REED GOLD MINE
AMERICA'S FIRST GOLD DISCOVERY

Teacher's Guide:

Supplemental Texts

Language Arts

Mathematics

Science

Social Studies

Technology

August 2020

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Reed Gold Mine State Historic Site
9621 Reed Mine Road
Midland, NC 28107

August 27, 2020

Dear Educators,

Thank you for considering a visit to Reed Gold mine State Historic Site. The Reed Mine was the site of the first documented discovery of gold in the United States, leading to a vast gold mining industry in North Carolina.

Located near Midland, Reed Gold Mine is comprised of 832 acres out of John Reed's 1,000-acre farm, of which 70 acres were used for gold mining. Group visitors to the site can view the exhibits in the visitor center, including the 10-minute orientation film *Carolina Gold*. From there, guides lead tours of the underground mine, taking visitors 50 feet below the surface through tunnels originally constructed between 1830s and 1850s. The 1895 Stamp Mill is operated daily, demonstrating how quartz was pulverized and mixed with mercury to extract the gold. The visit is concluded in the panning area, where visitors learn how gold is separated from the dirt, utilizing several scientific principles learned in class. A lucky few may find gold themselves to take home as treasured souvenir!

The recently updated Teacher's Guide showcases the history of John Reed, the Reed Gold Mine, and basic gold mining technology through several sections, including Language Arts, Mathematics, Science, Social Studies, and Technology. Each section meets several pertinent North Carolina Essential Standards and can be independently downloaded, including both information and educational activities.

While this information is useful for in class or in-home instruction, the staff at Reed Gold Mine invites you to schedule your class for a field trip to experience the fun and excitement of the mine and panning area in person. Information to schedule a trip is in the Group Reservations section of the website.

Sincerely,

Larry K. Neal, Jr.
Historic Site Manager
Reed Gold Mine State Historic Site

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

Supplemental Texts

These texts offer additional information on the history of Reed Gold Mine and North Carolina's gold mining industry.

A Brief History of Reed Gold Mine

Little is known about John Reed's early life, but he either enlisted or was drafted into the Hessian militia in modern-day Germany. He trained for several months before his regiment was mobilized to aid the British during the American Revolution. Reed fought with the British until 1782 when he deserted. He travelled to North Carolina and likely found work at a gristmill. Shortly after his arrival, he married Sarah "Sally" Kiser. They had nine children and ran a farm.

In 1799 their son, Conrad, stumbled upon a 17-pound gold nugget in the creek near his family's cabin. Supposedly the Reeds used it as a doorstop for a few years. In 1802, Reed brought the nugget with him on a supply run to show to a jeweler who identified it as gold. The jeweler offered to buy the gold for whatever price Reed named. Reed suggested $3.50, a week's pay for a farmer at the time. The jeweler gladly paid. However, the nugget was worth at least 100 times what Reed asked. At the time, it was worth about $3,600.00.

The following year, in 1803, Reed entered a partnership with three neighbors—Reverend James Love, Martin Phifer, and Fredrick Kiser. The plan was to search for gold on land supplied by Reed and the others would supply the equipment and enslaved labor to cover more ground. Later that year, Peter, an enslaved man, discovered a 28-pound nugget worth almost $6,000.

Gold mining changed the lives of the Reeds, especially when they began lode mining, underground mining in 1831. The underground mine became a family operation and Reed allowed only his sons and sons-in-laws to operate it until the mine closed for ten years because of a family argument.

Following Reed's death in 1845, the mine was sold to one of his grandson's and a son-in-law, Timothy Reed and Andrew Hartsell, respectively. They operated the mine under the Reed Gold and Copper Mining Company with limited success. Reed Gold Mine experienced its heyday under their leadership, with new technology and experts brought in to operate the mine.

Despite new machinery and expertise, the Reed Gold and Copper Mining Company failed in 1854, like many other gold mines. In 1855, the local sheriff auctioned the property. Little mining was done until 1895 when Reed Gold Mine was bought by Oliver S. Kelly, his son O. Warren Kelly, and Dr. Justin D. Lisle. The following year, the last large nugget was found.

Reed Gold Mine continued to operate through the early-twentieth century. Sadly, there were no more significant finds. By 1912, the Kellys stopped underground work at Reed Gold Mine. In 1971, the Kelly family donated the mine and to the State of North Carolina. In 1977, Reed Gold Mine State Historic Site officially opened to the public.

A Detailed History of Reed Gold Mine

John Reed, born Johannes Reith, was recorded by the Lutheran Church book in Salzburg as being born on 14 April 1759. He was the illegitimate son of Anna Elizabeth Reid and Johann Jakob Helmerich. When he was five, his mother married a widower named Adam Henrich Hahn.

Little is known about Reed's early life, but he either enlisted or was drafted into the Hessian militia from the Hessen-Cassel region in modern-day Germany. He served in Company 2 of the Garrison Regiment von Wissenbach and endured several months of grueling training before his regiment was mobilized to aid the British during the American Revolution.

Reed likely arrived in New York in June 1778, having travelled across the Atlantic with the second wave of Hessian troops who were intended to serve as replacements for the first wave that arrived in the Thirteen Colonies in October 1776. In November 1778, Reed's regiment sailed from New York to Georgia and assisted with the capture of Savannah in December 1778. Reed could have fought during the initial capture of Savannah; during the Siege of Savannah the following year, when Franco-American forces unsuccessfully attempted to retake the important port city; or could have arrived with later forces.

Reed remained with the British in Georgia until he deserted his post on 21 June 1782, from somewhere "outside of Savannah" and took his arms and equipment with him. Interestingly, two other men from Company 2 of the Garrison Regiment von Wissenbach also deserted the same day. It is unknown why Reed and the other men decided to desert that day, but it could have been due to rumors spreading about an impending evacuation of Savannah, which proved true in July of that year.

Whatever his motive for deserting, Reed made his way to what was then Mecklenburg County, modern day Cabarrus County, in North Carolina. Deserting was no small task, especially from the Savannah area. Members of the Tory militia, African Americans, and Native Americans were all employed to search the surrounding areas for deserters and to bring them back alive or dead. Not only that, many loyalists lived along any route Reed could have chosen. Had he been captured, the loyalists could have returned him to his commanding officer or decided to take matters into their own hands.

It is unknown what Reed did once he arrived in the Piedmont of North Carolina. There is reasonable speculation that he worked as a hired hand or farmer in a grist mill. There was a significant shortage of men to employ due to the wartime conditions. Additional evidence to support this theory is that Reed married Sarah Kiser, the daughter of the late owner, in late-1782 or 1783.

Sarah, more commonly documented as “Sally,” was the daughter of Peter Kiser and Fanny Garmon Kiser. She was born at the tail end of the Colonial period, in 1761, and grew up in Cabarrus County. Her father owned and operated a grist mill until his death in 1780 and had become successful enough to leave a respectable estate to his wife and nine children. With her a 20-year-old Sarah purchased a mare for £2,000, 10 shillings. For a poor Hessian deserter, Sally Kiser was quite the catch.

The couple had nine children that lived to maturity and steadily began purchasing land with help from Sally’s brother, Frederick Kiser. Over the years, they operated a subsistence farm, growing a little of everything in their fields to provide for their family and to sell at market. Their life together was typical of what other lower-class families until the dawn of the 19th century.

The story goes that in 1799 their son, Conrad, stumbled upon a 17-pound gold nugget in the creek near his family’s cabin. Supposedly the Reeds didn’t know what it was, so they used it as a doorstop for a few years. Once during that time, Reed brought the nugget to a silversmith in Concord, North Carolina, but the man was unable to identify the nugget as gold.

In 1802, Reed brought the nugget with him on a supply run to Fayetteville, North Carolina, to show to a jeweler. The jeweler told Reed to leave the nugget with him and, while he was gone, the jeweler melted the nugget down to a bar of gold about nine inches long. When Reed returned, the jeweler offered to buy the gold for whatever price Reed named. Reed suggested $3.50, a week’s pay for a farmer at the time. The jeweler gladly paid.

However, the nugget was worth at least 100 times what Reed asked. At the time, it was worth about $3,600.00. Today, it would be worth $415,140.00. Reed later discovered that he had been cheated by the jeweler. Oral tradition reveals he returned to Fayetteville and demanded more money and received an additional $1,000, possibly with the help from one of his neighbors.

The following year, in 1803, Reed entered into a partnership with three neighbors—Reverend James Love; Martin Phifer; and his brother-in-law, Fredrick Kiser. The plan was to search for gold on land supplied by Reed and the others would supply the equipment and enslaved labor to cover more ground. Profits were to be divided equally among the four men. Later that year, Peter, an enslaved man, discovered a 28-pound nugget worth almost $6,000.

In later years, one of John Reed’s sons-in-law, George Barnhardt, told the story of when Peter discovered the nugget. Barnhardt said that Peter’s enslaver, Love, offered Peter the opportunity to pry a small piece off the gold nugget with his dinner fork. Love reportedly said Peter could keep the piece as a reward if he was succeeded in removing it from the nugget.

Peter, however, declined Love’s offer. He knew that his fork would not be strong enough to break a piece off the gold nugget and that his fork, a valuable possession, would be damaged. He also knew that if he attempted and failed—as he was sure to do—his enslaver and the other men present would laugh at his expense.

By 1824, haphazard digging had yielded around $100,000 in gold. With his wealth, Reed managed to obtain the dubious honor of being one of the largest Antebellum slaveholders in North Carolina's Piedmont region. In 1804, he purchased three enslaved peoples—Charity, Dinah, and Sam. They were likely the first enslaved peoples he purchased. Some sources maintain he enslaved almost twenty African-Americans by his death.

Gold mining changed the lives of the Reeds, especially when they began lode mining, underground mining. Lode mining began in 1825 when Matthias Barringer from Montgomery County, North Carolina, was panning for gold in the creek on his farm. Along the lower part of the creek, he found many small gold nuggets, but as he followed the creek upstream there were none. He realized the gold must have washed out of the rocks on the bank of the creek.

As he walked along the stream, he spotted some white quartz rock and broke it open with a pick. To his surprise, he found a considerable amount of gold within the quartz. Barringer dug out the quartz, with help from partners and enslaved peoples, and followed it deeper and deeper into the earth. Eventually, the hole became a deep shaft with tunnels at different levels underground. Matthias Barringer became wealthy and many other gold mines started to look underground for gold in quartz.

In 1831, the first underground mining began at the Reed Mine. For unknown reasons, the original partnership was dissolved—possibly because of Love's death. After that, Reed allowed only his sons and sons-in-law to operate the mine until a legal dispute amongst the family resulted in the mine's closure for a decade.

Following Reed's death in 1845, his executors sold the mine to one of his grandson's and a son-in-law, Timothy Reed and Andrew Hartsell, respectively. The two operated the mine under the Reed Gold and Copper Mining Company with limited success, even though they used antiquated equipment.

In July 1853, the Reed Gold and Copper Mining Company purchased an additional 745 acres of land. The New York Corporation hired professional miners and installed the latest equipment, becoming one of several companies active in North Carolina following California's gold rush.

During the mid-1850s, Dr. Louis Posselt, a chemist and miner, managed Reed Gold Mine. Under his direction the mine experienced its heyday. Posselt spent considerable money developing the mine underground and erecting new surface machinery and buildings. He also built a small village, known as Brunerville. It had an engine house and millhouse, a large whim house and whim to raise ore, an office, a powder house, stables, a blacksmith shop, and 11 cabins.

Posselt instructed his employees in centuries-old European mining techniques. Miners tunneled along ore at different levels and chiseled out rooms to remove the ore. Loose ore was moved underground in low wheelbarrows. Iron kibbles, large buckets, were

used at Reed Gold Mine to hoist ore and miners up the 110-foot-deep Engine Shaft to the surface. A hoisting whim, initially powered by a single horse, accomplished this difficult work. Engine Shaft also contained a steam pump to raise water for the stamp mill and drain the mine.

A fifty-horsepower steam engine operated the pump and ore-crushing machinery that included a stamp mill. The wood-and-iron stamp mill resembled those of medieval Germany. Three large Chilean mills crushed ore to a finer size. A Chilean mill had a pair of large stone wheels for crushing ore. An arrastra, or drag-stone mill, substituted stones for the wheels of the Chilean mills. Concentrating tables used a reciprocating motion to separate gold from lighter materials. The mill workers used these steam-powered machines, with water and mercury, to catch the smallest flakes of gold before purifying it in retorts to separate the gold and mercury.

Despite new machinery and expertise, the Reed Company failed during 1854, like many other mines in the area. Tightening of the New York money market, and flagrant speculation, ruined many Carolina mines. In 1855, the local sheriff auctioned the Reed property for a quarter of its value. North Carolina gold production slipped, and the next owners did little mining.

By 1860, the mine had closed and remained so during the Civil War, along with nearly all Carolina gold mines. After the Civil War, the Reed mine changed ownership several times but little mining occurred until 1894. That year, Oliver S. Kelly, his son O. Warren Kelly, and Dr. Justin D. Lisle, visited Reed Gold Mine. The three men were looking for a gold mine to buy, and on January 10, 1895, they purchased Reed Gold Mine.

Later that year, the Kellys had a crew doing placer and lode mining at Reed Gold Mine. The new owners also leased the rights to mine the surface to a crew of local men and the last substantial nugget was found on 9 April 1896 by Jacob Shinn. The 23-pound find rekindled the owner's optimism and enthusiasm towards mining and so the Kellys ordered a cast-iron stamp mill from the Mecklenburg Iron Works of Charlotte. Once again, the Reed was typical of leading mines.

Reed Gold Mine continued to operate through the early-twentieth century. Sadly, there were no more significant finds. By 1912, the Kellys finished the last underground work at Reed Gold Mine. Gold production in Carolina dropped sharply in 1915 and never recovered despite renewed activity by panners during the Great Depression. Interest in panning for gold continued to decline and essentially came to a halt in the late-1940's and 1950's.

