Student Edition

California Education and the Environment Initiative

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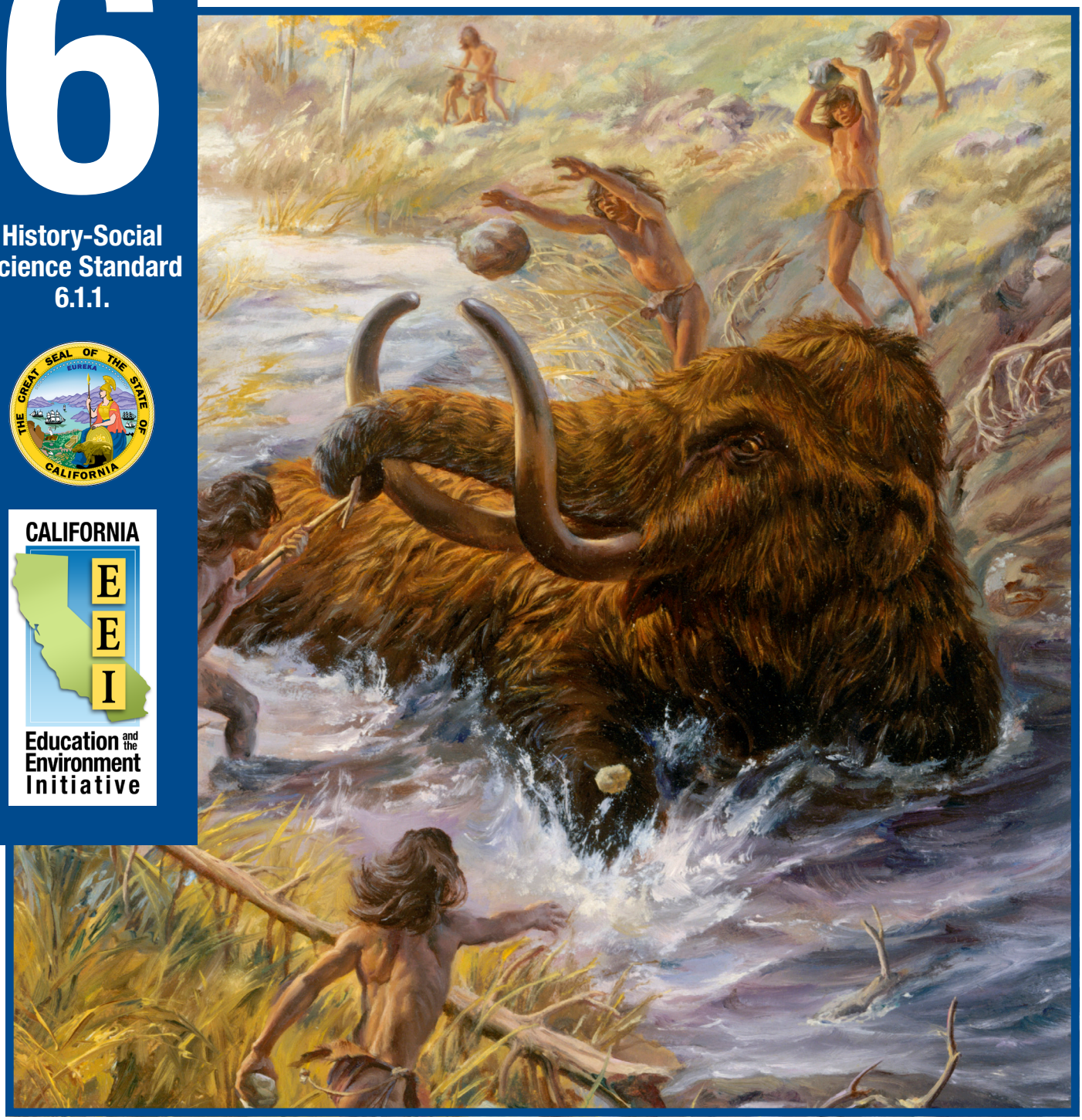

Paleolithic People: Tools, Tasks, and Fire

California Education and the Environment Initiative

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California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

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None required for this lesson.

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Gathering Resources from the Sea

Thousands of years ago, the San Dieguito Paleo-Indians lived along the shores of the San Diego Bay. Theirs was the earliest known culture in California. The Indian people spent part of each year inland, near the mountains, and the rest of the year along the coast. There were many sources of food on land and in the shallow waters of the bay. In tide pools and lagoons, the people gathered abalone, mussels, scallops, and clams. The San Dieguito made tools from stone, shell, and bone to help them hunt and fish.

