

## Script for “Elusive Gold” Power Point

<b>Slide 1:</b>	<b>Elusive Gold: Gold Mining Methods</b>
<b>Slide 2: Characteristics of Gold</b>	Prized for thousands of years, gold is a rare soft metal found in nature. Because it is soft, it is easier to work with than other metals. Gold can be hammered into really thin sheets or made into fine thread. When heated to 1943° F, gold melts into a liquid, which can be poured into various shapes.
<b>Slide 3: Characteristics of Gold</b>	<p>Gold is a very dense metal that weighs about 19 times more than the weight of water. Since gold is heavy, it is usually hidden beneath lighter materials such as sand or gravel. Loose pieces of gold often are found where water and gravity deposited them, such as beneath sand bars or trapped between rocks or in cracks.</p> <p>In nature, gold is usually found mixed with other minerals, a combination that is called gold ore. The source of gold can often be traced to a type of rock called quartz. This is where gold forms when chemical and volcanic conditions are just right. Real gold can often be confused with “fool’s gold” or iron pyrite.</p> <p><i>[Image: Engraved gold plate from Hearst Castle® Collection]</i></p>
<b>Slide 4: Gold Panning</b>	<p>The first miners along the American River near Coloma used ordinary picks and shovels, knives, frying pans, and tightly woven California Indian baskets to gather the loose particles of placer gold. By the summer of 1848, men with placer mining experience from Georgia and from Mexico had introduced metal gold pans, wooden bateas (bowls), and the rocker. The gold pans required dipping the gold pan in water to wash away the sand and gravel leaving behind the heavier gold. Panning was a lot of hard work, requiring the individual miner to spend hours squatting or stooping in the sun, either in or beside icy water, for a small return in gold.</p> <p><i>[Image: Miner using a gold pan, c. Mid-1800s.]</i></p>
<b>Slide 6: Rocker/Cradle</b>	Experienced miners quickly introduced the rocker, also known as a cradle, as an alternative to gold panning. The rocker was an open box mounted on rockers that used water, the rocking motion and gravity to separate the gold from dirt.
<b>Slide 7: Rocker/Cradle</b>	Three miners usually operated the rocker—one vigorously rocked it, one shoveled dirt onto the sieve, and the third poured water over the dirt to wash it down through the trough. As the lighter dirt and gravel was washed away through the open lower end of the rocker, the gold was trapped behind the cleats or riffles nailed onto the bottom.
<b>Slide 8: Long Tom</b>	By the winter of 1849, the “long tom,” an adaptation of the cradle, was developed. Usually about 12 feet long and stationary, the long tom was placed where water could pour

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	<p>through it from a ditch or wooden flume, washing the gold-bearing dirt across the riffles nailed the length of the trough.</p> <p><i>[Image: long tom at Auburn Ravine, 1852. Original daguerreotype at California State Library]</i></p>
<p><b>Slide 9: Long Tom</b></p>	<p>It required 6-8 men, but they could wash ten times the amount of gold that the same number of men could with the cradle. With the introduction of the rocker, the diversion of water, and subsequent mining techniques that required more capital investment and more men, large mining companies were formed, ultimately threatening and replacing the solitary, independent miner.</p> <p><i>[Image: Miners using a long tom near Auburn, 1852. Original daguerreotype at California State Library.]</i></p>
<p><b>Slide 10: Sluice</b></p>	<p>In 1850, the long tom evolved into the sluice, a series of riffle boxes fitted together into a long chain through which water continuous flowed. To supply the necessary water for the long toms and sluices, water from streams and rivers was often diverted by the use of wing dams. This also exposed new sources of gold-bearing dirt, or pay dirt.</p> <p><i>[Image: sluice mining operation at the head of Auburn Ravine, 1852. Original daguerreotype at California State Library.]</i></p>
<p><b>Slide 11: Water=Gold</b></p>	<p>As mining techniques changed, more water was needed. Water companies built dams and a ditch and flume system to supply mining claims with water. This allowed mining in many areas to continue during the dry summer months. Since they controlled the water supply, water companies charged miners large fees for water. An average miner would pan out about 8 dollars a day working a 12-hour day. Of that 8 dollars, about 6 dollars of it could go to the water company.</p> <p><i>[Left image: Head of flumes at dam, Craw Creek, CA. Right image: water reservoirs at Columbia, [date]]</i></p>
<p><b>Slide 12: Hydraulic Mining</b></p>	<p>Due to the large number of people in the gold fields, by 1851 the easily obtained surface gold began to give out, requiring new developments in mining technology. It is estimated that \$81 million in gold was mined by approximately 100,000 miners in 1852. As placer gold became more difficult to find, mining companies turned their attention to hydraulic mining. Developed in 1853, hydraulic mining was truly a California invention. Using high powered water cannons (monitors), miners washed whole mountainsides down a series of sluices to catch the gold.</p> <p><i>[Images: hydraulic mining at Malakoff Diggins State Historic</i></p>