In 1966, Reed Gold Mine was designated a National Historic Landmark by the National Parks Service. In 1971, the Kelly family donated 70 acres of the mine to the State of North Carolina and sold the remaining 820 acres to the State of North Carolina for well below its appraised value. The State of North Carolina then began work to preserve the gold mine and its rich history. In 1977, Reed Gold Mine State Historic Site officially opened to the public.

The North Carolina Gold Rush

North Carolina's gold rush began after German immigrant John Reed discovered in 1802 that the rock he'd used for a doorstop for three years was actually gold. The news soon spread and farmers in the area began hunting in their creek beds for gold nuggets. Charlotte, a little town of some 700 citizens, grew into a booming mine town, filled with folks who hoped they could strike it rich.

The gold industry brought real change to the Piedmont. In 1837 Congress authorized building branches of the U.S. Mint in Charlotte, North Carolina; Dahlonega, Georgia; and New Orleans Louisiana. The Charlotte Mint operated from 1838 through 1861. The total worth of the gold coins struck at the mint amounted to $5 million.

Many of the mining engineers who worked in the Piedmont’s mining industry came from overseas. Some arrived from Latin America, where gold and silver had been mined for centuries. Others came from well-known mining areas in Europe. Cornish miners, English investors, German mining engineers, Italian workers—they all came to North Carolina to try their fortune. One observer claimed that over 13 languages were spoken on Charlotte's streets in the 1830s!

Some Americans had mixed feelings about the newcomers flocking to the Piedmont. On the one hand, the immigrants possessed needed skills for the new industry. Many brought funds for investing in mining ventures and mining equipment. On the other hand, North Carolinians worried those international investors and miners might exploit the state’s good fortune for their own benefit.

Some observers also noted that mining had many positive effects on the local economy. For one thing, gold made it possible to pay in hard currency instead of relying on paper money. This eliminated old-fashioned and inexact trading methods. For another, property values in the Piedmont jumped between 200 and 300 hundred percent after gold was discovered. Each $100 worth of gold produced was said to represent an additional $75 worth of foodstuff sold to the miners.

Back in Cabarrus County, John Reed made sure his farm would not become a big mining operation like the Rudisill and St. Catherine's mines in Charlotte. The first shaft dug underground at the Reed Gold Mine was opened in 1831, several years after miners in Charlotte had been pulling gold out of quartz veins in the earth.

In the late-1820s and early-1830s, when miners at the Rudisill were using ore- crushing equipment that processed nearly 3,000 pounds of ore a day, miners at the Reed still relied on primitive methods of surface mining. Heavy machinery wasn't brought to the Reed until the 1850s—well after John Reed's death in 1845.

John Reed had plenty of chances to expand his mining operations. But he was strict: neither his partners nor his sons or sons-in-law were allowed to mine in any areas he cultivated. Apparently, he wanted to stay a farmer first, and be a miner second. Mining became the second largest occupation in the state after farming. Many farmers complained about the way mining tore up

agricultural land, making it impossible for farmers to cultivate fields filled with pits and shafts. Reed decided that his mine produced enough gold without hauling in heavy machinery. However small his mining operation may have seemed to outsiders, it was, for him at least, big enough.

North Carolina produced at least 1.1 million ounces of gold with a value of approximately $25 million. The gold rush made Charlotte a financial center for the region in the 19th century, and for the country at the close of the twentieth. Charlotte's two biggest banks; Bank of America and First Union, have their roots in gold rush history.

California gold may have eclipsed the gold rush in the Tarheel State, but North Carolina can always claim the bragging rights to the first documented discovery of gold in the United States.

“Boys, We’ve Got It!”

In 1896, the Kelly family leased the rights to mine along Little Meadow Creek to four local residents— Jacob L. Shinn, Jesse Cox, his son A. Mack Cox, and Dr. James Robert Jerome. All four had other occupations and mined in their spare time, like many farmers had even at the height of the gold rush.

On April 9, 1896, the four commenced digging in Dry Hollow which was just above Little Meadow Creek. Later that morning, Jacob Shinn, who was digging at around three and a half feet below the surface, struck something large and heavy. When the rock was brought to the surface, it didn’t look like gold, so it was tossed aside. Finally, Shinn took it down to Little Meadow Creek to wash it off. It was then that Shinn yelled, “Boys, we’ve got it!”

Their initial assumption had been wrong. The rock they’d tossed aside only hours before was a 23-pound gold nugget. The nugget was 11 inches long and 13 1/2 inches in circumference. It contained approximately five pounds of quartz.

The men headed to the nearby town of Georgeville, North Carolina, to weigh the rock and spread the news: the “big one” had been discovered at Reed Gold Mine. On the way, Jesse Cox shouted out their discovery and soon everyone who heard him was talking about the nugget. Soon hundreds of people hoping to see the nugget traveled to Georgeville, which was then a tiny village that sported little more than a store, a post office, a flour and corn mill, sawmill, and cotton gin.

Within days of the discovery, the manager of Reed Gold Mine Dr. Justin Lisle, received telegrams from as far away as Milwaukee, Wisconsin; New York; and Philadelphia, Pennsylvania; asking if the nugget was for sale. Instead, the men took the nugget to Concord, North Carolina, and to the assay offices in Charlotte, North Carolina, so that it could be on display. Several casts were made, including one for the Smithsonian Institution and one for the North Carolina Museum of History. Finally, the nugget was ground up for its gold. The “Shinn Nugget” was the last large nugget ever found at the Reed. At least, as far as we know!

Language Arts

Section I: Writing Prompts

Objective: Students learn to write a narrative by selecting one of the provided prompts.

Narrative Writing

Narrative writing is a style of writing that tells a story, typically though the use of characters and a plot.

Select one of the three prompts below and write a paragraph on a separate sheet of paper.

As you write your story, remember to:

- Be sure that your story includes a beginning, middle, and end.
- Use correct grammar, spelling, punctuation, and capitalization.
- Write in complete sentences.

Prompt #1:

Imagine that one day you discover a gold nugget worth one million dollars. Write a story about what happens after you find the nugget.

Prompt #2:

You have just been on a field trip to Reed Gold Mine. Write a story about your experiences at the North Carolina state historic site.

Prompt #3:

Write a story about an important event that has occurred in your life. Explain why the event was important and how it changed your life.

Language Arts

Section II: Oral Tradition Stories

Objective: Students learn about oral traditions, stories that have been passed down generations through word of mouth, by reading a short text and answer critical thinking questions. Vocabulary words are bolded and are defined in Section III.

Enslaved Labor in North Carolina Gold Mines

Enslaved peoples who worked at gold mines generally labored during the agricultural off seasons, when crops were **sowed** or **harvested**. They were forced to do some of the most dangerous work. Gold mine operators, in search of quick profits, often made enslaved men dig directly into hillsides without giving them time or opportunity to make sure the roof was secure. Because of that, cave-ins frequently occurred and sometimes the enslaved men were killed.

Some enslaved peoples were able to earn money while working in the mines, which they used to buy their freedom. Some were paid a set wage or were allowed to keep a small percentage of the gold they mined. Enslaved miners also earned money by doing extra work, such as washing laundry or making candles to sell, and could earn up to $30.00. Typically, enslaved peoples were not forced to labor on Sundays and certain holidays. Many spent their limited free time to **prospect** on their own.

Overseers did not trust enslaved peoples and watched them carefully to make sure they didn't escape. Whenever an opportunity arose, however, many enslaved peoples did seize the chance to escape their enslavers and head north to freedom. One advertisement described Reuben and his wife, Jinney, who were both enslaved peoples, and how their enslaver thought they were hiding in or near Smart's Mine in Mecklenburg County. John K. Harrison of Mecklenburg county made a claim in 1837 that one of his enslaved people was "**lurking** about Reed's Gold Mine." His claim was never authenticated.

1. Besides cave-ins, what other dangers do you think enslaved peoples faced while working in gold mines?

2. What are some other ways enslaved peoples might have earned money?

3. We know that some enslaved peoples were able to escape their enslavers. What do you think the consequences were for those who were captured and returned to the mines?

Peter's Nugget

In 1803, an enslaved man named Peter discovered the largest gold **nugget** ever found at Reed Gold Mine. His find occurred during the first mining season on Reed's property. The nugget weighed 28 pounds and today would be worth $683,760.00. Known as "Peter's Nugget," it remains the largest gold nugget discovered east of the Mississippi River.

In later years, one of John Reed's sons-in-law, George Barnhardt, told a story about the day Peter discovered the nugget. Barnhardt said that Peter's enslaver, Reverend James Love, offered Peter the opportunity to **pry** a small piece off the gold nugget with his dinner fork. Love reportedly said if Peter was successful, he could keep the piece as a reward for his work.

According to Barnhardt, Peter declined Love's offer. He knew that his fork would not be strong enough to break a piece off the gold nugget and that his fork, a valuable possession, would be damaged. He also knew that if he attempted and failed—as he was sure to do—his enslaver and the other men present would laugh at his expense.

1. If Peter had access to some of the gold he found, what might he have spent it on?

2. Some accounts say that Peter was an old man at the time, but historical documents indicate that Peter was probably a young adult, possibly even a teenager. Why would Peter's age be important?

3. During the 19th century, most discoveries were not attributed to the enslaved person but rather to their enslaver. This was common in many industries, not just gold mining. Why do you think Peter receives credit for discovering the 28-pound nugget?

John Reed's Values

John Reed was born in Hesse-Cassel, modern-day Germany, the illegitimate son of Anna Elizabeth Reidt. His mother later married a widower named Adam Henrich Hahn when Reed was five, but his first years were almost certainly hungry ones. In his early-twenties, Reed served with **Hessian** troops in the **American Revolution** and likely assisted with the capture and occupation of Savannah, Georgia. In 1782, he deserted and made his way from Savannah to the Piedmont of North Carolina. The **trek** was a dangerous one since bands of **loyalists** patrolled the countryside in search of deserters.

Reed made his way through three colonies before settling down in present-day Cabarrus county. He married Sarah "Sally" Kiser and had nine children with her. Eight of his nine children were born when he discovered that his land was literally a golden one.

Of all the land John Reed owned, only 70 acres were mined during the 19th century. Reed rarely did any mining himself, preferring to have partners who oversaw and implemented the work and gave him a share of the finds in exchange for using his land. Reed continued to farm until his death in 1845 at the ripe old age of 86. Even when his plow turned up a gold **nugget** or two in the field he **sowed** and **harvested**, he made sure those fields stay off limits to his partners.

Years later, when his sons and sons-in-law managed the underground mine, they were expressly forbidden to work anywhere Reed cultivated crops. Reed had made the rules during the earliest days of the prospecting and he stuck to them.

1. Why do you think John Reed was so determined to protect his crop fields?

2. The passage states, "…his first years were almost certainly hungry ones." Explain what that statement means.

3. Based on this text, how would you describe Reed's character?

The Missing Nugget

In the first thirty years or so after John Reed discovered he had gold on his land, he and his three partners controlled mining operations. The three partners were each to supply two enslaved peoples to do the majority of the work. John Reed supplied the land on which to **prospect**. Profits were divided event among the four men.

Martin Phifer, a prominent local businessman in the area, routinely **assayed** gold **nuggets** discovered at the mine. In later years of his life, he told a story of how he had received three nuggets, each weighing about 20 pounds, for assaying. When he examined the pieces closely, he discovered they fit together perfectly. However, there was a large gap where a fourth piece—also about 20 pounds—would have fit. Clearly, the pieces had somehow been broken apart and one was missing.

No one ever discovered where the missing nugget went. No legal battles happened afterwards. The partnership continued its existence without blame or harsh feelings. The same could not be said of a dispute among the next generation of partners.

After his original partners died, John Reed allowed his sons and sons-in-law to operate the mine while giving him $1/9^{th}$ of the profit. One day, John Reed's son George could not go to the mine because his wife was ill. In his place, he sent his 16-year-old son. That day, a 13-pound nugget was discovered.

George's partners refused to give him a share of the nugget because they insisted his son was not capable of performing an adult's share of the work. Therefore, George did not deserve any share of the nugget. John Reed, 75 years old at the time, attempted to pay George his share of the nugget using his own money. George was not **appeased**. He took his brothers and brothers-in-law to court and the mine was shut down for ten years due to legal proceedings, which George eventually won. He recovered a sum of money that just about covered ten years of legal expense.

1. How did John Reed's role change throughout this text?

2. Why didn't George just take the money and leave the matter behind when his father offered it to him?

3. Do you think the legal battle was worth it for George? Explain why or why not.

Rural Life at the Dawn of the 19th Century

John Reed's 12-year-old son Conrad made the first documented discovery of gold in the United States. But no one knew what Conrad had found for 3 years.

After the boy lugged the 17-pound "rock" home to his parents, the family used it as a doorstop. For three years, the **nugget** sat at everyone's feet. Once during that time, John Reed brough the nugget to a silversmith in Concord, North Carolina, but he was unable to identify it. It wasn't until 1802, when Reed took his annual trip to Fayetteville, North Carolina, that the nugget's secret was revealed.

A jeweler in Fayetteville told Reed to leave the nugget with him and, while he was gone, the jeweler melted the nugget down to a bar of gold about nine inches long. When Reed returned, the jeweler offered to buy the gold for whatever price Reed named. Reed suggested $3.50, a week's pay for a farmer at the time. The jeweler paid—gladly. With the money, Reed bought his wife Sally fabric for a new dress and some coffee beans.

The story continues that when John gave Sally the beans, she added them into a pot of water with some meat. Although coffee is a common beverage today, it wasn't common with **rural** Americans at the time, so she was astonished that beans would not cook soft. After Reed tasted the coffee stew, Sally tossed the mess out on a hill near their cabin.

At the time, $3.50 was a lot of money, especially for something the family had used as a doorstop. However, the nugget was worth at least 100 times what Reed asked. At the time, it was worth about $3,600.00. Today, it would be worth $415,140.00! Reed later discovered that he had been cheated by the jeweler. **Oral tradition** tells us that he returned to Fayetteville and demanded more money and received an additional $1,000.

