



# SANTA CLARA COUNTY PARKS

## New Almaden Quicksilver County Park



# Teaching and Activity Guide

Developed by the Interpretive Staff & Volunteers of Santa Clara County Parks  
Revised December 2017

## Site Overview

Thank you for your interest in Almaden Quicksilver County Park. The activities and information in this teaching guide will help you prepare for your park visit. You may print any of the materials for educational use within your classroom.



## Site Policies

The New Almaden Quicksilver Mining Museum is a sensitive and valuable cultural and historic site. Please respect it as you would your home. To preserve and protect this area, it is important to follow all park rules and regulations, including the following:

- Please stay on marked pathways.
- Do not climb on trees, fences or any structures.
- Picking of plants or flowers is prohibited.
- Removal of artifacts or any other items from the park is prohibited.
- Do not touch or move artifacts
- No running inside the Museum

## What to Expect on the Day of your Field Trip

### ***New for 2017-2018 school year:***

***Field trips start at 9:30am and end at 11am. There is no snack break during the program.***

We look forward to meeting your class at **the New Almaden Quicksilver Mining Museum**. Please review the information below to prepare your students and chaperones for a successful field trip.

### **Field Trip Overview:**

Students explore the history and science of mercury mining and its importance to the gold rush and local mining communities through a museum tour and hands-on activities.

### **Before your Field Trip:**

We encourage you to review this [\*\*Teacher's Guide\*\*](#) and visit the [\*\*museum website\*\*](#) to familiarize yourself with the area.

Be advised that there is NO cell coverage at the park, so it is important you communicate field trip details and directions with all chaperones prior to your travels to the park. Do not rely on last minute calls or texts. **If you need to reach park staff in the 24 hours before your field trip, please call the park interpreter directly and/or leave a message at the museum gift shop at 408-918-7777.**

### **What to Bring:**

- Nametags for all students and adults
- Clothing appropriate for the day's weather forecast
- Snacks, lunches (optional)\*

\*Please leave all food and backpacks on the bus or in your vehicles during the field trip. If this is not possible, you may leave lunches in the museum building, but the park is not responsible for any lost or damaged items.

### **What NOT to Bring:**

Students should have their hands free - no backpacks, toys, or food should be carried during the field trip. Cell phones should be silent and out of sight during the field trip. Adults may take photos, but we ask that they do not do so in a way that would interrupt instructional time or pull students away from the field trip activities.

**Getting to the Park:** Casa Grande and the New Almaden Quicksilver Mining Museum are located at 21350 Almaden Road. Casa Grande is the impressive white building with picket fencing just past the Post Office. The Club Almaden sign is still up on the large redwood tree at the entrance.

**From Highway 85** take the Almaden Expressway exit south 6.5 miles to Almaden Road. Turn right on Almaden Road and proceed 2.5 miles west to the town of New Almaden. The Casa Grande will be on your left.

**From Highway 880** take 101 south to 280 north (toward San Francisco). Exit 280 at Hwy. 87 (Guadalupe Parkway) south. Exit Hwy. 87 at Almaden Expressway south (to the right). Proceed about 8 miles to Almaden Road. Turn right on Almaden Road and proceed 2.5 miles to the town of New Almaden.

### **Arrival:**

**Please arrive at least 10 minutes early to check in with park staff and allow students time to use the restrooms.** The program runs continuously from 9:30-11am. If you need to have a snack break before the field trip, please arrive by 9:00am. Instruction will begin promptly at the front entrance at 9:30am.



**Student Expectations:**

In order to ensure a safe and positive learning environment for all, students must...

- Stay with their group at all times
- Show respect for instructors, chaperones, fellow students, and other park visitors
- Show respect for the park, including its displays, trails, rocks, plants, and animals

**Teacher and Chaperone Expectations:**

In order to ensure a safe and positive learning environment for all, adults must...

- Follow instructions of park staff and volunteers and actively participate in field trip activities
- Keep their group of students together at all times and not let students run ahead
- Keep cell phones or other distracting devices on silent and out of sight during instructional time
- Remind students of expectations and encourage good behavior

Note: If behavior difficulties arise, individuals will be sent to the teacher to resolve the problem. If repeated difficulties are not resolved, the field trip may be cut short.

**Departure:**

You are welcome to stay in the museum back yard for lunch following the field trip. You're responsible for picking up all your trash and leaving the park as clean - or cleaner - than you found it. The park is open to the public during your visit, so we ask that you keep noise levels down and be courteous of neighbors and other visitors.

