



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 March 2020

Table of Contents

Site Overview	3
Site Policies	3
What to Expect on the Day of your Field Trip	4
Field Trip Overview.....	7
State Standards Supported By Field Trip Experience.....	8
Program Format & Field Trip Schedule	9
Background Information	10
Geologic History Q&A	14
Vocabulary & Fun Facts	16
New Almaden Word Search	18
Supplemental Resources and Credits	19

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.
- No eating or drinking is permitted in the museum.
- Do not touch or move artifacts, unless invited to do so.
- No running inside the Museum.
- While we love to see enthusiastic students at the Museum, please remind your students to use their indoor voices and raise their hand if they have something to share with the group.

What to Expect on the Day of your Field Trip

New for 2020-2021 school year: Field trips start at 10:00am and end at 12:00pm. 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.

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.

A Park Interpreter will contact you two weeks before your field trip to answer questions and provide detailed direction on how to divide students into groups before arriving.

Be advised that there is NO cell coverage at the park. It is important to communicate field trip details and directions to chaperones prior to traveling to the park. Do not rely on last minute calls or texts. **If you need to reach park staff 24 hours before your field trip, please call the park interpreter directly and/or leave a message with staff at 408-918-7770.**

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 a designated area within the museum building, but the park is not responsible for any lost or damaged items.

What NOT to Bring:

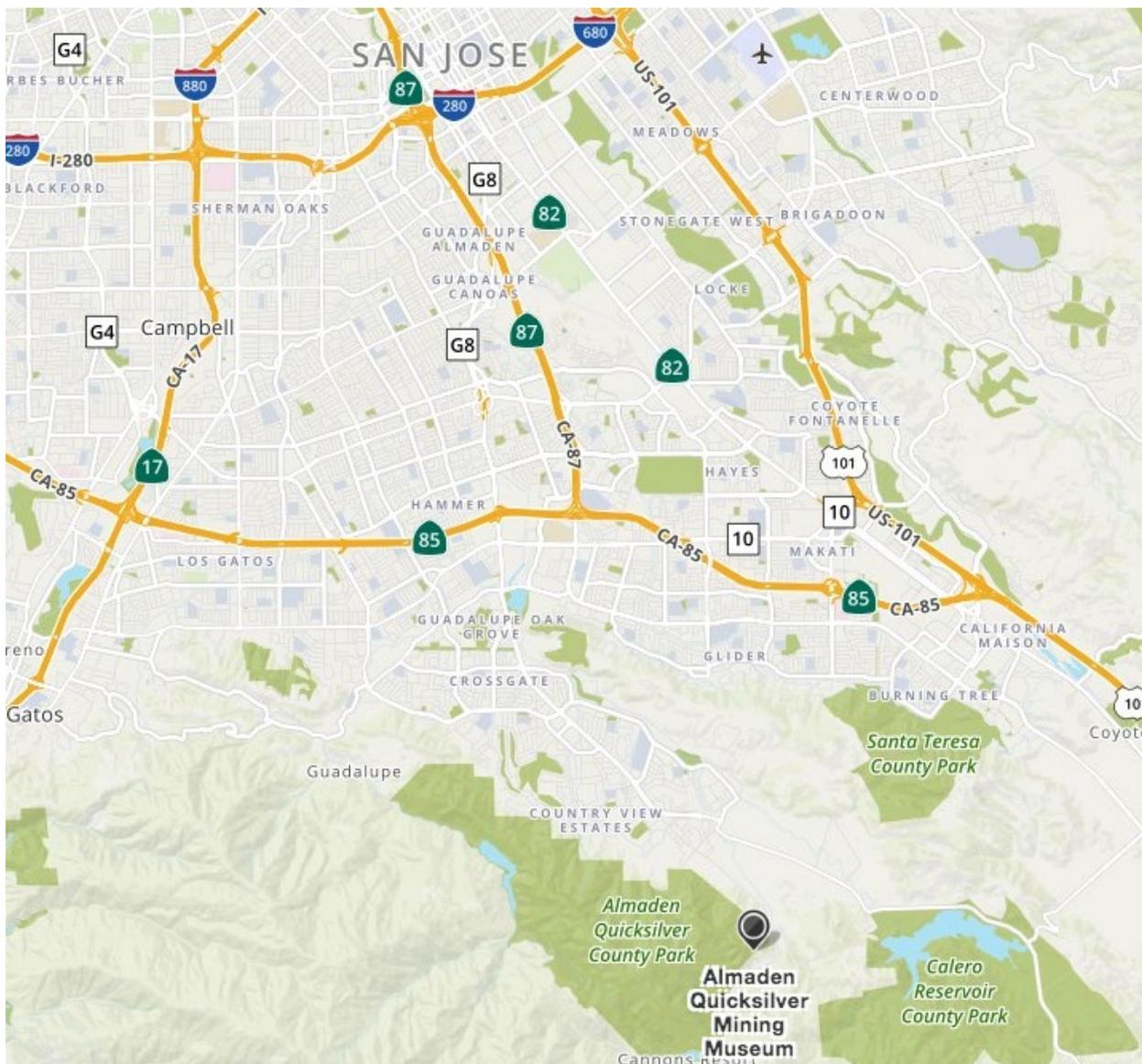
Students should have their hands free - no backpacks, toys, or food should be carried during the field trip. Cell phones should be silent and out of sight during the field trip. Adults may take photos, but we ask that they do not interrupt instructional time or pull students away from field trip activities.