1. Why do you think the jeweler paid Reed $3.50 "gladly?"

2. Do you feel the jeweler owned Reed more money even though Reed named his price? Explain why or why not.

3. What does John and Sally Reed's behavior tell us about rural lifestyle of the time?

Language Arts

Section III: Oral Tradition Vocabulary

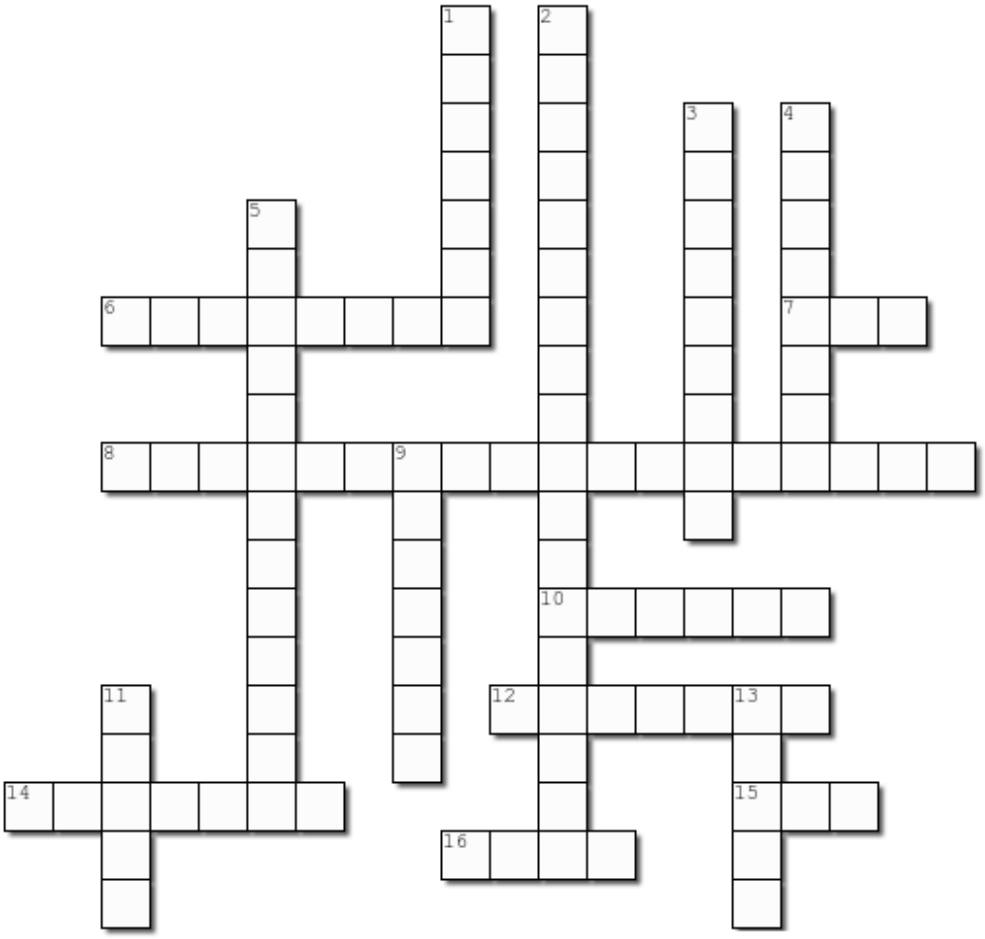
Objective: Students learn vocabulary words related to the oral tradition stories and complete a crossword puzzle.

Oral Tradition Vocabulary

- **American Revolution** – the war fought by the Thirteen Colonies for their independence from Great Britain (1775 – 1783).
- **Appease** – to satisfy; to relieve; to pacify.
- **Assay** – the use of a chemical solution to identify the amount of metal or ore.
- **Harvest** – to gather a crop once it is grown.
- **Hessian** – a German soldier paid by the British to fight the colonists during the American Revolution.
- **Initially** – occurring at the beginning.
- **Lurking** – to sneak; to lie in wait.
- **Loyalist** – a person who still considered themselves a British subject during the American Revolution.
- **Nugget** – a small lump of gold.
- **Oral Tradition** – stories that are passed along by word of mouth.
- **Prospect** – to search for gold.
- **Pry** – to raise, move, or force open with a lever.
- **Rural** – having to do with the country; rustic.
- **Sow** – to scatter seed over the ground for growing.
- **Trek** – a slow, hard journey.
- **War for Independence** – another name for the American Revolution.

Oral Traditions Crossword Puzzle

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

Across

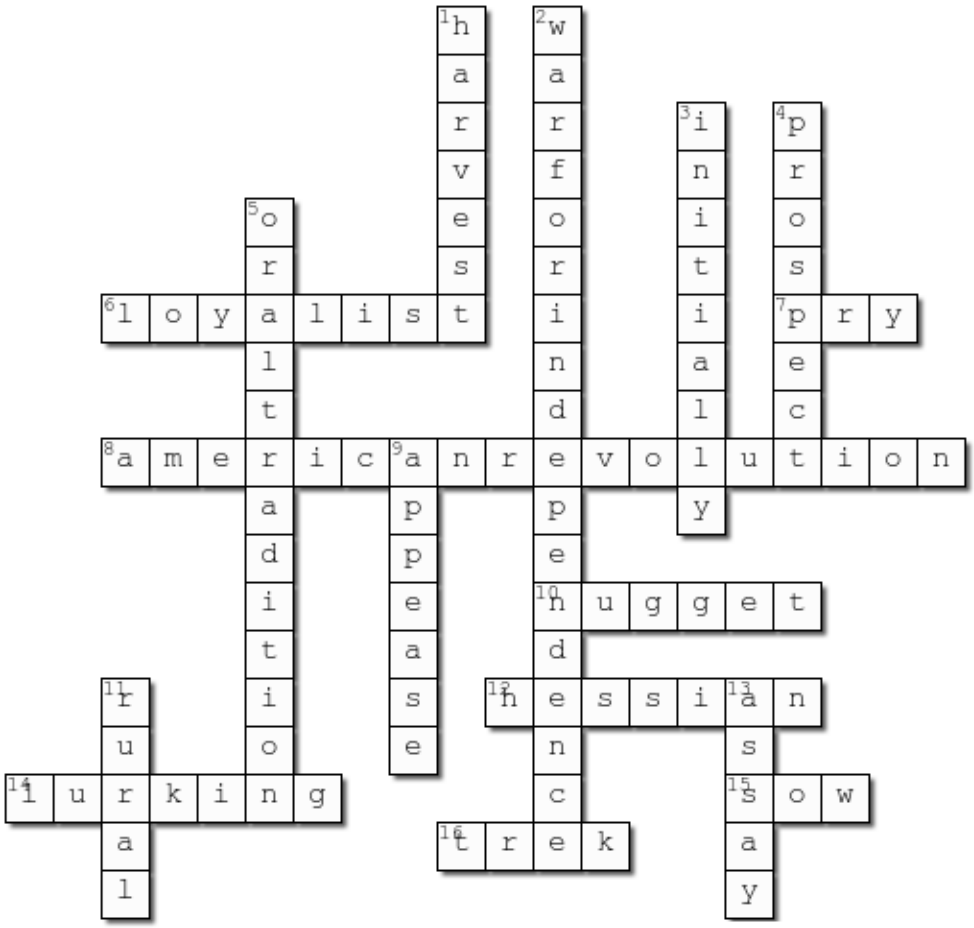
6. a person who still considered themselves a British Subject during the American Revolution
7. to raise, move, or force open with a lever
8. the war fought by the Thirteen Colonies for their independence from Great Britain (1775 – 1783)
10. a small lump of gold
12. a German soldier paid by the British to fight the colonists during the American Revolution
14. to sneak; to lie in wait
15. to scatter seed over the ground for growing
16. a slow, hard journey

Down

1. to gather a crop once it is grown
2. another name for the American Revolution
3. occurring as the beginning
4. to search for gold
5. stories that are passed along by word of mouth
9. to satisfy; to relieve; to pacify
11. having to do with the country, rustic
13. the use of a chemical solution to identify the amount of metal or ore

Oral Traditions Crossword Puzzle Answer Key

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

Across

6. a person who still considered themselves a British Subject during the American Revolution (**loyalist**)
7. to raise, move, or force open with a lever (**pry**)
8. the war fought by the Thirteen Colonies for their independence from Great Britain (1775 – 1783) (**americanrevolution**)
10. a small lump of gold (**nugget**)
12. a German soldier paid by the British to fight the colonists during the American Revolution (**hessian**)
14. to sneak; to lie in wait (**lurking**)
15. to scatter seed over the ground for growing (**sow**)
16. a slow, hard journey (**trek**)

Down

1. to gather a crop once it is grown (**harvest**)
2. another name for the American Revolution (**warforindependence**)
3. occurring as the beginning (**initially**)
4. to search for gold (**prospect**)
5. stories that are passed along by word of mouth (**oraltradition**)
9. to satisfy; to relieve; to pacify (**appease**)
11. having to do with the country, rustic (**rural**)
13. the use of a chemical solution to identify the amount of metal or ore (**assay**)

Language Arts

Section IV: Newspaper

Objective: Students learn to write articles about events by creating their own newspaper.

Newspaper Activity

Take the following events and create a newspaper. Be sure to include titles, advertisements, and illustrations. Refer to the stories in the "Oral Traditions" section for information needed to complete this activity.

"Gold Discovered on John Reed's Farm"

"Local Man Cheated by Fayetteville Merchant"

"George Reed in Family Feud over Gold Partnership"

"Peter Finds Largest Nugget East of the Mississippi River"

Language Arts

Section V: Poetry

Objective: Students learn to analyze and discuss poetry by reading poems related to gold. Students additionally learn several types of poems and choose a

Golden Goose

Shel Silverstein

Yes, we cooked that fat ol' goose.

You say we were insane

Because she laid those golden eggs,

But you don't know the pain

Of trying to boil a golden egg

While you just starve away.

If she'd just laid *ordinary* eggs

She'd be with us today.

Read the poem and do the following activities.

1. Generate a list of words or phrases that use "gold."
    a. Examples: "golden touch," "heart of gold"

2. Create a poem using one of more of the phrases from list created during the first activity.
    a. Pick a type of poem from the "Poetry Vocabulary List."

Gold!

Thomas Hood

Gold! Gold! Gold! Gold!

Bright and yellow, hard, and cold,

Molten, graven, hammer'd, and rolled;

Heavy to get, and light to hold;

Hoarded, barter'd, bought, and sold,

Stolen, borrow'd, squander'd, doled;

Spurn'd by the young, but hugged by the old

To the very verge of the churchyard mould;

Price to many a crime untold:

Gold! Gold! Gold! Gold!

Read the poem and do the following activities.

1. Have the students choose one of the following phrases from Hood's poem and write a paragraph explaining what they think the author meant.

2. Illustrate an image expressed in the poem.

What is Gold?

Mary O'Neill

Gold is a metal
Gold is a ring
Gold is a very
Beautiful thing.
Gold is the sunshine
Light and thin
Warm as a muffin
On your skin.
Gold is the moon
Gold are the stars;
Jupiter, Venus
Saturn and Mars
Gold is the color of
Clover honey
Gold is a certain
Kind of money.
Gold is alive
In a flickering fish
That lives its life
In a crystal dish.
Gold is feeling
Like a king
It's like having the most
Of everything—
Long time ago
I was told
Yellow's mother's name
Is gold…

Read the poem and do the following activities.

1. Write a paragraph about what gold is to you and explain your answer to your class.

2. Write a paragraph explaining what you think O'Neill meant in the lines "Long time ago/I was told/Yellow's mother's name/Is gold…" Share your paragraph with the class and discuss other students' interpretations.

3. Answer the multiple-choice quiz on the following page.

“What is Gold?” Quiz

1. All of the following characteristics are found in “What is Gold?” except:
    - Rhyme
    - Metaphors
    - Stanzas
    - Repetition

2. What is the mood of this poem?
    - Playful
    - Scary
    - Serious
    - Lonely

3. According to the poem, gold is all of the following except:
    - Feeling like a king
    - A metal
    - Money
    - Loving your pet

4. What are gold and sunshine compared to in the poem?
    - The answer to a wish
    - Warm as a muffin
    - Clover honey
    - Feeling like a king

“What is Gold?” Quiz Answer Key

1. All of the following characteristics are found in “What is Gold?” except:
   - □ Rhyme
   - □ Metaphors
   - ■ Stanzas
   - □ Repetition

2. What is the mood of this poem?
   - ■ Playful
   - □ Scary
   - □ Serious
   - □ Lonely

3. According to the poem, gold is all of the following except:
   - □ Feeling like a king
   - □ A metal
   - □ Money
   - ■ Loving your pet

4. What are gold and sunshine compared to in the poem?
   - □ The answer to a wish
   - ■ Warm as a muffin
   - □ Clover honey
   - □ Feeling like a king