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	<i>Park, late 1800s.]</i>
<b>Slide 13: Hydraulic Mining &amp; the Environment</b>	<p>Unfortunately, the sludge of mud and gravel left over from hydraulic mining filled the riverbeds, causing major flooding and burying farmlands in the valleys. Finally, in 1884 hydraulic mining was restricted after a long political battle over its environmental effects. The controversial impacts of hydraulic mining are still visible today at Malakoff Diggins State Historic Park.</p> <p><i>[Images: Hydraulic Mining remains at Malakoff Diggins State Historic Park]</i></p>
<b>Slide 14: Coyoting</b>	<p>Coyoting was a form of dry mining, meaning water wasn't available to separate the gold from the dirt. Miners would sink a shaft into the ground, then using a wench would haul the dirt and rocks to the surface. The gold was then separated from the gravel and rocks by either being washed in a sluice or crushed.</p>
<b>Slide 15: Coyoting</b>	<p>Coyoting was extremely dangerous. Often the shafts were not supported and many coyote miners lost their lives in collapsed holes.</p> <p><i>[Image: Coyote hole at Red Rock Canyon State Park.]</i></p>
<b>Slide 16: Hard Rock Mining</b>	<p>Another form of mining, hard rock mining, began in the summer of 1849 in the southern mines of the Mother Lode in Mariposa County. The Mother Lode on the Sierra Nevada's western slope is a long belt of gold-bearing granite, one of the most extensive and richest mineral bearing areas on the earth's surface. By the early 1850s, hard rock mining became a major branch of the gold industry in California. Hard rock mining required large companies of miners and lots of money to extract the gold.</p> <p><i>[Image: Miners descending into Empire Mine, c. 1900]</i></p>
<b>Slide 17: Hard Rock Mining</b>	<p>Miners would sink shafts into the ground and dig underground tunnels following gold veins. Hard rock miners working in the underground mines used drills to remove the gold bearing quartz, also known as ore. Hard rock mining was dangerous work. Cave-ins were common. The deeper underground tunnels went the more miners had to worry about poisonous gases and flooding.</p> <p><i>[Image: Miner drilling ore at Empire Mine, c. 1930]</i></p>
<b>Slide 18: Hard Rock Mining</b>	<p>Once drilled and blasted from the rock, the ore was then hauled to the surface in ore carts or buckets so it could be crushed by the large stamp mills and processed to extract the gold.</p> <p><i>[Background image: Stamp mill battery floor. Inset image: Miner with ore cart in Empire Mine, c. 1940s.]</i></p>

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<p><b>Slide 19:</b> <b>Hard Rock Mining &amp; the Environment</b></p>	<p>Evidence of hard rock mining is still visible today. Empire Mine, one of the oldest and largest hard rock mines in California, had 367 miles of tunnel dug. In operation for over 100 years (1852-1959), Empire Mine had 5.6 million ounces of gold extracted by miners. Chemicals such as mercury, used to extract the gold, still poison the water and dirt near the mine. Open mine shafts are dangerous because of unstable rock walls, sudden deep vertical shafts that would kill a person if they fell down in them, and the possibility of getting lost or injured in one.</p> <p><i>[Background image: Mine shaft at Empire Mine State Historic Park. Left overlay: Tailing pond at Empire Mine State Historic Park. Right overlay: Mine tunnel entrance at Plumas-Eureka State Park.]</i></p>
<p><b>Slide 20:</b> <b>California Mining Legacy</b></p>	<p>The earliest tools used by miners during the California gold rush were simple instruments designed to separate the gold from lighter sand and gravel by using gravity and water. These simple tools were quickly replaced by more sophisticated mining technology that required more men to work them. Each new mining device attempted to get the gold faster and more effectively.</p> <p>Abandoned tunnels, rusted mining equipment, piles of gravel and exposed rock remain today as evidence of the miners’ rush to find gold. Some of the mining towns that supplied the miners remain today as growing towns, like Columbia. Others have become ghost towns, the most famous of which is Bodie State Historic Park. If you were a miner during the gold rush, what form of mining would you have done?</p> <p><i>[Image 1: Abandoned tunnel at Plumas-Eureka State Park. Image2: Rusted equipment and exposed hillside at Malakoff Diggins State Historic Park. Image 3: Hoist wench at Bodie State Historic Park. Image 4: Columbia State Historic Park today. Image 5: Bodie State Historic Park today.]</i></p>