In 1542, explorer Juan Rodriguez Cabrillo sailed Spanish ships north along the Baja coast into California, landing in San Diego. There, the Spanish found plenty of scallops, clams, lobster, and crayfish in the waters. He and his men also met the Kumeyaay, descendants of the San Dieguito Paleo-Indians, then living around San Diego Bay. The Kumeyaay made nets and traps out of agave fiber to help them catch fish and the other sea life that was readily available. They wove tule reed boats, which they paddled out beyond the breakers. Out on the ocean they caught larger fish using sharp hooks carved from abalone shells and fishing lines made from yucca fibers. The Spanish settled in California, building the first mission and military fort near San Diego, where resources from the land and the sea quickly became famous back home in Spain.

Tule reed boat

Another popular fishing spot in California, for both Indian cultures and the people coming from Europe, was the San Francisco Bay. People from all over the world came to California during and after the Gold Rush, and many of them had experience in fishing. They settled in the San Francisco area and helped build a large fishing industry there. After an earthquake destroyed the city of San Francisco in 1906, many of these fishing families sailed south to San Diego.

The Mighty Sardine

These fishermen concentrated on gathering a fish that was not very popular at the time—the sardine.

These little silvery fish lived in great numbers off the coast in San Diego waters. Sardine fishing had always been popular in the area, and a large boat was not necessary to do it. Rowing out in small boats, the fishermen spread nets on top of the kelp beds off Point Loma. The nets had small holes that caught sardines. The fishermen then handpicked the sardines out of the nets, one by one. Because this took so much time, a few hundred pounds of sardines was considered a "big catch."

Soon, fishermen developed a new net called the *lampara* (lam-pah-rah). With this net, a person could scoop out sardines without having to handpick them off the net. The fishermen could catch many more sardines, because it did not take as much time to unload their nets. In fact, they began to catch more fish than the local people would eat. To preserve the fish, people began canning sardines, using oil to preserve them. Two men, Alex Steele and Edward Hume, started the first sardine cannery in San Diego. Canning made it possible to ship sardines across the country. The popularity of the little fish grew. In a few years, crews had harvested so many sardines that they had almost gone extinct. They became harder and harder for fishermen to find, and the sardine business declined.

Birth of an Industry

In 1908, fishermen began to buy boats with gasoline-powered engines. The engines made it easier to move in the bay and out into deeper waters. With the faster boats, the fishermen could now catch faster-swimming fish, like bluefin and albacore tuna. In 1911, the Pacific Tuna Company began to can albacore in San Diego. The company sold the fish by advertising that it had a mild flavor, similar to chicken. People across the country started to buy tuna, and the tuna industry grew.

After sailing out to sea, fishing crews would drop live bait over the sides of their boats. The tuna went for the bait. Fishing crews then hooked the tuna on lines and brought them close to the boat. Then they pulled the fish over the side. There were so many tuna and the boats were more spacious, allowing the average boat to bring in 100 to 200 tons of fish at a time.

By the 1920s, San Diego fishermen were harvesting over 97,000 tons of tuna per year. The city became known

Tuna fisherman

Common dolphins

as the Tuna Capitol of the World. After World War II, large companies began to buy up the canneries in San Diego. These large companies helped small boat owners buy bigger boats. The new boats could travel 3,000 miles on a single tank of fuel. Most of the boats also had refrigerators on them to help keep the fish fresh on the way home. They also used a new kind of net, called a *purse seine* (purs-sen) net.

New Technology

These nets are over a mile long, and are shaped like a bag–closed at the bottom, with an opening at the top. The fishermen use the net to surround a school of tuna. When the net is full, the boat crew closes the bottom and top, like a drawstring. This herds the fish into the center of the net. Then the workers use smaller nets to scoop the tuna into the boat. The tuna are refrigerated or frozen soon after they hit the deck.

As more and more boats used purse seine nets, the populations of tuna and other fish near shore went down. This meant that San Diego fishermen had to travel farther to find fish further out in the Pacific Ocean. On their long journeys out to sea, the tuna fisherman started to notice something—that when they would see dolphins around, the tuna were not far away. It was easy to spot schools of dolphins as they came to the surface to breathe. The tuna crews discovered that tuna were usually swimming below the dolphins. The Eastern Pacific Ocean is the only place in the world where these two species swim together.

Using this new knowledge to help hunt for tuna, fishing crews began using new technique called “dolphin-set” fishing. A person in a plane (later on helicopters were used) would fly over the ocean, looking for dolphins. The fishing boats would be nearby on the surface of the water, waiting for the person in the plane to tell them where the dolphins were and where they were heading. Once they had this information, the crews got ahead of the dolphins

and set up purse seine nets around them. When the nets were full, the crews pulled the nets' bottoms together, and the tuna swimming underneath the dolphins were captured.