Poetry Vocabulary

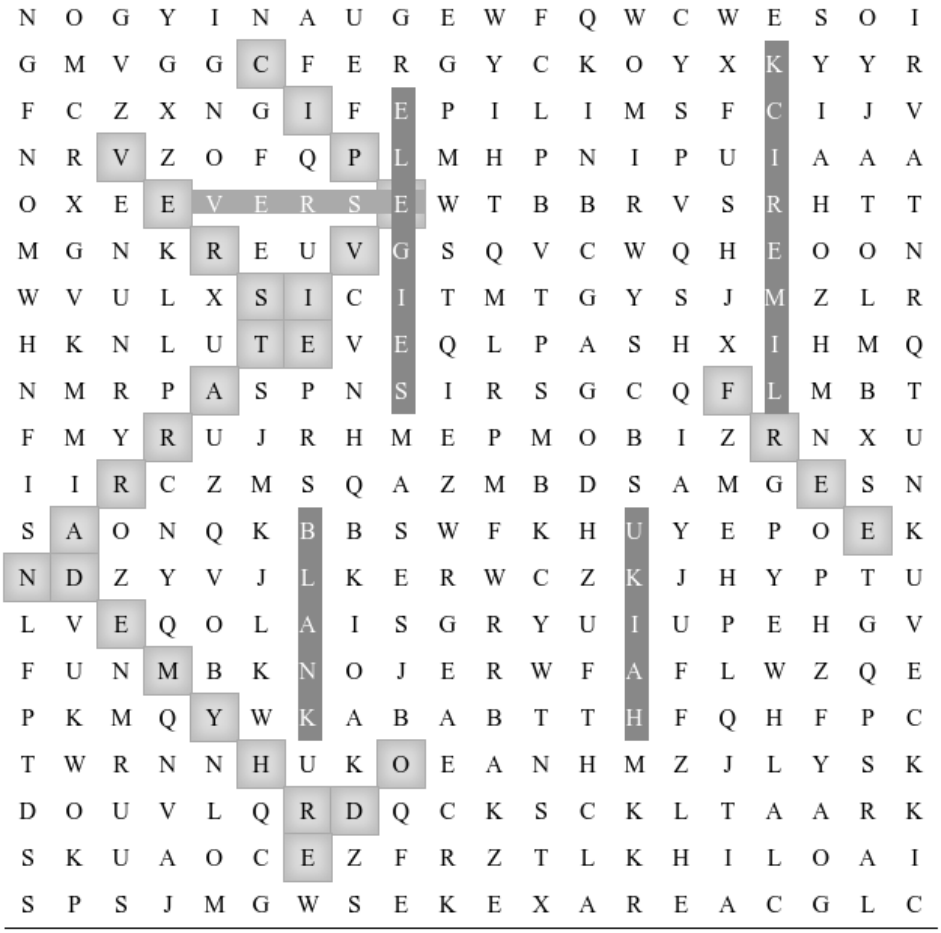
- **Blank verse** – poetry written with precise meter that does not rhyme.
- **Elegies** – a poem that reflects on either death or loss.
- **Epic –** a long narrative that highlights the extraordinary adventures of characters.
- **Free verse** – poetry that lacks a consistent rhyme scheme, metrical pattern, or musical form.
- **Haiku** – a three-line poetic form that originated in Japan. The first line has five syllables, the second line has seven syllables, and the third line has five syllables.
- **Limerick -** a five-line poem that consists of a single stanza and an AABBA rhyme scheme.
- **Narrative poetry** – poetry that tells a story.
- **Ode** – a tribute to its subject, although the subject does not need to be deceased.
- **Rhymed poetry** – poetry that rhymes.
- **Sonnet** – a 14-line poem, typically about love.

Poetry Word Search

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

BLANK
ELEGIES
EPIC
FREE
HAIKU
LIMERICK
NARRATIVE
ODE
RHYMED
VERSE
VERSE

Poetry Word Search Answer Key



BLANK	ELEGIES	EPIC
FREE	HAIKU	LIMERICK
NARRATIVE	ODE	RHYMED
VERSE	VERSE	

Mathematics

Section I: Expanded Notation and Written Numerals

Objective: This activity has students practice expanded notation and written numerals by rewriting numerals in a paragraph.

Expanded Notation and Written Numerals

Change the numerals into expanded notation:

173 = _____+_____+_____

5,491 = _____+_____+_____+_____

761,853= _____+_____+_____+_____+_____+_____

Spell out the numerals. Use one letter in each space:

11 = ___ ___ ___ ___ ___ ___

48 = ___ ___ ___ ___ ___ - ___ ___ ___ ___ ___

472= ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ - ___ ___ ___

Directions: Change the numbers in the following story into expanded notation or spell out the numerals. Put one letter in each space when spelling out the numerals.

According to the story, in 1799 (___ + ___ + ___ + ___) John Reed's 12 (___ + ___) year old son, Conrad, went bow and arrow fishing 1 (___ ___ ___) day down at the creek on his father's farm. The young boy saw something shiny and yellow in the waters of Little Meadow Creek. He waded into the water and hauled out a 17 (___ + ___) pound chunk of gold. The family used it as a doorstop for 3 (___ ___ ___ ___ ___) years. John Reed sold it for $3.50

(___ ___ ___ ___ ___ dollars and ___ ___ ___ ___ ___ cents) but the gold rock was worth a lot more. It was worth $3,600 (_____ + _____). Today that gold nugget would be worth about $399,277 (_____ + _____ + _____ + _____ + _____ + _____).

Expanded Notation and Written Numerals Answer Key

Change the numerals into expanded notation.

173= 100+70+3

5,491= 5,000+400+90+1

761,853= 700,000+60,000+ 1,000+ 800+50+3

Spell out the numerals

11= ELEVEN

48= FORTY-EIGHT

472= FOUR HUNDRED AND SEVENTY-TWO

Directions: Change the numbers in the following story into expanded notation or spell out the numbers.

According to the story, in 1799 (**1000+ 700+ 90+ 9**) John Reed's 12 (**10**+ **2**) year old son, Conrad, went bow and arrow fishing 1 (**ONE**) day down at the creek on his father's farm. The young boy saw something shiny and yellow in the waters of Little Meadow Creek. He waded into the water and hauled out a 17 (**10** + **7**) pound chunk of gold. The family used it as a doorstop for 3 (THREE) years. John Reed sold it for $3.50

(**THREE** dollars and **FIFTY** cents) but the gold rock was worth a lot more. It was worth $3,600 (**$3,000** + **600**). Today that gold nugget would be worth about $399,277 (**300,000 + 90,000 + 9,000 + 200 + 70 + 7).**

Mathematics

Section II: Using Graphs and Charts

Objective: Students learn about graphs and charts by answering questions and creating their own using information provided about Reed Gold Mine.

Using Graphs and Charts

Reed Gold Mine has a series of adits, also known as horizontal tunnels. The four main adits are Linker, Morgan, Tunnel #3, and Sawmill. The approximate lengths and approximate years opened are:

Linker, 150 feet long, opened around 1833.

Morgan, 85 feet long, opened around 1840.

Tunnel #3, 75 feet long, opened around 1880.

Sawmill, 60 feet long, and opened around 1895.

The Main Rocks and percentage of rocks found in each adit are as follows; Linker has 40% greenstone, 30% argillite, and 30% quartz. Morgan has 70% greenstone, and 30% quartz. Tunnel #3 had approximately 50% greenstone, 30% argillite, and 20% quartz. Sawmill had 20% greenstone, and 80% argillite.

1. Complete the following chart using the information found in the above paragraph.

Adit/Crosscut Name	Approximate Length	Main Rocks	Approximate Year Opened
Linker Adit			
Morgan Crosscut			
Saw Mill Adit			
Tunnel #3 Adit **(Lower Hill Trail)**			

2. White quartz is the stone in which gold is found. Which of the adits/crosscuts has quartz?

3. Using the chart from the 1st problem, make a bar graph showing the lengths of the adits/crosscuts. Use a separate sheet of paper to complete the graph.

4. Using the bar graph you created in problem 3, which adit or crosscut is the longest and what is its length?

5. Using the bar graph you created in problem 3, which adit or crosscut is the shortest and what is its length?

Excavation Times

Kind of Rock	Time to Excavate per Inch
Greenstone	45 minutes
Quartz	30 minutes
Argillite	10 minutes

6. Tunnel #3 consist of about 23 feet of argillite, 15 feet of quartz, and about 36 feet of greenstone. Using the chart above, how long would it take to dig Tunnel #3?
   Hints: 1-foot equals 12 inches. Then find the length of time it would take to dig each kind of rock.

7. If Tunnel #3 had 2 more feet of greenstone, how much longer would it take to complete the adit?

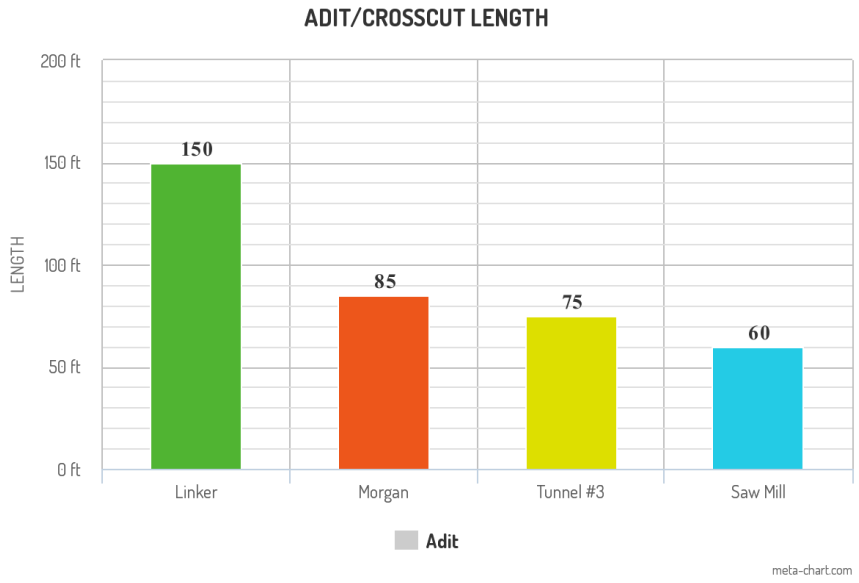
Using Graphs and Charts Answer Key

1. Complete the chart above using the information found in the above paragraph.

Adit/Crosscut Name	Approximate Length	Main Rocks	Approximate Year Opened
Linker Adit	150 feet	Greenstone (40%) Argillite (30%) Quartz (30%)	1833
Morgan Crosscut	85 feet	Greenstone (70%) Quartz (30%)	1840
Tunnel #3 Adit **(Lower Hill Trail)**	75 feet	Greenstone (50%) Argillite (30%) Quartz (20%)	1880
Saw Mill Adit	60 feet	Argillite (80%) Greenstone (20%)	1895

2. Milky quartz is the stone in which gold is found. Which of the adits/crosscuts has quartz?
   Linker, Morgan, Tunnel #3

3. Using the chart from problem 1, make a bar graph showing the lengths of the adits/crosscuts. Use a sheet of paper to make the graph.



4. Which adit or crosscut is the longest and what is its length?
   Linker, 150 ft

5. Which adit or crosscut is the shortest and what is its length?

   Sawmill, 60 ft

6. Using the information on the rock types present, why was the shortest adit not expanded?

   Possible answer: The adit had to be long to reach the veins of quartz. It was the first adit mined, so they thought there could be more gold if they continued. The other adits and crosscuts were so deep they were too far below the water table of the water to be safely removed and Linker was intended to help with drainage

Excavation Times

Kind of Rock	Time to Excavate per Inch
Greenstone	45 minutes
Quartz	30 minutes
Argillite	10 minutes

7. Tunnel #3 consist of about 23 feet of argillite, 15 feet of quartz, and about 36 feet of greenstone. Using the chart above, how long would it take to dig Tunnel #3? (Hints: 1-foot equals 12 inches. Then find the length of time it would take to dig each kind of rock.)

Argillite: 23 x 12= 276 inches: 276 x 10 = 2760 minutes; 2760 minutes = 46 hours

Quartz: 15 x 12 = 180 inches; 180 x 30 = 5400 minutes; 5400 minutes = 90 hours

Greenstone: 36 x 12 = 432 inches; 432 x 45 = 19,440 minutes = 324 hours

Total: 46+90+324= 460

8. If Tunnel #3 had 2 more feet of greenstone, how much longer would it take to complete the adit?

   2 x 12 = 24 inches; 24 x 45 = 1080 minutes; 1080 minutes = **Answer is 18 hours**

Price of Gold

Average Annual Price of Gold Per Ounce

(US Dollars-Actual Terms)

Year	Average Price Per Ounce	Year Low	Year High	Difference Between low and High Price
2020	$1696.94	$1472.35	$2061.50	
2019	$1393.34	$1270.05	$1542.60	
2018	$1268.93	$1176.70	$1360.25	
2017	$1260.39	$1162.00	$1351.20	
2016	$1251.92	$1073.60	$1372.60	
2015	$1158.86	$1049.60	$1298.00	
2014	$1266.06	$1144.50	$1379.00	
2013	$1409.06	$1192.75	$1692.50	
2012	$1668.86	$1537.50	$1790.00	
2011	$1573.16	$1316.00	$1896.50	
2010	$1226.66	$1052.25	$1426.00	
2009	$973.66	$813.00	$1218.25	
2008	$872.37	$692.50	$1023.50	
2007	$696.43	$608.30	$841.75	
2006	$604.34	$520.75	$725.75	
2005	$444.99	$411.50	$537.50	
2004	$409.53	$373.50	$455.75	
2003	$363.83	$319.75	$417.25	
2002	$310.08	$277.80	$348.50	
2001	$271.19	$256.70	$292.85	
2000	$279.29	$263.80	$316.60	

Complete the chart the above by finding the difference of the high and low prices of each year**.** Then use the chart above to answer the following questions.

1. Which year had the biggest difference in the high and low prices? What was the difference?

2. Which year had the smallest difference in the high and low prices? What was the difference?

3. How many years was the average price between $1,000 and $1,300?

4. List the 5 years for the highest average price.

5. List the 5 years with the lowest average price.

6. If you bought 1 ounce of gold in 2000, in what year would you need to sale it to make the highest profits? How much profit would you make?
   Hint look at the High Price column

7. Use the average price on the chart to determine how much each nugget would be worth for the years given. Then figure out the difference in the prices.

   a) 2-ounce nugget in 2008, in 2015: difference between the two numbers.

   b) 4-ounce nugget in 2000, in 2007: difference between the two numbers.

   c) 6-ounce nugget in 2017, in 2020: difference between the two numbers.