Getting to the Park:

Casa Grande and the New Almaden Quicksilver Mining Museum are located at 21350 Almaden Road. Casa Grande is the impressive 2-story, white building with picket fencing just past the Post Office. As you enter the driveway, the Club Almaden sign hangs on the large redwood tree at the entrance. If you miss the entrance, drive down the street a quarter mile and turn around in the Almaden Quicksilver County Park Hacienda Trailhead parking lot. Look for the white bell tower on the right side of the road for the turnaround.

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. The Casa Grande will be on your left.



Arrival:

Please arrive at least 15 minutes early to check in with park staff and allow students time to use the restrooms. The program runs continuously from 10am-12:00pm. If you need to a snack break before the field trip, please arrive by 9:30am. Instruction will begin promptly on the back brick patio on the east side of the building at 10am.

Class Size & Chaperone Expectations:

- Scheduled programs are limited to 35 students maximum. We may occasionally offer programs for larger groups if staffing and volunteer availability allows. We strive to keep our group sizes small to allow for the most enriching experience possible for your students.
- Your class should provide one adult chaperone for every 6 students. Teachers and chaperones will be assigned duties and integrated into program activities. Chaperones must be willing and able to be responsible for a group of students; therefore, only students enrolled in the class should be present. No young siblings should accompany chaperones.
- Chaperones should always keep their group of students together and not let students run ahead or wander the museum unsupervised.
- Chaperones keep cell phones or other distracting devices on silent and out of sight during instructional time.
- Remind students of expectations and encourage good behavior.

Chaperone Training:

Chaperones will meet the Park Interpreter before the start of the program for a brief training. Chaperone assistance is integral to the success of this field trip. Chaperones help guide small groups of students through museum exploration activities. Please meet the Park Interpreter at 9:50am.

Departure:

You are welcome to stay in the museum backyard for lunch following the field trip. You're responsible for picking up your trash and leaving the park as clean - or cleaner - than you found it. The backyard 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.

A post field trip survey and post field trip activities will be emailed to the teacher by the Park Interpreter.

Field Trip Overview:

The mines of New Almaden brought together people with diverse backgrounds and skill sets to form a vibrant community that took pride in providing a steady supply of mercury essential to the success of California's Gold Rush. The New Almaden Quicksilver Mining Museum field trip experience will help students gain a deeper understanding and appreciation for the historical importance of New Almaden in California's history, especially as it pertains to the California gold rush.

Educational Objectives:

1. Students will be able to explain to a friend or family member that mercury was important to the gold rush because it helped miners in the Sierra Nevada separate gold from its ore/rock body.
2. Students will have the opportunity to observe photos, objects, and/or written accounts from one to two individuals that contributed to the success of the New Almaden mining community.
3. Students will participate in a reflective storytelling activity that illustrates how each town or mining identity contributed to mercury's defining role in the development of California during the Gold Rush.

