Park's archaeologist, contacted Dr. John Johnson, the recently hired curator of anthropology at the Santa Barbara Museum of Natural History, to unwrap the plaster-jacketed block of earth and initiate state-of-the-art analyses of Arlington Man's remains. The earliest attempts were not promising. Because of the great age of the bones, very little collagenous protein remained. Eventually using a resin filtration method that he pioneered, Dr. Thomas Stafford, a geologist and radiocarbon dating expert, obtained a small sample of collagenous amino acids from a small femur fragment. The astounding result of when Dr. Stafford's dated this protein was that Arlington Man was 13,000 years old. These remains represented the oldest reliably dated human bone in the Americas!

Significance:



What are some of the significant findings that emerge from the discovery of human presence on Santa Rosa Island about 13,000 years ago and ongoing studies of the Arlington Springs Site? At the end of the Pleistocene, the sea level was a lot lower than today and what are now four islands were then all connected together in one mega-island, known to scientists as Santarosae. That island was never connected to the mainland, so Arlington Man's presence implies use of watercraft along the coast 13,000 years ago.

One of the scenarios for how the ancestors of Native Americans first entered the continent was by a coastal migration route as the glaciers along the western margin of the continent gradually retreated. Thus, the Arlington Springs Site provides evidence to show that people indeed were using boats along the Pacific Coast not long after Paleoamericans entered the continent. Paleontological evidence reveals that Santarosae had different flora and fauna at the end of the Pleistocene than do the Northern Channel Islands today.

Pygmy mammoths and a giant deer mouse left their bones in the same geological formation that contains Arlington Man's bones. Because full-sized Columbian mammoths were being hunted elsewhere in North America during the late Pleistocene, there is reason to believe that Arlington Man's people likely pursued the pygmy mammoths that they found on the island. Although no conclusive evidence for pygmy mammoth hunting has yet been discovered, it must be pointed out that sea level rise has inundated and obliterated the most likely coastal locations where people would have lived at the end of the Pleistocene, both on the island and on the mainland. Arlington Springs would have been an interior island location some 13,000 years ago, several miles from where the coast then existed. The fact that Arlington Springs is the only site in coastal California known to date to the Late Pleistocene makes it of exceptional importance for contributing to our knowledge of the earliest peoples to inhabit our region.

The One-Pager

Description/Explanation: A one-pager is a comprehensive response to your learning experience. It is a way to make your own unique statement about what you have learned. It is a way to be creative, experimental, and it allows you to respond imaginatively while being brief and concise.

Purpose: The purpose of a one-pager is to own what you have read and watched. Our minds work better when we are asked to do something with what we are reading and seeing.

Connections: A one-pager connects the verbal with visual. It connects the author's thoughts to your own. It also makes connections between words and images.

Directions/Check List: (remember to outline illustrations/text in black pen)

- ☐ Read the assigned pages. Mark the text as directed and record notes, ideas, and your thoughts in the margins. *Do this as you read!*
- ☐ Put the title of the reading on the back of this paper.
- ☐ Create a border design around the four edges of the paper. **The border should relate to the reading/video.**
- ☐ Pull out at least 3 important quotes from the reading and write them on the page.
- ☐ Draw 3-5 illustrations on the paper. **The illustrations must relate to the reading/video, be well done, and colorful.**
- ☐ Find 3 **unfamiliar** words and define them.
- ☐ Scatter 5-7 words or phrases around the illustrations. These words and phrases need to relate to the reading/video.
- ☐ Write a personal reflection about your learning experience. This should be at least 3 sentences (what you think and why). Make sure to use academic language.
- ☐ Use colored pencils, and pens to make your page visually appealing.
- ☐ Write your name, date and period on this side of the paper.

Additional Resources:

Relative vs. Absolute Dating:

- https://prezi.com/u-xtjxz4ovil/relative-vs-absolute-dating/

Archaeologic History:

- Clovis Site: http://www.smithsonianmag.com/history/the-clovis-point-and-the-discovery-of-americas-first-culture-3825828/
- The Kelp Highway: http://natural-history.uoregon.edu/research/paleocoastal-research-project/kelp-highway-hypothesis
- Evolution of the Pygmy Mammoth: https://www.nps.gov/chis/learn/historyculture/pygmymammoth.htm