Price of Gold Answer Key

Average Annual Price of Gold Per Ounce

(US Dollars-Actual Terms)

Year	Average Price Per Ounce	Year Low	Year High	Difference Between low and High Price
2020	$1696.94	$1472.35	$2061.50	**$589.15**
2019	$1393.34	$1270.05	$1542.60	**$272.55**
2018	$1268.93	$1176.70	$1360.25	**$183.55**
2017	$1260.39	$1162.00	$1351.20	**$189.20**
2016	$1251.92	$1073.60	$1372.60	**$299.00**
2015	$1158.86	$1049.60	$1298.00	**$248.40**
2014	$1266.06	$1144.50	$1379.00	**$234.50**
2013	$1409.06	$1192.75	$1692.50	**$499.75**
2012	$1668.86	$1537.50	$1790.00	**$252.50**
2011	$1573.16	$1316.00	$1896.50	**$580.50**
2010	$1226.66	$1052.25	$1426.00	**$373.75**
2009	$973.66	$813.00	$1218.25	**$405.25**
2008	$872.37	$692.50	$1023.50	**$331.00**
2007	$696.43	$608.30	$841.75	**$233.45**
2006	$604.34	$520.75	$725.75	**$205.00**
2005	$444.99	$411.50	$537.50	**$126.00**
2004	$409.53	$373.50	$455.75	**$82.25**
2003	$363.83	$319.75	$417.25	**$97.50**
2002	$310.08	$277.80	$348.50	**$70.70**
2001	$271.19	$256.70	$292.85	**$36.15**
2000	$279.29	$263.80	$316.60	**$52.80**

Complete the Chart the above by finding the difference of the High and Low prices of each year. Then use the chart above to answer the following questions.

1. Which year had the biggest difference in the high and low prices? What was the difference? **Year 2020; Difference is $589.15**

2. Which year had the smallest difference in the high and low prices? What was the difference? **Year 2001; Difference is $36.15**

3. How many years was the average price between $1,000 and $1,300?
   5 Years in total (Listed latest to earliest); 2010, 2014, 2015, 2016, 2017, 2018

4. List the 5 years for the highest average price and list their price.
   2020 ($1696.94), 2019 ($1393.34), 2013 ($1409.06), 2012 ($1668.86), 2011 ($1573.16)

5. List the 5 years with the lowest average price and list their price.
   2000 ($279.29), 2001 ($271.19), 2002 ($310.08), 2003 ($363.83), 2004 ($409.53)

6. If you bought 1 ounce of gold in 2000, in what year would you need to sale it to make the largest amount of profits? What would those profits be? (Hint look at the High Price column) **Sell in 2020 for a profit of $1744.90**

7. Use the average price on the chart to determine how much each nugget would be worth for the years given. Then figure out the difference in the prices.

   a) 2-ounce nugget in 2008, in 2015: difference in the prices.

   Price per ounce in 2008 = $872.37 **Price per ounce in 2015 = $1158.86**

   872.37 x 2 = $1744.74 in 2008 **1158.86 x 2 = $2317.72 in 2015**

   $2317.72-$1744.74 = $572.98 difference

   b) 4-ounce nugget in 2000, in 2007: difference in the prices.

   Price per ounce in 2000 = $279.29 **Price per ounce in 2007 = $696.43**

   $279.19 x 4 = $1116.76 in 2000 **$696.43 x 4 = $2785.72 in 2007**

   $2785.72 - $1116.76 = $1668.96

   c) 6-ounce nugget in 2017, in 2020: difference in the prices.

   Price per ounce in 2017 = $1260.39 **Price per ounce in 2020 = $1696.94**

   $1260.39 x 6 = $7562.34 **$1696.94 x 6 = $10181.64**

   $10181.64 - $7562.34 = $2619.30

Mathematics

Section III: Stem and Leaf Graphs

Objective: Students learn to create and use stem and leaf graphs to solve word problems.

Stem and Leaf Graphs with Word Problems

There have been several large nuggets found at Reed Gold Mine. The 6 largest have weighed 28, 23, 17, 13, 10 and 7 pounds troy.

NOTE: Gold and metal are weighed on the troy system. A troy pound has 12 troy ounces rather than 16.

1. Convert each of the nugget weights given above into troy ounces.

2. Create a stem and leaf plot to show the weight using troy pounds for the larger nuggets of gold found at Reed Gold Mine.

3. Create a stem and leaf plot to show the weight using troy ounces for the larger nuggets of gold found at Reed Gold Mine.

4. Which is greater, the number of nuggets that weigh more than 20 pounds troy or between 10 and 20 pounds troy?

5. How many nuggets weigh between 15 to 20 pounds troy?

6. How many nuggets weigh between 100 to 250 troy ounces?

7. How many nuggets weigh between 1 to 15 pounds troy?

8. If you were to create a bar graph showing the different weights of the nugget, which nugget would have the longest bar? Which would have the shortest?

9. Create a bar graph using the information from the stem plot you created in Question 3.

10. If the price for one ounce of gold was $185, how much would the 3 largest nuggets be worth?
    Hint: Each troy pound has 12 troy ounces

11. If the price for one ounce of gold was $235, how much would the 3 smallest nuggets be worth?
    Hint: Each troy pound has 12 troy ounces

Stem and Leaf Graphs with Word Problems Answer Key

The have been several large nuggets found at and around Reed Gold Mine. The 6 largest have weighed 28, 23, 17, 13, 10 and 7 pounds troy.

NOTE: Gold and metal are weighed on the troy system. A troy pound has 12 troy ounces rather than 16.

1. Convert each of the nugget weights given above into troy ounces. (Remember one troy pound equals 12 troy ounces)

   28 x 12 = 336 Troy Ounces **23 x 12 = 276 Troy Ounces**

   17 x 12 = 204 Troy Ounces **13 x 12 = 156 Troy Ounces**

   10 x 12 = 120 Troy Ounces **7 x 12 = 84 Troy Ounces**

2. Create a stem and leaf plot to show the weight using troy pounds for the larger nuggets of gold found in the Reed Gold Mine area.

Stem	**Leaf**
0	7
1	0 3 7
2	3 8

3. Create a stem and leaf plot to show the weight using troy ounces for the larger nuggets of gold found in the Reed Gold Mine area.

Stem	**Leaf**
8	4
12	0
15	6
20	4
27	6
33	6

4. Which is greater, the number of nuggets that weigh more than 20 pounds troy or between 10 and 20 pounds troy?

   10-20

5. How many nuggets weigh between 15 to 20 pounds troy?
   1

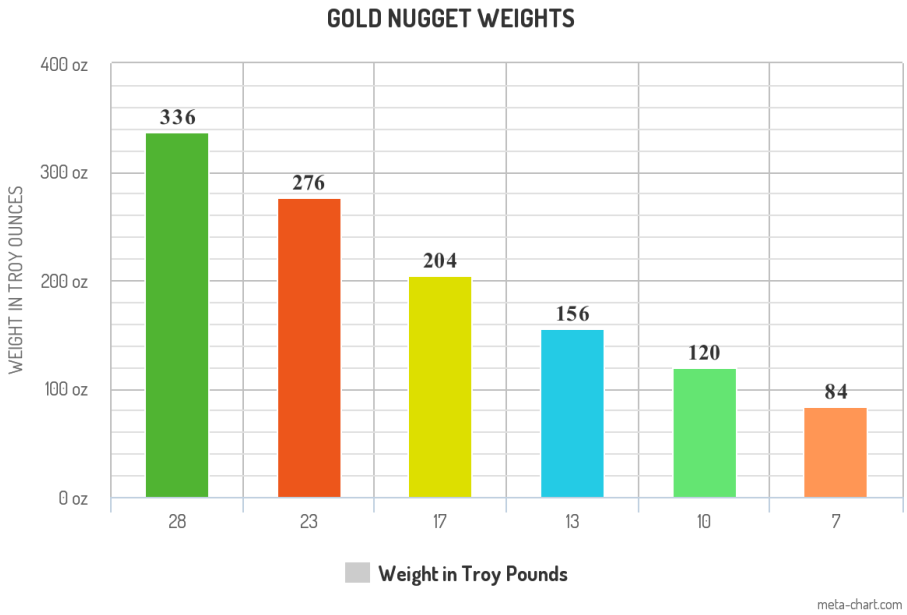
6. How many nuggets weigh between 100 to 250 troy ounces?
   3

7. How many nuggets weigh between 1 to 15 pounds troy?
   3

8. If you wanted to create a bar graph showing the different weights of the nugget, which nugget would have the longest bar? Which would have the shortest?

   28-pound nugget would be the longest; 7-pound nugget would be the shortest

9. Create a bar graph using the information from the stem plot you created in **Question 3**.



10. If the price for one ounce of gold was $185, how much would the 3 largest nuggets be worth each?
    Hint: Each troy pound has 12 troy ounces

    Largest Nuggets are 28, 23, 17 troy pounds

    28 x 12 = 336 Troy Ounces **336 x 185 = $62,160**

    23 x 12 = 276 Troy Ounces **276 x 185 = $51,060**

    17 x 12 = 204 Troy Ounces **204 x 185 = $37,740**

11. If the price for one ounce of gold was $235, how much would the 3 smallest nuggets be worth each?
    Hint: Each troy pound has 12 troy ounces

    Smallest Nuggets are 13, 10, 7 troy pounds

    13 x 12 = 156 Troy Ounces **156 x 235 = $36,660**

    10 x 12 = 120 Troy Ounces **120 x 235 = $28, 200**

    7 x 12 = 84 Troy Ounces **84 x 235 = $ 19,740**

Mathematics

Section IV: Math Game

Objective: Students learn to use multiplication to crack a secret code.

Secret Code

Directions: Use your multiplication facts to solve these problems. Then on the line below the problem, decode the secret fact about Reed Gold Mine.

A 24	**B 84**	**C 42**	**D 45**	**E 60**	**F 4**	**G 75**	**H 88**
I 12	**J 37**	**K 23**	**L 30**	**M 49**	**N 18**	**O 54**	**P 32**
Q 59	**R 72**	**S 20**	**T 40**	**U 63**	**V 77**	**W 142**	**X 1**
Y 27	**Z 85**						

4 3 8 10 5 12 9

X3 X6 X4 X6 X8 X5 X7

___ ___ 1803, ___ ___ ___ ___ ___

9 2 5 6 9 7 3 9 5 15

X5 X6 X4 X7 X6 X9 X20 X7 X12 X3

___ ___ ___ ___ ___ ___ ___ ___ ___ ___

4 11 1 2 4 36 3 6 5 8

X10 X8 X60 X15 X6 X2 X25 X10 X4 X5

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

2 7 3 15 5 20

X9 X9 X25 X6 X12 X2

___ ___ ___ ___ ___ ___ at Reed Gold Mine.

Secret Code Answer Key

Directions: Use your multiplication facts to solve these problems. Then on the line below the problem, decode the secret fact about Reed Gold Mine.

A 24	B 84	C 42	D 45	E 60	F 4	G 75	H 88
I 12	J 37	K 23	L 30	M 49	N 18	O 54	P 32
Q 59	R 72	S 20	T 40	U 63	V 77	W 142	X 1
Y 27	Z 85						

4	3		8	10	5	12	9
X3	X6		X4	X6	X8	X5	X7

I N 1803, P E T E R

9	2	5	6	9	7	3	9	5	15
X5	X6	X4	X7	X6	X9	X20	X7	X12	X3

D I S C O V E R E D

4	11	1		2	4	36	3	6	5	8
X10	X8	X60		X15	X6	X2	X25	X10	X4	X5

T H E L A R G E S T

2	7	3	15	5	20
X9	X9	X25	X6	X12	X2

N U G G E T at Reed Gold Mine.

Science

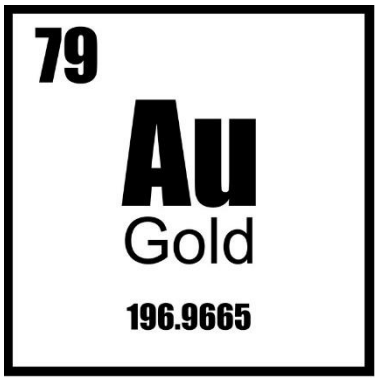
Section I: Formation of North Carolina Gold Deposits

Objective: Students will learn how gold ended up in North Carolina's Piedmont region and can complete a related matching game.

Formation of North Carolina Gold Deposits

Gold is a naturally found element on earth, which means it was present when the earth was formed. An element is one of the basic substances that is composed of atoms of a single kind and is unable to be separated into simpler substances through ordinary chemical means.

In other words, gold cannot be broken down into other material or matter. Gold is a soft, heavy isometric mineral. It is the native element Au. Gold is widely found as nuggets or grains in alluvial deposits or in veins of quartz.



Gold is number 79 on the Periodic Table of Elements. The symbol is Au, which stands for Aurum, the Latin word for gold. The number at the bottom is the atomic weight, also known as relative atomic mass.

Volcanoes, or at least volcanic action, played a role in the discovery of gold in Cabarrus County, North Carolina. Well below the surface is gabbro, a dark-colored, basic intrusive igneous rock. Gabbro is commonly called greenstone due to its green color and mineral properties. At some point in the earth's development, the gabbro rock was forced upward through the crust, opening large fissures and smaller cracks from magma moving underneath the surface.

The gabbro material contained traces of gold as well as silicates, which form quartz. The chemical composition of quartz is SiO2, or silicon dioxide. While the gabbro rock was still molten, but starting to cool, the gold and silicates started to fill those fissures and cracks, forming milky white quartz veins, and trapping the gold. The white color was caused by bubbles of gas and liquid as the quartz crystals formed filling in the open spaces.

As the quartz veins eroded away, the gold settled either into larger fissures or along the surface near sources of water. Water was the main source of the erosion, the process by which the surface of the earth—minerals, rocks, and soil—are worn away. Water also caused the gold to be carried downstream and deposited along the route.