State Standards Supported by Field Trip Experience:

Grade	California Content Standards- Social Studies	Common Core	Next Generation Science Standards (NGSS)	Environmental Literacy Standards
3	<p>3.1.2. Trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).</p> <p>3.3.3 Trace why their community was established, how individuals and families contributed to its founding and development, and how the community has changed over time, drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources</p>	<p>Speaking & Listening CCSS.ELA-LITERACY.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.</p> <p>CCSS.ELA-LITERACY.SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.</p> <p>Writing CCSS.ELA-LITERACY.W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.</p> <p>Reading CCSS.ELA-LITERACY.RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</p>	<p>3-ESS3. Earth and Human Activity <i>ESS3.B: Natural Hazards. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.</i></p>	<p><i>Principle 1: People Depend on Natural Systems</i> Concept A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.</p>
4	<p>4.4.2. Explain how the Gold Rush transformed the economy of California, including the types of products produced and consumed, changes in towns (e.g., Sacramento, San Francisco), and economic conflicts between diverse groups of people.</p> <p>4.3.3. Analyze the effects of the Gold Rush on settlements, daily life, politics, and the physical environment</p>	<p>Speaking & Listening CCSS.ELA-Literacy.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.</p> <p>CCSS.ELA-Literacy.SL.4.2 Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</p> <p>Writing CCSS.ELA-Literacy.W.4.8: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.</p> <p>Reading CCSS.ELA-Literacy.RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>CCSS.ELA-Literacy.RI.4.7 : Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears</p>	<p>4-ESS3 Earth and Human Activity</p> <p><i>4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</i></p> <p><i>ESS3.A: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways.</i></p>	<p><i>Principle 2: People Influence Natural systems</i> Concept C: The expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.</p>

Program Format and Schedule

Program Format: Throughout the program, field trip activities are both interpreter facilitated & chaperone guided. Docent volunteers may be present to help with facilitation.

When students arrive at the museum, they will be introduced to the site and program flow. After, students tour the Victorian Rooms with a Park Interpreter. Following this tour, students participate in a discussion about cinnabar, mercury, amalgamation, and mercury's significance to gold processing. Next, students explore the museum through the lens of historical identities with chaperone guidance. The class culminates their day with a collaborative storytelling activity that connects the historical identities to the California Gold Rush. Their completed "Story on A String" project can be taken back to their classroom for display and used as a reference for post field trip activities.

Field Trip Schedule:

Time	Activity
9:30 am	Arrival if a Snack Break is Needed
9:45 am	Arrival & Restroom Break
9:50 am	Chaperone Training, Split Students Into Groups
10:00 am	Whole Group Introduction on Brick Patio, Victorian Rooms Tour
10:20 am	Interpreter Facilitated Exploration & Discussion
10:45 am	Group Museum Exploration - Activity 1
11:10 am	Group Museum Exploration - Activity 2
11: 35 am	Whole Group Conclusion Activity
11:50 am	Self-Guided Museum Exploration
12 to Departure	Lunch *optional if your group chooses to eat in backyard

Background Information



Ohlone Village

The first people known to have lived in the Almaden Valley were ancestors of the Muwekma Ohlone Tribe. The native way of life consisted of a close community where tribal members worked together to provide for their families. The Muwekma Ohlone mined red earth from a small cave in the Almaden Valley many years before the Spanish colonized California. The Muwekma Ohlone ground the red earth to use as paint. These red rocks were also a valuable item for trading.

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 settle near his fort in the Sacramento Valley. In 1845, Mexican Army Captain Andres Castillero was sent to convince Sutter to leave California. On the way, Castillero stopped at Mission Santa Clara where he was shown samples of a heavy red rock. Castillero was trained in geology and metallurgy. He suspected that the red rock may contain something valuable.