However, the nets caught the dolphins as well. If the dolphins did not jump out and over the tops of the purse seine nets, the nets would hold them underwater. The trapped dolphins could not get to the surface to breathe. Between 1950 and 1970, six million dolphins died in purse seine nets in the Pacific Ocean. People all over the world called for a change in the way tuna was being fished. To protect the dolphins, the U.S. Congress passed the Marine Mammal Protection Act in 1972. This Act made it illegal to "take" marine mammals in U.S. waters, or for U.S. citizens to "take" them in other waters, or bring marine mammals and marine mammal products into the United States.

Changing Our Ways

This meant the tuna fishermen in California had to change their methods. They began using a new net called the Medina Panel. This net would not entangle the dolphins. They also began using a technique called "backing down." After they set the net, the crew pulled the nets lower in the water, out from under the dolphins, allowing the dolphins to escape. These new nets and techniques prevented the deaths of many dolphins. However, the 1980s were also hard on tuna fishermen for other reasons. In 1982 and 1983, the waters of the Eastern Pacific Ocean got warmer (the El Niño effect). Tuna that had once lived close to the California coast moved to cooler, deeper waters further out in the Pacific. In the cooler waters, tuna and dolphins do not swim together. It became harder for the fishermen to find tuna and to travel such great distances to hunt for the fish. At the same time, many other countries around the world began fishing for tuna and opening their own canneries. It soon was less expensive for a shopper to buy tuna canned in other countries than to buy tuna canned in California.

Over the years, the fishing industry in California has had its ups and downs. Many people still hunt and gather fish and other resources from our coastal waters (to the extent that current laws allow), just as humans have for thousands of years. Other people have started to raise fish and other living things from the sea on farms. Although the tools and techniques for gathering them may be new, our needs for these resources from the sea have never changed.

Tuna fishing with purse seine

Petra, an Early Paleolithic Girl

Petra woke up, stretched, yawned, and slowly opened her eyes. She blinked at the bright light coming in through the opening in the rock shelter. She uncurled her body, feeling the dirt and small rocks she had been laying on rub against the hair that covered her skin. Her little brother was still sleeping. She ran outside to find food she could eat. The adults from her clan were sitting on the ground, their bodies naked in the warm sunshine of Africa.

Map of Wadi Kubbaniya

Her mom had gathered some nuts and fruit while Petra was sleeping. When she saw her daughter, she pointed to the small pile of food, grunting and pointing at Petra's mouth. Petra understood that this food was for her, so she sat on the ground and used her fingers and teeth to open the delicious fruit. She was glad her mom had gathered this. Her mom's hands were bigger than her own so she could gather more food at one time.

While she ate, Petra hoped that today she could follow her people on their scavenging trip. She had not eaten meat in a while and was hungry for it. She heard a loud sound and turned to watch her father hitting a rock with another rock. This was a good sign; it meant they would be going out to find food.

Petra's little brother had woken up, and he pointed at the nuts Petra had not eaten and pointed to his belly. She smiled and gave him her leftovers.

The members of the clan soon gathered, each with a small, sharpened stone that could be used to cut into hide or through bone. They needed to leave before the Sun was high in the sky and too hot. They would look for a sick or dead animal to scavenge. Some of the people stayed behind to protect their babies and young children from being eaten by large predators.

The group left. A while later, they found a big animal in the grass that had been killed and partly eaten by predators. They used their stones to cut through the animal's hide and bones, and they quickly cut out as many chunks of meat as they could before the predators returned. They ate some meat and saved some to bring back for the people that had stayed behind.

On the walk back to where they had been the last few nights, they found a stream of water. They all lowered their hands to cup water into their mouths. Petra was happy with a belly full of meat and water. She was disappointed that she had not been able to see the men hunt, together pouncing on an animal to bring it down. However, she knew that hunting was dangerous because sometimes the men would get hurt. Hunting did not happen very often.

Paleolithic people scavenging mammoth

Knowing how much her little brother enjoyed eating bird eggs, she climbed a tree where she had seen birds flying in and out of a gap in the leaves and found a nest with an egg to give him.

Petra knew they would soon be moving to a new location, as they had done ever since she could remember.

Paleolithic period stone tools

Peter, a Late Paleolithic Boy

Peter woke up, stretched, yawned, and slowly opened his eyes. He blinked but could not see much because the shelter, which was made out of mammoth bone and hide to keep the cold air out, also kept out the light. He wrapped his animal hide clothing tighter, put on his hide shoes, and prepared himself for the blast of cold air that would hit him when he walked outside. His little sister, whose tiny body was curled against him for warmth, looked at him and spoke in their language, "I'm cold! Don't leave yet!"

They lived in the area that today we call Ukraine, where it was very cold. They moved often, following the migration of the mammoths. Peter remembered when he was little that they had lived in an area that was warmer, but they had been traveling ever since he could remember, and now they lived in an area that was always cold.