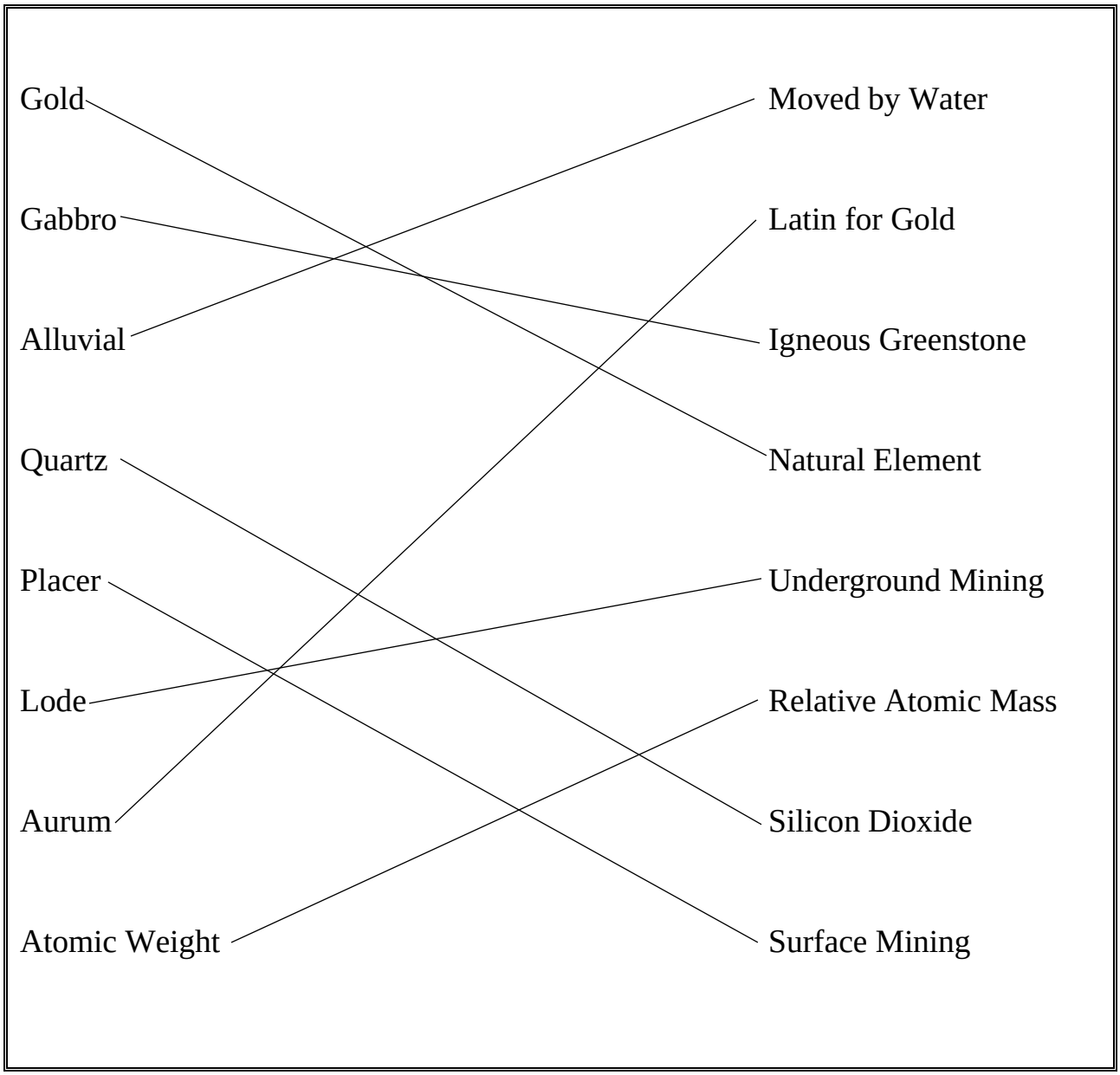
The gold along the surface became known as placer deposits, while the underground quartz veins utilized lode mining. Placer mining found loose gold, from smaller flakes to large nuggets, while lode mining required machinery to process the quartz to extract the gold.

Gold Matching Game

Match the word on the left with the correct definition or word on the right.

Gold	Moved by Water
Gabbro	Latin for Gold
Alluvial	Igneous Greenstone
Quartz	Natural Element
Placer	Underground Mining
Lode	Relative Atomic Mass
Aurum	Silicon Dioxide
Atomic Weight	Surface Mining

Gold Matching Game Answer Key



Science

Section II: Uses of Gold

Objective: Students will learn about the many uses of gold and can complete a related worksheet.

Uses of Gold

Gold has many uses for everyday life. Everything from money to space travel utilizes gold in a unique way.

Gold has been used for money for thousands of years, dating back to 1091 B.C. in China. The rarity of gold gives it value, allowing countries to base entire banking systems by how much they keep stored around the world. Gold coins would be produced to use as money to purchase goods and services. While gold is still used as currency today, it is mostly for collectors hoping the value of gold remains high even when other investments lose their value.

Gold is ductile, meaning it can be shaped by drawing or pulling, which makes it useful in creating various forms of jewelry. An ounce of gold can be formed into a wire five miles long. Gold is also malleable, meaning it can be hammered very thin, to the point it is transparent. These properties allow goldsmiths to shape this metal into intricate rings, necklaces, earrings, eyeglasses, or ornamental art.

Gold is also often used in medicine because the metal has potential healing properties for the body. One major use was for rheumatoid arthritis, in the form of gold shots. Myochrysine, which contains gold sodium thiomalate, is used to help treat and potentially stop further progression of this disease in both children and adults. Gold is also used in the treatment of cancer, malaria, and certain laser eye treatments.

One of the largest uses of gold today is electronics, specifically in circuit boards and other components that control powered devices. Gold is one of the best conductors of electricity since the metal will not corrode or tarnish. A thin layer of gold along the edge of a circuit board where connections are made will remain just as bright and strong as the day it was made. Other metals, such as copper and silver tarnish rather easily, and may start to slowly erode, causing breaks in the electrical contacts. The electronic recycling industry helps collect gold from used electronics to be processed and repurposed into other uses around the world.

One of the most interesting uses of gold is in the space industry. Even when gold is hammered so thin it is transparent, it still can reflect heat, including harmful UV rays which can damage eyes. Most space helmets have a thin layer of gold across the face shield to protect astronauts while conducting space walks or maintaining the space station. Satellites, solar panels, and other equipment in space exposed to the unprotected harmful rays of the sun also use gold to protect their surfaces and electronics.

Uses of Gold Worksheet

Fill in the missing words based on descriptions in the sentences.

1. Gold wire can be created due to being _____ which pulls it out into thin strands.

2. Since gold cannot rust or tarnish, it is resistant to _____, unlike copper or silver.

3. Gold can usually be found on an electronic _____, which controls the functions of any powered device.

4. Just like carrying quarters today in a pocket, _____ could be used to purchase items in a store or to pay a bill years ago.

5. Astronauts require a _____ to be placed over their face shields to protect them from the harmful rays of the sun.

6. The _____ of gold around the world helps determine the value and investment capabilities.

Uses of Gold Worksheet Answer Key

1. Gold wire can be created due to being **ductile** which pulls it out into thin strands.

2. Since gold cannot rust or tarnish, it is resistant to **corrosion**, unlike copper or silver.

3. Gold can usually be found on an electronic **circuit board**, which controls the functions of any powered device.

4. Just like carrying quarters today in a pocket, **gold coins** could be used to purchase items in a store or to pay a bill years ago.

5. Astronauts require a **thin layer of gold** to be placed over their face shields to protect them from the harmful rays of the sun.

6. The **rarity** of gold around the world helps determine the value and investment capabilities.

Science

Section III: Properties of Gold

Objective: Students will learn about the properties of gold and can complete a related laboratory experiment.

Properties of Gold

When the early miners dug along the banks of creeks and panned for gold, they were taking advantage of several scientific properties of gold, including mass, volume, density, and specific gravity.

One of those is a scientific property called density. If you had two rocks that were the same size, but one rock was much heavier than the other, the heavier rock would be denser. Density means that the rock's materials are more closely compacted together, which also affects its specific gravity.

Determining the density of a material is also determining how many grams each cubic centimeter of the material weighs. When the material is weighed, that provides the mass, versus the number of cubic centimeters of space the material uses, which is the volume. When volume is divided into the mass, the equation determines the density of the material. The formula to calculate density is:

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

It is easy to tell that some minerals seem heavier than others, which helps in identifying certain characteristics. When attempting to determine whether one mineral is heavier than another, geologists use a property called specific gravity. This is the number of times a mineral is as heavy as an equal volume of water. Regarding gold, one ounce of pure gold has a specific gravity of 19.3, which means that ounce is 19.3 times heavier than an ounce of water.

Archimedes, a famous Greek mathematician, developed a formula for finding specific gravity:

$$\text{Specific Gravity} = \frac{\text{Mass of Mineral in Air}}{\text{Mass of Mineral} - \text{Mass of Mineral in Water}}$$

The early miners knew a piece of gold was much heavier than a rock of the same size. They determined that by adding water to the dirt and rocks in the pan and sloshing the mixture around, the heavier gold would eventually work to the bottom of the pan. After giving the gold time to settle at the bottom of the pan, the miner would remove all the other materials and hopefully see the gold. This may sound simple, but takes patience, practice, and some scientific knowledge of density to become a panning expert.

The following activity will demonstrate density with various materials, which can then be compared to the density of gold.

Properties of Gold Experiments

Materials:

- Graduated cylinder (try a baby bottle marked in milliliters)
- Water
- String
- Balance scale with weights
- Calculator
- Materials to measure (copper pennies, lead fishing weights, iron carpenter's nails, quartz, or granite, etc.)

Step 1: Mass

1. Use a balance scale to weigh each specimen to the nearest gram.
2. Record the weight in grams.

Step 2: Volume

1. Put water into graduated cylinder until it reaches an even number and is deep enough to submerge each specimen.
2. Tie a string to the specimen and completely submerge it into the cylinder.
3. Count the number of milliliters the water rises. This tells how much space the specimen replaces in the cylinder.
4. Each milliliter of water is equal to one cubic centimeter.
5. Record the number of cubic centimeters (cc) of volume.

Step 3: Density

1. Using your calculator:
2. Enter the mass of the material, then press the "division" key.
3. Enter the volume of the material and press the "equals" key. The total will be the number of grams per cc, or the density of the material.
4. Round the number off to the nearest tenth, if applicable. Record the answer.

Step 4: Specific Gravity

1. Use the information from Step 1.
2. Put water into the graduated cylinder until it reaches an even number and is deep enough to submerge each specimen.
3. Place each specimen into the cylinder separately.
4. Use the balance scale to weigh the cylinder with each specimen, separately.
5. Record the masses for the water, cylinder, and the specimen.
6. Using the formula for specific gravity, your information, and a calculator, calculate the specific gravity for each person.

Note: Use enough of each material to register several cc's in the cylinder. If you bundle several pennies or nails, be sure to weigh all of them together on the scale.

Laboratory Data Sheets

Material	Mass	Volume
_____	_____ g	_____ cc
_____	_____ g	_____ cc
_____	_____ g	_____ cc
_____	_____ g	_____ cc
_____	_____ g	_____ cc
_____	_____ g	_____ cc

Material	Density	Specific Gravity
_____	_____ g/cc	_____
_____	_____ g/cc	_____
_____	_____ g/cc	_____
_____	_____ g/cc	_____
_____	_____ g/cc	_____
_____	_____ g/cc	_____

1. Rank the materials on your chart from the least dense to the densest.
   a. _____ d. _____
   b. _____ e. _____
   c. _____ f. _____

2. Do you notice any differences between the least dense and most dense materials? Yes_____ No_____. If so, what did you notice? _____
   _____
   _____

3. If gold were <u>not</u> a very dense material, would panning have been a good way to find the Nuggets? Yes _____ No _____. Why? _____
   _____
   _____

4. If gold would have been the least dense material, where would it have been found in the pan? _____
   _____

5. Rank the materials on your chart from the lowest specific gravity to the greatest specific gravity.
   a. _____ d. _____
   b. _____ e. _____
   c. _____ f. _____

6. Do you notice any differences between the material with the lowest specific gravity and the material with the highest specific gravity? Yes _____ No _____. If so, what did you notice?_____
   _____
   _____

Science

Section IV: Amalgam

Objective: Students will learn about amalgams and can perform a simple science experiment to better understand the concept.

Amalgam

The miners discovered gold will bond with mercury, which is called an amalgam. While the two metals—mercury is a liquid metal in its normal state—join, they do not change chemically into a new substance, and can later be separated by heat.

Once this discovery was made, miners began to coat pans and copper plates to trap the gold. Mercury would not stick to the copper and would be scraped off and sent to be boiled off in a retort, which was like a still. Mercury boils at roughly 675° Fahrenheit, or 357° Celsius. Gold, on the other hand, has a boiling point of 5,000° Fahrenheit or 2,700° Celsius. The mercury would be boiled away and then recondensed into a liquid to be reused, which the gold residue would be further processed and purified.

While mercury was very beneficial to the mining industry, it was also a poison to those who used it on a regular basis. The symptoms of mercury poisoning vary greatly but can have long term negative effects on the human body and brain.

Copper and Steel Experiment

Materials:

- 20 dull brown pennies (pre 1990 dates work better because they contain more copper)
- 1 clean steel nail
- 1 tablespoon of salt
- ¼ cup of white vinegar
- Clear drinking Glass (not plastic)
- Plastic Spoon
- Paper Towels
- Non-metal bowl full of clean water for rinsing

Step 1: Put the vinegar and salt into the clear drinking glass and stir until the salt is dissolved. This creates an acid solution.

Step 2: Put the 20 pennies into the acid solution and observe what happens. Leave them in the solution for a minimum of 5 minutes.

Step 3: After a minimum of 5 minutes, use the plastic spoon to remove the pennies from the solution. **Do not dump out the solution**. Rinse the pennies with water and leave them on paper towels to dry.

Step 4: Place the clean steel nail in the acid solution so that part of the nail is in the solution and part is above the solution. Leave it in place for 15 to 20 minutes then remove from the glass. What does the nail look like now? Are there two different colors? Do you see a light copper color to the section that was in the solution? If not, put the nail back into the solution for a while longer.

Once the nail is finished in the solution, place on paper towels to dry before handing the part in the solution. The copper coating should remain once the nail has dried.

What happened to make the copper bond to the steel? See the following page for the answer.

What Happened?

Pennies are made of copper atoms. When oxygen atoms come in contact with the copper atoms, molecules called copper oxide are formed. Copper oxide gives the pennies that dull brown color. The acid that was formed by mixing the white vinegar with table salt caused the copper oxide to dissolve. With the copper oxide gone, the pennies looked clean again.

When the acid dissolved the copper oxide, it also dissolved some of the copper atoms that were on the pennies. Those copper atoms left the pennies and floated around in the acid, but some of their electrons were left behind, still attached to the pennies. That caused the floating atoms to have a positive charge, which are known as copper ions.