Cinnabar



John Sutter

Castillero went to Sutter's Fort, asked Sutter to leave, and returned to Mission Santa Clara when he and Sutter couldn't come to an agreement. 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. Castillero was shown to the red rock cave in the rolling hills south of Pueblo San Jose. After he experimented with roasting some of the ore, he confirmed that it contained mercury. He knew that mercury was used to separate gold and silver from the rocks in which they are found. This made mercury very important and very valuable. Castillero 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 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.

In 1850, Henry Halleck was made general manager of the mines. Under his direction, thirteen brick and cement furnaces were built for roasting cinnabar. During these early mining days, the mine employed around 200 men. These miners carried 200 pounds of cinnabar out of the mine in leather backpacks called zurróns. They transported these heavy loads up steep notched redwood ladders called escaleras.



Henry Halleck



Casa Grande

By 1854, the stately three-story, 27-room Casa Grande and its extensive grounds had been built at the beginning of the road. The basement (ground level) contained a large kitchen, storage room, a wood-burning furnace, servant's quarters, and large vault. The 1st floor housed the parlor, the library/office, drawing room, pantry, and dining room. A dumbwaiter installed in the pantry brought food up from the kitchen. In the 1880s mine manager J.B. Randol renovated Casa Grande's 5-acres of landscaped lawns, flower gardens, shrubs, pond, a family orchard, and added a gymnasium.

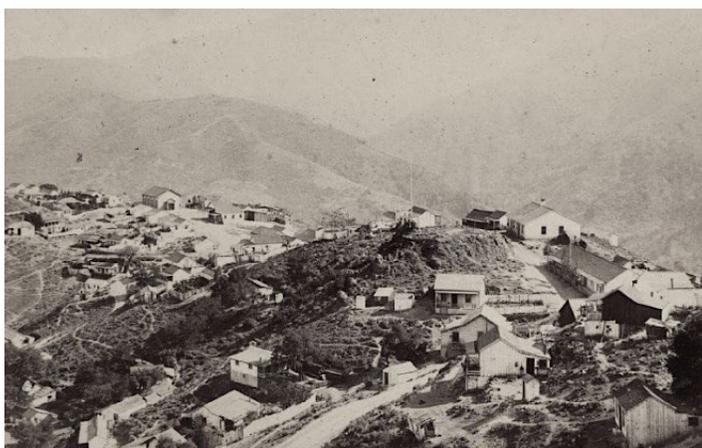
Traveling to Casa Grande was a 4-5 hour carriage ride from San Francisco or a 2 hour ride from San Jose. Upon arrival, visitors were whisked into the parlor to relax. The opulence of the room furnishings was meant to impress prospective buyers of company stock.

New Almaden was comprised of three major settlements: the Hacienda, Spanishtown, and Englishtown.

As the mining operation increased, small cottages were built along Almaden Road leading from Casa Grande to the furnace yard. This area became known as the Hacienda. Its cottages mostly housed salaried mine management. The Hacienda later grew to include a school, post office, doctor's office, social club, blacksmith shop, butcher, stables, and jail.



Hacienda



Spanishtown, with its winding streets and scattered hillside houses, was one of the first settlements to spring up near the original entrance to the mine. While its residents were predominantly Mexican, it was also home to Californios, Spanish, and Chilean miners. Spanishtown grew to be the largest of the three communities in New Almaden.

Residents of Spanishtown raised livestock such as chickens and cows and tended gardens. Water and firewood were delivered to the houses by burrow. As the population grew, a Catholic church and schoolhouse for grades 1-4 were built.