Peter ran outside to find food to eat. The adults from the clan were sitting on hides and had a fire going to keep them warm. His dad patted the seat next to him and offered his son mammoth meat that had been preserved in the cold ground. Peter's father had used a hand ax to cut the meat into chunks. The ax was made from a piece of stone, first struck from the big rocks near the stream.

Peter found a stick, put it through the chunk of meat, and held it over the fire to cook. When his little sister came out of the shelter, Peter looked up and smiled. She was wrapped in so many layers of animal-skin clothing that she could barely walk. Just then, his mother walked up. She had been down at the stream and was carrying a container of water and three fish she had caught in her net.

Peter's father told him they would be going out to hunt

Map of Ukraine

today. His eyes brightened because he would be able to use the spear and spear thrower his grandfather had made for him. Some of the people of the clan started to gather, each with a spear made of bone or antlers or a bow and arrows. They also carried spear throwers they would use to help them throw their spears longer distances.

Others would stay behind to tend the fire and keep their babies and young children warm. They would also cook the meat they had preserved, since they would be moving to a new location soon. Peter reminded his mother to check the snare trap he had set a few days ago, hoping a rabbit had been caught in it.

Reindeer hunting

The group left. A while later, they found a herd of reindeer. They hid behind some rocks, discussing how to kill as many animals as they could. It was decided that eight of them, including Peter, would aim for four of the reindeer. At the leader's signal, four men shot their bows and arrows and the other four used their spear throwers to hurl their spears at the animals. The animals ran, leaving the wounded ones behind. The hunters quickly killed the wounded animals. Peter's grandfather had brought a sled to bring the dead animals back to their shelter where they could be butchered and their meat preserved by putting it on racks over low fires for drying and for smoking.

Peter smiled as he thought of the tasty meal they would enjoy. On the way back he found a frozen rabbit and decided to take it home for his sister; scavenging was the easiest way to get meat!

Bone and hide shelter

A Mastadon Mystery—Theory A

Why did mastodons become extinct at the end of the Ice Age? Scientists do not know for sure. However, based on fossil records and other things they have studied, they have several possible explanations. Here is one of their ideas.

People during the Pleistocene killed mastodons and other large mammals for food and tools. We know this because scientists have found spear points in the bones of some animals. Some scientists think Paleolithic people killed so many mastodons that the species could not survive.

Early people made changes to the environment. For example, when they used fire to hunt, they burned plants. This changed the food and habitat available for animals. Some scientists think these habitat changes may have caused the extinctions.

In Australia and North America, large mammals became extinct about the time humans arrived in the region. We know this from studying fossils and bones. This suggests that human practices caused the extinctions.

A Mastadon Mystery—Theory B

Why did mastodons become extinct at the end of the Ice Age? Scientists do not know for sure. However, based on fossil records and other things they have studied, they have several possible explanations. Here is one of their ideas.

Most plants can only grow in places where the temperature is right for them. Plants cannot grow where it is too warm or too cold. Scientists who study ancient plants and fossils know that temperatures rose at the end of the Ice Age. Glaciers melted, and rainfall patterns changed. These changes caused the environment to change too.

Many plants could no longer grow in the same places or at the same time of year. When the plants in an area change, the animals that live there often have trouble surviving. Some scientists think climate and ecosystem changes are what caused mastodons and other large mammals to become extinct. Their food sources may have disappeared, or they may have faced climate conditions in which they could not live.

A Mastadon Mystery—Theory C

Why did mastodons become extinct at the end of the Ice Age? Scientists do not know for sure. However, based on fossil records and other things they have studied, they have several possible explanations. Here is one of their ideas.

Scientists have discovered that many mastodons during the late Ice Age were sick. The mammals had a disease called tuberculosis. Scientists learned this by looking at mastodon bones and finding signs of the disease.

Tuberculosis is a disease that people get. Tuberculosis spreads from person to person very easily. As humans moved into new areas, they brought the disease with them. Some scientists think tuberculosis spread very quickly from people to all the mastodons. They think this is what caused the mastodons to become extinct.

Tuberculosis alone probably would not have killed all the mastodons. However, the disease would have weakened the animals and made it harder for them to survive other challenges.

A Mastadon Mystery—Theory D

Why did mastodons become extinct at the end of the Ice Age? Scientists do not know for sure. However, based on fossil records and other things they have studied, they have several possible explanations. Here is one of their ideas.

Mastodons were plant eaters. Pictures of mastodons usually show them to be big, peaceful animals. However, scientists have studied mastodon skulls. They have found signs that male mastodons sometimes fought with each other quite ferociously. Studies show that some mastodons died from wounds they got during these fights.

Not much is known about how or why mastodons fought. Most scientists think that climate change, disease, or hunting by humans caused the mastodons to become extinct. Some scientists think that fighting between adult males may have played a part in the mastodons' decline.

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