When the nails were added to the solution, some of the iron atoms left the nail just like the copper atoms left the pennies. The iron atoms also left some of their electrons behind. This caused the nail to have a negative charge. Since opposite charges attract each other, the positively charged copper ions that were left behind in the acid were attracted to the negatively charged nail. Therefore, the part of the nail that was left in the solution gained a light copper coating.

Social Studies

Section I: Life of John Reed

Objective: Students learn about John Reed's life, from birth to death, and complete activities after completing the reading.

The Life of John Reed

John Reed, born Johannes Reith, was recorded by the Lutheran Church book in Salzburg as being born on 14 April 1759. He was the illegitimate son of Anna Elizabeth Reid and Johann Jakob Helmerich. When he was five, his mother married a widower named Adam Henrich Hahn.

Little is known about Reed's early life, but he either enlisted or was drafted into the Hessian militia from the Hessen-Cassel region in modern-day Germany. He served in Company 2 of the Garrison Regiment von Wissenbach and endured several months of grueling training before his regiment was mobilized to aid the British during the American Revolution.

Reed likely arrived in New York in June 1778, having travelled across the Atlantic with the second wave of Hessian troops who were intended to serve as replacements for the first wave that arrived in the Thirteen Colonies in October 1776. In November 1778, Reed's regiment sailed from New York to Georgia and assisted with the capture of Savannah in December 1778. Reed could have fought during the initial capture of Savannah; during the Siege of Savannah the following year, when Franco-American forces unsuccessfully attempted to retake the important port city; or could have arrived with later forces.

Reed remained with the British in Georgia until he deserted his post on 21 June 1782, from somewhere "outside of Savannah" and took his arms and equipment with him. It is unknown why Reed decided to desert that day or exactly why he decided to travel to North Carolina. Deserting was no small task, especially from the Savannah area. Members of the Tory militia, African Americans, and Native Americans were all employed to search the surrounding areas for deserters and to bring them back alive or dead. Not only that, many loyalists lived along any route Reed could have chosen. Had he been captured, the loyalists could have returned him to his commanding officer or decided to take matters into their own hands.

It is unknown what Reed did once he arrived in the Piedmont of North Carolina. There is reasonable speculation that he worked as a hired hand or farmer in a grist mill. There was a significant shortage of men to employ due to the wartime conditions. Additional evidence to support this theory is that Reed married Sarah Kiser, the daughter of the late owner, in late-1782 or 1783. The couple had nine children: Henry, born in 1783; Frances "Fanny," born in 1785; Conrad, born in 1787; John Jr., born in 1790; George, born in 1792; Elizabeth, born in 1794; Catherine, born in 1797; Mary "Polly," born in 1800; and Martha "Patsy," born in 1803.

The Reeds operated a subsistence farm, growing a little of everything in their fields to provide for their family and to sell at market. Their life together was typical of what other lower-class families until the dawn of the 19th century. In 1799 their son, Conrad, stumbled upon a 17-pound gold nugget in the creek near his family's cabin. Supposedly the Reeds didn't know what it was,

so they used it as a doorstop for a few years. Once during that time, Reed brought the nugget to a silversmith in Concord, North Carolina, but the man was unable to identify the nugget as gold.

In 1802, Reed brought the nugget with him on a supply run to Fayetteville, North Carolina, to show to a jeweler. The jeweler told Reed to leave the nugget with him and, while he was gone, the jeweler melted the nugget down to a bar of gold about nine inches long. When Reed returned, the jeweler offered to buy the gold for whatever price Reed named. Reed suggested $3.50, a week's pay for a farmer at the time. The jeweler gladly paid. However, the nugget was worth at least 100 times what Reed asked. At the time, it was worth about $3,600.00. Today, it would be worth $415,140.00. Reed later discovered that he had been cheated by the jeweler. Oral tradition reveals he returned to Fayetteville and demanded more money and received an additional $1,000, possibly with the help from one of his neighbors.

The following year, in 1803, Reed entered a partnership with three neighbors—Reverend James Love; Martin Phifer; and his brother-in-law, Fredrick Kiser. The plan was to search for gold on land supplied by Reed and the others would supply the equipment and enslaved labor to cover more ground. Profits were to be divided equally among the four men.

By 1824, haphazard digging had yielded around $100,000 in gold. With his wealth, Reed managed to obtain the dubious honor of being one of the largest Antebellum slaveholders in North Carolina's Piedmont region. In 1804, he purchased three enslaved peoples—Charity, Dinah, and Sam. They were likely the first enslaved peoples he purchased. Some sources maintain he enslaved almost twenty enslaved peoples by his death.

In 1831, the first underground mining began at the Reed Mine. For unknown reasons, the original partnership was dissolved—possibly because of Love's death. After that, Reed allowed only his sons and sons-in-law to operate the mine until a legal dispute amongst the family resulted in the mine's closure for a decade.

In 1842, at age 82, John Reed became a citizen of the United States. Not long after that, on May 28, 1845, Reed passed away at the age of 86. In accordance to his will, the mine was sold at public auction. Over the years, Reed Gold Mine saw many different owners. In the 1890s, the land was sold to the Kelly family who operated the mine until 1912. In 1971, the Kelly family donated 70 acres of the mine to the State of North Carolina and sold the remaining 820 acres to the State of North Carolina. In 1977, Reed Gold Mine State Historic Site officially opened.

After reading "The Life of John Reed", choose one of the following activities to complete.

1. Research your family's history. Create a family tree to show your findings.

2. Choose a group who settled in your county and research their history. Write a report including information such as answers to questions like, "What brought them to North Carolina?," "What did they do?," and "How did they influence their area?"

Social Studies

Section II: Reed Gold Mine Vocabulary

Objective: Students will learn key Reed Gold Mine and gold mining vocabulary words and complete assignments to aid in understanding the definitions.

Reed Gold Mine Vocabulary

- **Acre –** a unit of measurement for land.
- **Adit –** a horizontal entrance/exit of an underground mine.
- **Amalgamation –** the process of combing mercury and gold in order to take the gold out of its ore.
- **Assay –** the use of a chemical solution to identify the amount of metal or ore.
- **Bechtler Mint** – the name of the first gold only mint started in North Carolina. It was a local family run mint that turned the locally mined gold into coins and ingots. The predecessor to the Charlotte Mint.
- **Chilean Mill** – a mill for crushing quartz, by rotating two stone wheels in a circle. Used to extract gold from white quartz.
- **Cornish** – term used to describe immigrants that moved to America from Cornwall, England to work in the newly created gold mines.
- **Excavation** – to dig a hole or channel in the ground.
- **Gold** – a precious yellow metal with the atomic symbol of AU. Was the main precious metal mined at Reed Gold Mine.
- **Immigrants** – a person who leaves the country they were born in to live permanently in a different country.
- **Investments** – the process of investing money in either a business to venture in order to make money.
- **Jaw Crusher** – an adjustable machine for crushing quartz to various sizes in order to prepare the quartz to be used at the Stamp Mill.
- **Kibble** – a large cast iron bucket used to lower miners in and out of shaft as well as bringing the quartz that mined to the surface.
- **Little Meadow Creek** – the location where Conrad Reed found the first gold nugget in America while fishing.
- **Lode Mining** – the term used to describe mining that took place below the surface of the ground. Also known as underground mining.
- **Miner** – the term used to describe the workers that worked in gold mine as well as other mines.

- **Nugget** – a small lump of gold.
- **Ore** – a naturally occurring solid material from which a metal or valuable mineral can be profitably extracted.
- **Panning** – the action that involved washing gravel or dirt in a pan to separate out the gold.
- **Pick** – a tool used to break loose formation of rocks by striking it with the end of the pick, normally rocks that have the chance to have gold in them.
- **Placer Mining** – the term used to describe mining that took place above the surface of the ground normally using pans, shovels and various rockers. Also known as aboveground mining.
- **Prospecting –** the action of searching mineral deposits to find valuable metals or gems.
- **Quartz** – a hard white or colorless rock that gold is found inside.
- **Reed Gold Mine** – a North Carolina State Historic Site where the first documented discovery of gold occurred in America.
- **Rural –** having to do with the country; rustic
- **Shaft** – a vertical entrance/exit into an underground mine.
- **Stamp Mill** – a large machine for pounding pieces of ore into a file gravel to separate gold.
- **Stope** – in underground mining, the area from which the ore is removed.
- **Veins –** a thin, sheet-like igneous intrusion or mineral filling in a fracture or crevice in a country rock.

Reed Gold Mine Vocabulary Quiz

1. What element does amalgamation use in it process?
   - Argon
   - Mercury
   - Helium
   - Bromine

2. What is a kibble?
   - A cast iron bucket
   - A sturdy rope
   - A strong shovel
   - A lazy miner.

3. Which of the following could you crush ore or quartz in?
   - Stamp Mill
   - A kibble
   - Ore Cart
   - A mint

4. John Reed was an _____ from Germany.
   - Ancestor
   - Immigrant
   - Artist
   - Teacher

5. In 1799, the first documented discovery of gold was found where?
   - Kershaw
   - Gold Hill
   - Lucky Strike
   - Reed Gold Mine

6. The first form of mining to take place at Reed Gold Mine was _____ also known as aboveground mining.
   - Jaw crushing
   - Lode mining
   - Placer mining
   - Rocking

7. Which of the following mean a vertical entrance and exit of a mine?
   - Adit
   - Drift

- Shaft
- Crosscut

8. Gold was found in a rock called _____.
   - Quartz
   - Greenstone
   - Gravel
   - Argillite

9. The term was used to describe the immigrants that came from England to work in the gold mines.
   - French
   - Londoners
   - Yorkers
   - Cornish

10. What is a small lump of gold called?
    - Picker
    - Nugget
    - Spec
    - Flake

Reed Gold Mine Vocabulary Quiz Answer Key

1. What element does amalgamation use in it process?
   - ☐ Argon
   - ■ Mercury
   - ☐ Helium
   - ☐ Bromine

2. What is a kibble?
   - ■ A cast iron bucket
   - ☐ A sturdy rope
   - ☐ A strong shovel
   - ☐ A lazy miner.

3. Which of the following could you crush ore or quartz in?
   - ■ Stamp Mill
   - ☐ A kibble
   - ☐ Ore Cart
   - ☐ A mint

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   - ■ Immigrant
   - ☐ Artist
   - ☐ Teacher

5. In 1799, the first documented discovery of gold was found where?
   - ☐ Kershaw
   - ☐ Gold Hill
   - ☐ Lucky Strike Mine
   - ■ Reed Gold Mine

6. The first form of mining to take place at Reed Gold Mine was _____ also known as aboveground mining.
   - ☐ Jaw crushing
   - ☐ Lode mining
   - ■ Placer mining
   - ☐ Rocking

7. Which of the following mean a vertical entrance and exit of a mine?
   - ☐ Adit
   - ■ Shaft

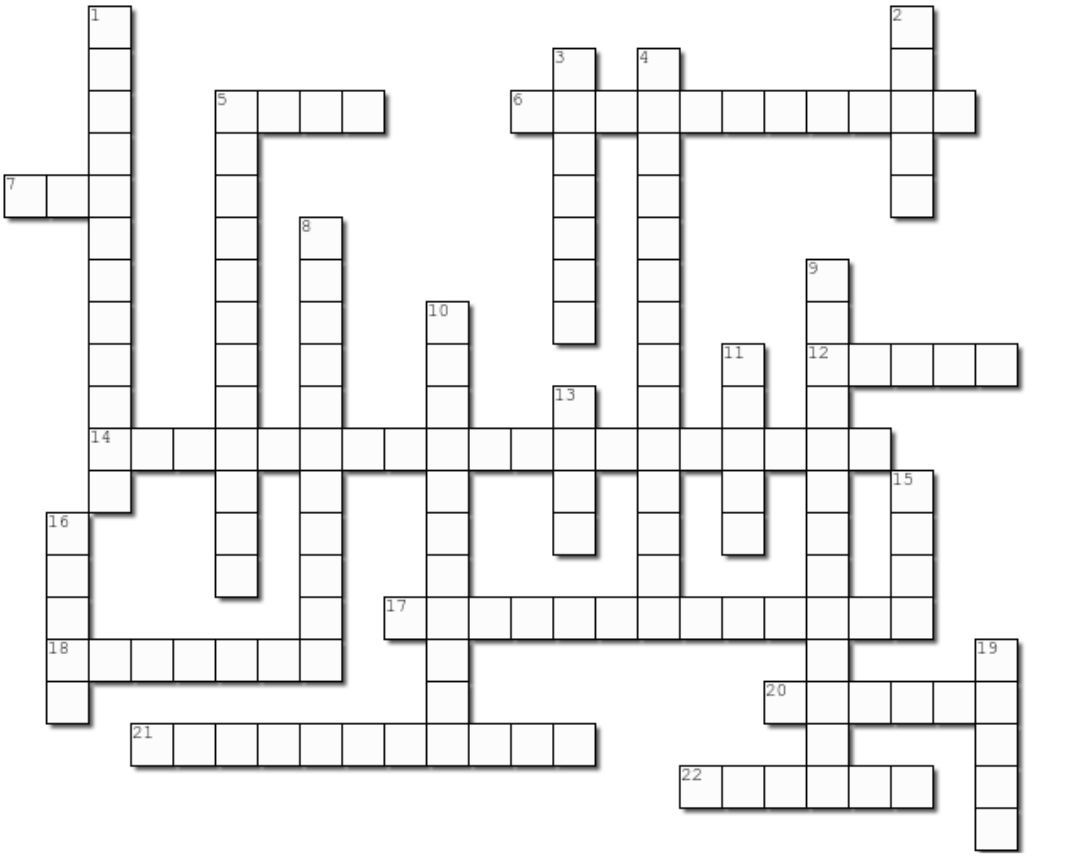
- □ Drift
- □ Crosscut

8. Gold was found in a rock called _____.
   - □ Argillite
   - □ Greenstone
   - □ Gravel
   - ■ Quartz

9. Which of the following terms was used to describe the immigrants that came from England to work in the gold mines?
   - □ French
   - ■ Cornish
   - □ Yorkers
   - □ Londoners