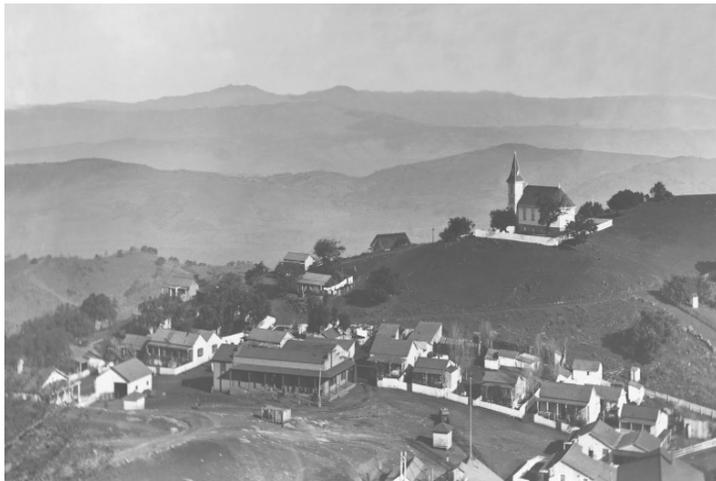
Spanishtown miner

The men of Spanishtown often worked as ore extractors or furnace operators. Underground miners worked 10-hour shifts 6 days a week. They brought their lunches and tools down into the mines, including candles which were the predominant light source.

When Samuel Butterworth replaced Henry Halleck as mine manager in the 1860's, the mining company built houses on another ridge of Mine Hill. These houses were for the recently recruited miners of Cornwall, England. The Cornish immigrants were eager for employment after the decline of the tin mines in their home country. The Cornish used their extensive hard rock mining experience to expand the mine infrastructure deeper and deeper underground. Some of the mineshafts were over 2000 feet deep, and one was even 600 feet below sea level! Pumps were installed to keep them from flooding.



Englishtown miner



Englishtown

Under Mine Managers Butterworth and J. B. Randol, miners were encouraged to settle on the hills of New Almaden with their families. A Methodist Church, Company Store, and Helping Hand Hall were built in Englishtown. A one-room primary school house taught grades 1-8. This school was the largest of the three New Almaden schools, and at its peak enrollment in 1886 had 4 teachers and about 253 students. Unmarried miners rented rooms in boarding houses.

Immigrants from Wales, Sweden and Finland also lived in this area. Englishtown was sometimes nicknamed "Gabbletown" because many languages could be heard going up the hill to the mines.

New Almaden was also home to a small group of Chinese workers from 1870 to 1885. Chinese miners weren't allowed to enter into the contract bidding system that the other nationalities engaged in and were relegated to working as ore pickers, laundry workers, and cooks.

Many Chinese immigrants adopted Western traditions to assimilate into American culture. They adopted Western clothing styles and cut off their long braid called a queue. Immigrants who cut off their queue could never return to China.



Chinese worker

China was a valuable trading partner for the mercury mine as New Almaden's location provided an incredible geographical advantage over the mercury mine in Spain. The Chinese purchased mercury to produce vermilion, a red pigment, which they used to paint temples and other buildings.

According to oral history, a Chinese delegation representing the emperor came to New Almaden to negotiate a contract for mercury. Grateful for the hospitality shown to his emissaries, the Chinese emperor gifted the Chinese pagoda, which the Chinese call a Ting. Originally, installed across Los Alamitos Creek, the Ting was moved to two other locations on the property. In 1885, after J. B. Randol renovated the building and landscaped the gardens, it is shown in pictures near the Casa Grande.



The Ting

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 China, Mexico and other countries. More than 1 million (1,065,000) flasks of mercury were produced in New Almaden, amounting to more metallic wealth than any California gold mine.

The decline of mercury began in the 1880s and 1890s. The quality of cinnabar ore began to decline. The Quicksilver Mining Company Board of Directors refused to invest in new mining infrastructure for a failing mine. In the 1890s, the cyanide process was introduced to separate precious metals from their ore bodies. While still toxic, cyanide processing did not require the industrial mining infrastructure that cinnabar mining and mercury processing required. By 1927, Quicksilver Mining Company and New Almaden Mining Company had declared bankruptcy. The most productive mercury mining operation in California was done.