**After the Field Trip:**

We encourage you to reflect on the field trip by asking your students to write a letter to the staff and/or volunteer instructors to share what they learned or enjoyed during their visit to the park. Letters can be mailed to Education Programs, Attn: New Almaden Quicksilver Mining Museum, Santa Clara County Parks, 298 Garden Hill Rd., Los Gatos, CA 95032.

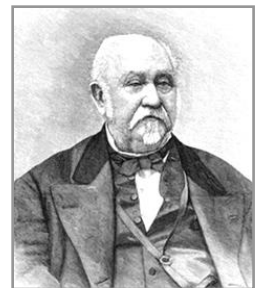
## Background Information



The first people known to have lived in the Almaden Valley were the Ohlone Native People. The Ohlone way of life consisted of a close community where tribal members worked together to provide for their families.

California was still governed by Mexico in 1845. However, John Sutter, on whose property gold was first discovered in California, threatened Mexico's hold on California by encouraging Americans to move west and near his fort in the Sacramento Valley. In 1845, a man named Andres Castillero was sent by the Mexican government to try to convince Sutter to leave

California. On the way, Castillero stopped at Mission Santa Clara. During his stay, he saw the Ohlone painting the church walls with a red paint they created by smashing red rocks in the courtyard. Castillero went on to Sutter's Fort, asked Sutter to leave, and returned to Mission Santa Clara when he and Sutter couldn't come to an agreement.



*John Sutter*

Mexico had recently separated from Spain and, therefore, their normal supply of mercury was cut off. This impacted Mexico's ability to process gold and silver. The Mexican government stated that anyone who could find a source of mercury in its California territory would earn a very large reward. When Castillero realized what he had found, he knew he would be rich. He knew that the Ohlone's red rocks were cinnabar, an ore containing mercury, and that mercury was used to separate gold from the rocks in which it is found. That made mercury very important and very valuable. The Ohlone took Castillero to their "red cave" and he filed a claim and started the Santa Clara Mine on the property that is now Almaden Quicksilver County Park.



1848 was an exciting year in the history of California. The Mexican-American War came to an end and gold was discovered at Sutter's Mill. As a part of the peace treaty ending the war, Mexico sold California to the United States for \$18 million.

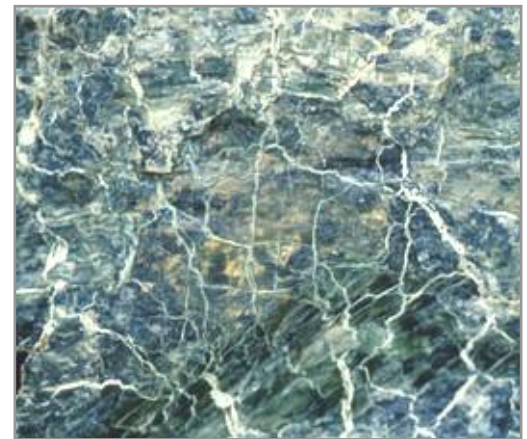
The mine eventually became the New Almaden Quicksilver Mine owned by Barron, Forbes Company who named it after the largest mercury mine in the world in Almaden, Spain. During its years of operation, New Almaden provided mercury for the California Gold Rush, the Comstock silver lode in Nevada, all the western mining states as well as exported to China and other countries.

Large mining operations ceased in New Almaden around 1927 though a few small individual operators continued until 1976. During World War II, large-scale mining operations were resumed to provide mercury needed for the war effort. Modern rotary furnaces were used during this time to process large amounts of low-grade ore. (Remnants of a rotary furnace may still be seen on "the hill.") By 1970, the price of mercury had declined. It cost more to mine and process cinnabar than the resulting mercury could be sold for. In 1973, the County of Santa Clara began purchasing the old mining properties with the goal of creating a county park. In 1975, a good portion of Almaden Quicksilver County Park was opened to the public.

## Geologic History Q&A

### **Q.** Where do our mountains come from?

**A.** During the age of the dinosaurs - the Jurassic Era – the land that is now known as New Almaden was under water. Through the process of plate tectonics, the massive Pacific Plate moved eastward and crashed into the North American Plate. It was a messy crash and some of the heavy Pacific Plate scraped up on top of North America, dragging with it the underlying rock from deep down near the Earth's mantle. During this process, some igneous mantle rock metamorphosed into



*Serpentinite*

**serpentinite**— our state rock! Several million years ago, the Pacific Plate started moving northeast and pressure along a bend in the fault pushed up the surrounding rocks and forming the Santa Cruz Mountains. These mountains are made of many different types of rocks. Most of which formed millions of years ago beneath the ocean. The Capitancillos Range is a smaller range within the Santa Cruz Mountains that contains cinnabar ore.