Rotary Furnace

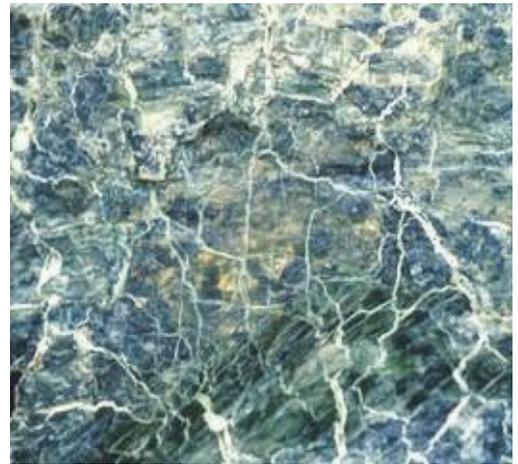
During World War II, large-scale mining operations were resumed to provide mercury used in blasting caps. Modern rotary furnaces built in the hills were used during this time to process large amounts of low-grade ore. (Remnants of a rotary furnace may still be seen on "the hill.") By 1970, the price of mercury had declined. It cost more to mine and process cinnabar than the resulting profits from the sale of mercury. Between 1927 and 1976, a few small individual operators continued small mining operations.

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. Gone is the cacophonous noise of bells, whistles, hammers on anvils, the rumble of ore carts and explosions that rocked the earth. Today visitors enjoy the scenic beauty of rolling tree-studded hills, glimpses of wild rabbits and lizards scurrying between bushes with red-tailed hawks soaring overhead, and the sighing of the wind.

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 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** – 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 formed 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.



Serpentinite

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 miner's look for valuable metals (such as the mercury at New Almaden) in the form of veins and masses of ore." 1

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 Muwekma 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.

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



Quartz

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.)

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 heavy metal that is liquid at room temperatures. Mercury's symbol on the periodic table is Hg, which stands for hydrargyrum: the greek hydrárgyros: hydr (water) + árgyros (silver) = quicksilver.

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

Cinnabar, mercury's ore, contained 75% mercury and 25% sulfur 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.

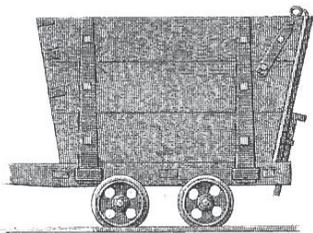
Fact: In New Almaden, cinnabar was first used by the Muwekma Ohlone, who crushed it to a powder to make a beautiful red-orange paint. They used the cinnabar they dug from the "red cave" in New Almaden to make a paint to decorate their bodies and trade with tribes.



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.

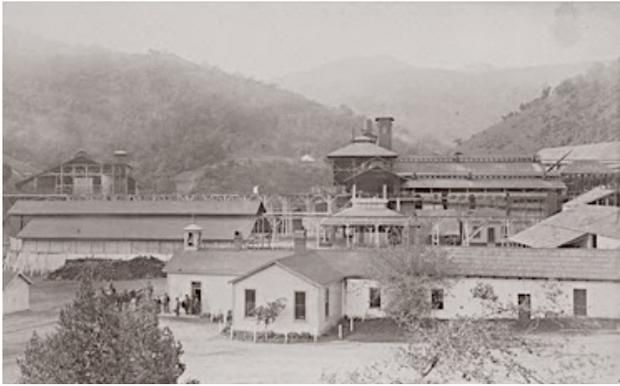
An **ore car** was a large, wheeled cart used to haul ore on rails. Ore is the name given to rocks that contain valuable minerals, such as cinnabar.



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 railway* 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 with a pipe or tube at the top that allows the gases to escape. The mercury and sulfur gases, released by the heat, go into the pipe where the mercury gas cools to a liquid and flows back out the pipe.

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. In a furnace, heat 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 forming vapors. Mercury gas cooled as it flowed up and down through channels. The hottest gases were cooled by water. Mercury was collected in troughs at the bottom of the cooling units. The sulfur gas was exhausted, emptied into the air, through smokestacks.

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

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

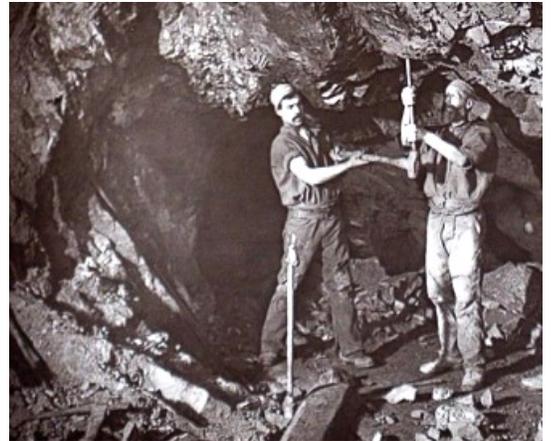
Fact: The reduction works was at the Hacienda entrance to Almaden Quicksilver County Park and filled the flat area at the base of the hill.

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 because it does not combine or amalgamate with mercury. The flasks of mercury from the mine were taken to Alviso by donkey cars and later by horse-drawn wagons 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.

Word Bank QUICKSILVER FURNACES OHLONE ALMADEN CINNABAR FLASK SERPENTINE CASTILLERO		1. nickname for mercury
		2. mercury's ore
		3. means "the mine" in Arabic
		4. Mexican army captain who made the first mercury mining claim in California
		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

Supplemental Resources:

The State of California's Education and Environment Initiative curriculum includes comprehensive teacher's guides and classroom lesson plans for fourth grade teachers studying the California Gold Rush with their students. Educators can obtain a free password to download all curriculum materials by visiting the EEI website at <http://www.californiaeei.org/Curriculum/>

We recommend the following unit:

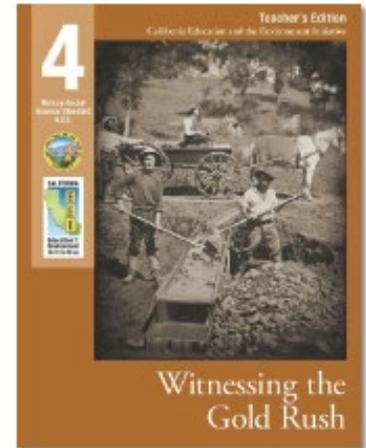
Witnessing the Gold Rush

Subject: History-Social Science

Reading Grade: Fourth Grade

Content Standard: 4.3.3

The search for gold and the influx of settlers influenced the natural environment (rivers, forests, mountains, valleys), and placed great demands upon our state's natural and social resources.



Credits & Suggested Reading

Arbuckle, Clyde. History of San Jose. San Jose: Smith McKay Printing,

1986. Barlowe, Sy. Learning about Minerals. Mineola: Dover Publications, Inc.,

CET (Center for Ecological Technology) Mercury (the Element!) in Our Environment: Problems and Solutions. 18 August 2004. (*Curriculum and teacher resources for grades 4-8*)

@Country Boy Mine. "TBT When you go on a tour at the Country Boy Mine, you learn about double jacking. Here are some miners from 1890s." Twitter, 17 Sept.2015, twitter.com/countryboymine/status/644686413032632320

English, Henry. The Mining Almanack for 1850: Being a Yearly Compendium of Information on General Science, with Tabular and Other Statistical Details Relating to the Mining Interests. Mining Journal Office, London. 1850.

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 and other topics.*)

Hart, Eugene R. A Guide to the California Gold Rush. Merced: FreeWheel Publications, 2002.

Johnston, Andrew Scott. Mercury and the Making of California: Mining, Landscape, and Race, 1840–1890. University Press of Colorado, 2013.

Lanyon, Milton and Laurence Bulmore. Cinnabar Hills: The Quicksilver Days of New Almaden. Los Gatos: Village Printers, 1967.

Miller, Sally M., Latham, A.J.H. and Flynn, Dennis O. Studies in the Economic History of the Pacific Rim. Psychology Press, 1998.

Pope, Norman. Crisis at Quicksilver Hill. 1975.

Schneider, Jimmie. Quicksilver: The Complete History of Santa Clara County's New Almaden Mine. San Jose: Zella Schneider, 1992.

Thompson & West. Historical Atlas of Santa Clara County. 1876. San Jose: Smith & McKay Printing Company, 1973.

United States v. Andres Castillero, 68 U.S. 17. U.S. Supreme Court. 1863. Justice Clifford. Court Listener, courtlister.com/opinion/87506/united-states-v-andres-castillero/. Accessed 26 Mar. 2020.