**Q. What is a fault?**

**A.** "A fault is a fracture in the earth along which there is movement.

Much of California's diverse landscape and complex geology can be attributed to faulting. Faults create spaces below the earth's surface where miners look for valuable metals (such as the mercury at New Almaden) in the form of veins and masses of ore."<sup>1</sup>

**Q. Where does cinnabar come from?**

**A.** The deep fractures of the San Andreas Fault system let molten rock come up near the surface. Hot water forced through the rock carried atoms of mercury into the surrounding rock. The mercury combined with sulfur to make cinnabar. Cinnabar is the ore containing mercury.

**Q. How do we find cinnabar?**

**A.** As the mountains grew, rainstorms washed rocks off the mountaintops creating openings in the hills. The Ohlone found the beautiful cinnabar rocks in one of these openings or caves. (They called the cinnabar mohetka.) When miners came, they enlarged the Ohlone's "red cave" and dug several tunnels, adits, and shafts, following the veins of cinnabar.



*Quartz*

**Q. What are the common rocks and minerals of New Almaden?**

**A.** Rocks: (Rocks are composed of various minerals.)

- *Sandstone, greywacke:* gray
- *Greenstone:* greenish
- *Chert:* red, brown, black, orange
- *Serpentinite:* blue-green

Minerals: (A mineral is an element or distinctive compound that occurs naturally.)

- *Cinnabar:* red, vermilion
- *Quartz:* white, clear
- *Dolomite:* white, cream

**Q. Why Do We Mine Today?**

**A.** Although mining ended at New Almaden in 1976, mining continues for various materials throughout many other parts of the United States and Canada.

- "The mining industry in the U.S. directly employs over 140,000 people, with annual salaries ranging from about \$30,000 to over \$100,000 per year.
- Every American uses over 47,000 pounds of mined products each year.
- Mining lets us surf the Internet since over 40 different minerals are required in the manufacture of computers. (Check out the Internet site given below to find out which specific minerals are used in computers.)

<sup>1</sup> [California Has Its Faults](http://www.consrv.ca.gov/cgs/information/publications/teacher_features/faults.htm). 7 February 2003 <[http://www.consrv.ca.gov/cgs/information/publications/teacher\\_features/faults.htm](http://www.consrv.ca.gov/cgs/information/publications/teacher_features/faults.htm)>.

## Vocabulary & Fun Facts

**Al Maden** means “the mine” in Arabic. The original Almaden Mine is in Spain and began mining activities before 500 BC.

**Fact:** Andres Castillero claimed the first quicksilver mine at New Almaden in 1845, before gold was discovered in California. (This made it the first official mine known by European immigrants in California.) At that time, California was governed by Mexico.

**Quicksilver** means, “living silver.” It is a nickname or descriptive name for liquid mercury.

**Fact:** The mines produced \$75 million of quicksilver before 1945.

**Mercury** is a very heavy metal and the only metal that is liquid at room temperatures. Its chemical symbol is Hg, for hydrargyrum, so you can see why they shortened the name.

**Fact:** Mercury unites (amalgamates) with gold and silver allowing these precious metals to be separated from crushed rocks.



**Cinnabar**, mercury's ore, contains 75% mercury and 25% sulphur and is bright red-orange or vermilion. When it is heated at high temperatures, the ore releases mercury and sulfur gases. (The word *cinnabar* comes from Arabic and means *dragon's blood*.)

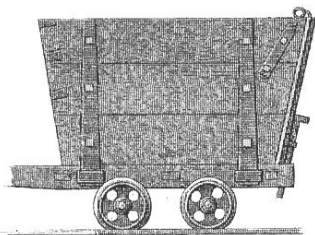
**Fact:** Here at New Almaden, cinnabar was first used by the Ohlone who crushed it to a powder to make a beautiful red-orange paint. They used the cinnabar they dug from the “red cave” in New Almaden to make a paint to decorate their bodies and to trade with other tribes.

When the Spanish missionaries came, it was used to paint and decorate the walls of Mission Santa Clara.

**Serpentinite** is a slippery rock, usually blue-green in color. Cinnabar ore is found where hot water changes the blue-green serpentinite to white, yellow and red rock.

**Fact:** Serpentinite is California's state rock.

An **ore car** was a large, wheeled cart used to haul ore on rails. Ore is the name given to rocks that contain valuable minerals, such as cinnabar.



**Fact:** Ore cars were used to transport ore from the tunnels to the Hacienda's Reduction Works where the ore was processed. To bring the ore down the steep hills, an *incline railroad* was installed. There were two rail lines: one for ore cars coming down and the other to return the empty cars to the top. The two were interconnected so that, using gravity, the weight of the full car pulled the empty car back to the top.

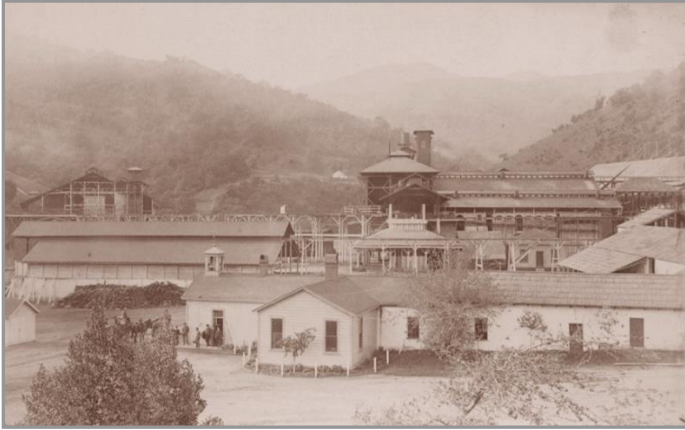
A **retort** is a closed oven used to heat cinnabar ore. In a retort, the heat is applied to a container that holds the ore and there is a pipe or tube at the top that allows the gases to escape. The mercury and sulfur gases, released by the heat, go into pipes where the mercury gas cools to a liquid and flows back down the pipes and out.

**Fact:** Gun barrels from cannons and whale pots were used for the first retorts at New Almaden. Just the barrel was used, not the whole cannon.



**Furnaces** are very large burners used to heat cinnabar into mercury and sulfur gases or vapors. In a furnace, the heat exhaust flows through the material to be heated. This is a direct application of heat. It is efficient but often adds impurities from the heat source to the vapors that are formed. Mercury gas was cooled by water and flowed back down to be collected. The sulfur gas rose up into smokestacks to be exhausted (emptied into the air).

**Fact:** The early furnaces burnt wood and used up most of the trees in the mountains from New Almaden to Santa Cruz. Because of this, most of the trees you see today are less than 100 years old.



The **Reduction Works** was where the cinnabar ore was taken in ore cars and wagons to be heated in furnaces. The liquid mercury was collected, cleaned, and put into flasks.

**Fact:** The reduction works was at the Hacienda entrance to Almaden Quicksilver County Park.

**Single jacking** and **double jacking** were two methods used to drill holes in rock. In single jacking, one man would work both the drill and hammer. In double jacking, one man held the drill and a second man hammered it in.

**Fact:** The words "jacking" and "jackhammer" come from the Cornish miners who were often called "Jack" as in "Hey, do you have a job for my Cousin Jack?"

A **flask** is an iron bottle that holds 76 pounds of mercury.

**Fact:** Iron was used since it does not combine or amalgamate with mercury. The flasks of mercury from the mine were taken to Alviso by donkey cars and loaded on boats that sailed or steamed to San Francisco.





# New Almaden Word Search

**Directions:** First, use the Word Bank to fill in the blanks below. Next, find your answers in the word search puzzle.

<b>Word Bank</b>  QUICKSILVER FURNACES OHLONE ALMADEN CINNABAR FLASK SERPENTINE WATER		1. means "living silver"
		2. mercury's ore
		3. means "the mine" in Arabic
		4. cooled mercury gases into a liquid
		5. Native People who used cinnabar to make paint
		6. heated cinnabar into mercury and sulfur gases
		7. held 76 pounds of mercury
		8. California's state rock

## New Almaden Word Search

C I N N A B A R Y X L G I V X  
 J O M J O F A H M I N E R A L  
 M R W Y H U C Q W W R O C K A  
 U Z V S L R X U U D W O R E T  
 J O B E O N G I M M C B A M R  
 X N M R N A D C K C N G O E N  
 I U I P E C A K J A M L T E P  
 T R N E R E S S E S S A D L F  
 M V E N C S V I O T W A V J L  
 E R R T F U A L P I M M J A V  
 R H Y I O Q D V Y L V A F B J  
 C G G N I R A E A L G U L V R  
 U I M I Y B T R O E S H A D O  
 R B U T U I V C L R G S S O B  
 Y W I E F F X P Y O T T K X E

ALMADEN  
 CINNABAR  
 FLASK  
 FURNACES  
 OHLONE  
 QUICKSILVER  
 SERPENTINITE  
 WATER  
 ORE  
 MINERAL  
 ROCK  
 MINER  
 MERCURY  
 RETORT  
 CASTILLERO

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Fabulous Facts about Mineral Resources. 7 February 2003. *(Free, printable 3-page brochure from California Geologic Survey)*

Flashcard Exchange. 7 February, 2003. *(Free online flashcards on Minerals and Rocks as well as other topics)*

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