10. What is a small lump of gold called?
    - □ Picker
    - ■ Nugget
    - □ Spec
    - □ Flake

Reed Gold Mine Vocabulary Crossword Puzzle



Created using the Crossword Maker on TheTeachersCorner.net

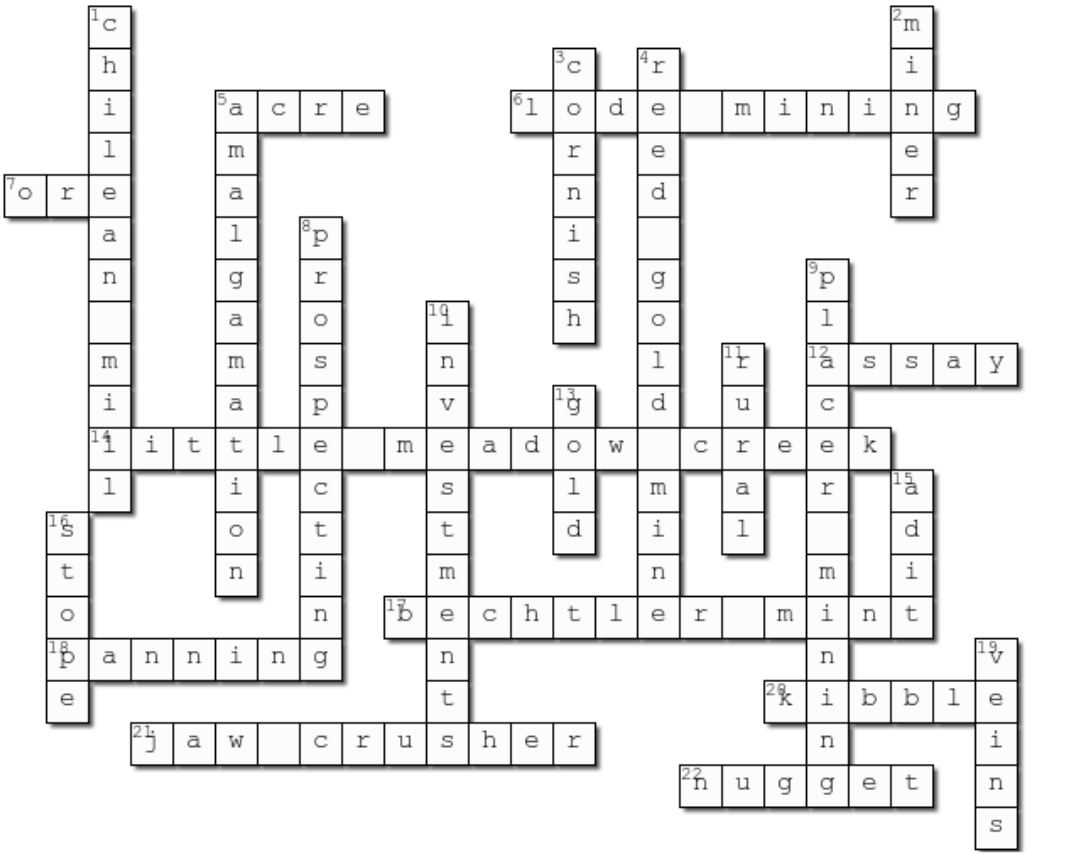
Across

5. a unit of measurement for land.
6. the term used to describe mining that took place below the surface of the ground. Also known as underground mining.
7. a naturally occurring solid material from which a metal or valuable mineral can be profitably extracted.
12. the use of a chemical solution to identify the amount of metal or ore.
14. the location where Conrad Reed found the first gold nugget in America while fishing.
17. the name of the first gold only mint started in North Carolina. It was a local family run mint that turned the locally mined
18. the action that involved washing gravel or dirt in a pan to separate out the gold.
20. a large cast iron bucket used to lower miners in and out of shaft as well as bringing the quartz that mined to the surface.
21. an adjustable machine for crushing quartz to various sizes in order to prepare the quartz to be used at the Stamp Mill.
22. a small lump of gold.

Down

1. a mill for crushing quartz, by rotating two stone wheels in a circle. Used to extract gold from white quartz.
2. the term used to describe the workers that worked in gold mine as well as other mines.
3. term used to describe immigrants that moved to America from Cornwall, England to work in the newly created gold mines.
4. a North Carolina State Historic Site where the first documented discovery of gold occurred in America.
5. the process of combing mercury and gold in order to take the gold out of its ore.
8. the action of searching mineral deposits to find valuable metals or gems.
9. the term used to describe mining that took place above the surface of the ground normally using pans, shovels and various roc
10. the process of investing money in either a business to venture in order to make money.
11. having to do with the country; rustic
13. a precious yellow metal with the atomic symbol of AU. Was the main precious metal mined at Reed Gold Mine.
15. a horizontal entrance/exit of an underground mine.
16. in underground mining, the area from which the ore is removed.
19. a thin, sheet-like igneous intrusion or mineral filling in a fracture or crevice in a country rock.

Reed Gold Mine Vocabulary Crossword Puzzle Answer Key



Created using the Crossword Maker on TheTeachersCorner.net

Across

5. a unit of measurement for land. (**acre**)
6. the term used to describe mining that took place below the surface of the ground. Also known as underground mining. (**lode mining**)
7. a naturally occurring solid material from which a metal or valuable mineral can be profitably extracted. (**ore**)
12. the use of a chemical solution to identify the amount of metal or ore. (**assay**)
14. the location where Conrad Reed found the first gold nugget in America while fishing. (**little meadow creek**)
17. the name of the first gold only mint started in North Carolina. It was a local family run mint that turned the locally mined (**bechtler mint**)
18. the action that involved washing gravel or dirt in a pan to separate out the gold. (**panning**)
20. a large cast iron bucket used to lower miners in and out of shaft as well as bringing the quartz that mined to the surface. (**kibble**)
21. an adjustable machine for crushing quartz to various sizes in order to prepare the quartz to be used at the Stamp Mill. (**jaw crusher**)
22. a small lump of gold. (**nugget**)

Down

1. a mill for crushing quartz, by rotating two stone wheels in a circle. Used to extract gold from white quartz. (**chilean mill**)
2. the term used to describe the workers that worked in gold mine as well as other mines. (**miner**)
3. term used to describe immigrants that moved to America from Cornwall, England to work in the newly created gold mines. (**cornish**)
4. a North Carolina State Historic Site where the first documented discovery of gold occurred in America. (**reed gold mine**)
5. the process of combing mercury and gold in order to take the gold out of its ore. (**amalgamation**)
8. the action of searching mineral deposits to find valuable metals or gems. (**prospecting**)
9. the term used to describe mining that took place above the surface of the ground normally using pans, shovels and various roc (**placer mining**)
10. the process of investing money in either a business to venture in order to make money. (**investments**)
11. having to do with the country; rustic (**rural**)
13. a precious yellow metal with the atomic symbol of AU. Was the main precious metal mined at Reed Gold Mine. (**gold**)
15. a horizontal entrance/exit of an underground mine. (**adit**)
16. in underground mining, the area from which the ore is removed. (**stope**)
19. a thin, sheet-like igneous intrusion or mineral filling in a fracture or crevice in a country rock. (**veins**)

Social Studies

Section III: Timeline of Reed Gold Mine

Objective: Students view a timeline of Reed Gold Mine's history and create their own timelines.

Reed Gold Mine Timeline

1778 John Reed Comes to the Colonies to fight for the British as a German mercenary during the American Revolutionary War.

1787 John Reed receives from the state of North Carolina a land grant of 70 acres on Meadow Creek.

1799 Reed's son, Conrad, finds a large, shiny yellow rock in Little Meadow Creek.

1802 A jeweler in Fayetteville determines that Conrad's yellow rock is really 17 pounds of almost pure gold.

1803 John Reed joins three other men Frederick Kiser, Rev. James Love, and Martin Phifer, Jr. forming a mining partnership to search of gold in Little Meadow Creek. Peter, an enslaved man of Reed's partner Rev. Love, discovers the largest nugget ever found at Reed. The nugget weighed approximately 28 pounds

1804 The United States Mint in Philadelphia processes $11,000 in Cabarrus County gold.

1806 William Thornton, physician, inventor, and designer of the United States Capitol, purchases on credit 35,000 acres of land near the Reed and establishes the North Carolina Gold Mine Company.

1820 Gold is discovered in other counties adjoining Cabarrus.

1824 Reed Gold Mine becomes one of the state's three major gold mines, having unearthed an estimated $100,000 worth of gold.

1827 The North Carolina state legislature charters the North Carolina Gold Mining Company.

1829 The stamp mill, a wood and iron structure used for crushing ore, makes its appearance in North Carolina.

1831 Christopher Bechtler and his son Augustus begin the minting of gold coins in Rutherford County. John Reed's grandson, Isaac Crayton sinks the first shaft at Reed.

1834 A legal dispute begins between the sons and sons-in-law of John Reed over a 13-pound nugget, resulting in a court order for the closing of Reed Gold Mine.

1835 Congress votes to establish a branch of the Federal Mint at Charlotte.

1837 The Charlotte mint opens for business.

1842 John Reed becomes a U.S. citizen at the age of 82.

1854 The Reed Gold and Copper Mining Company fails, and many other mining corporations are either ruined or in financial difficulty.

1855 The sheriff of Cabarrus County auctions the Reed Gold Mine.

1861 The Charlotte mint closes because of disruptive effects of the Civil War.

1895 Oliver Kelly, Warren Kelly and Dr. Justin Lisle purchase Reed Gold Mine.

1912 The last underground excavations take place at the Reed Mine.

1915 Much work is done in the Carolina mines, and the largest amount of gold is found since 1887.

1942 The federal government orders that gold mining be suspended to divert production to national defense during World War II.

1966 The Reed is designated a Registered National Historic Landmark.

1971 North Carolina acquires the Reed property from the Kelly family.

1977 On April 23, Reed Gold Mine State Historic Site opens to the public

Reed Gold Mine Timeline Quiz

1. What is the range of this timeline?
   - 207 years
   - 3,749 years
   - 199 years
2. Who originally discovered the gold on the Reed's property?
   - John Reed
   - Conrad Reed
   - Rev. James Love
3. How much did the first gold nugget weigh?
   - 17 ounces
   - 17 pounds
   - 23 pounds
4. All of the following except _____ were partners with John Reed.
   - Frederick Kiser
   - William Thornton
   - Martin Phifer
5. Who established the North Carolina Gold Mine Company?
   - William Thornton
   - Christopher Bechtler
   - Rev. James Love
6. How many years elapsed between the opening and closing of the Charlotte mint?
   - 36 years
   - 24 years
   - 76 years
7. Why did the federal government stop gold mining in 1942?
   - There was very little gold left to mine.
   - The government wanted to be in control of all gold production in the United States
   - The United States wanted to decrease gold production in order to increase production of supplies needed for World War II.
8. In which year did the State of North Carolina acquire Reed Gold Mine?
   - 1971
   - 1778
   - 1835
9. How many years after John Reed came as a German mercenary, did he die?
   - 46 years
   - 67 years
   - 36 years
10. In what year was the first shaft dug at the Reed?

- 1824
- 1799
- 1831

11. The jeweler that determined Conrad's rock was gold was located in what town?
    - Charlotte
    - Raleigh
    - Fayetteville
12. In 1834, the Reed was closed because of a dispute over a ____ pound nugget.
    - 18
    - 28
    - 13
13. Christopher Bechtler and his son began minting gold coins in this county in 1831
    - Cabarrus
    - Rutherford
    - Mecklenburg
14. A wood and iron structure that is used for crushing ore is called a _____.
    - Pick
    - Stamp mill
    - Nugget
15. An enslaved man named _____ found the largest nugget ever discovered at Reed in 1803.
    - John
    - Conrad
    - Peter
16. Warren Kelly, Oliver Kelly and Dr. Justin Lisle purchased the Reed in this year.
    - 1799
    - 1977
    - 1895

Reed Gold Mine Timeline Quiz Answer Key

1. What is the range of this timeline?
   - ☐ 207 years
   - ☐ 3,749 years
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   - ■ The United States wanted to decrease gold production in order to increase production of supplies needed for World War II.
8. In which year did the State of North Carolina acquire Reed Gold Mine?
   - ■ 1971
   - ☐ 1778
   - ☐ 1835
9. How many years after John Reed came as a German mercenary, did he die?
   - ☐ 46 years

- ■ 67 years
- □ 36 years

10. In what year was the first shaft dug at the Reed?
    - □ 1824
    - □ 1799
    - ■ 1831
11. The jeweler that determined Conrad's rock was gold was located in what town?
    - □ Charlotte
    - □ Raleigh
    - ■ Fayetteville
12. In 1834, the Reed was closed because of a dispute over a ____ pound nugget.
    - □ 18
    - □ 28
    - ■ 13
13. Christopher Bechtler and his son began minting gold coins in this county in 1831
    - □ Cabarrus
    - ■ Rutherford
    - □ Mecklenburg
14. A wood and iron structure that is used for crushing ore is called a _____.
    - □ Pick
    - ■ Stamp mill
    - □ Nugget
15. An enslaved man named _____ found the largest nugget ever discovered at Reed in 1803.
    - □ John
    - □ Conrad
    - ■ Peter
16. Warren Kelly, Oliver Kelly and Dr. Justin Lisle purchased the Reed in this year.
    - □ 1799
    - □ 1977
    - ■ 1895

Timeline Activities

Choose one of the following activities:

1. Choose a key era from the Reed Gold Mine Time line and describe what your life and lifestyle would have been during it. Be sure to include at least 3 of the following:
    a. Economy
    b. Schools and Education
    c. Social Activities
    d. Entertainment
    e. Important People
    f. Key historical events of the period

2. Research changes in one of the following areas due to mining:
    a. Population
    b. Enviroment
    c. Landform
    d. Industry

Social Studies

Section IV: Mapping Activities

Objective: Students learn where gold was discovered in North Carolina.

North Carolina Gold Map Activity

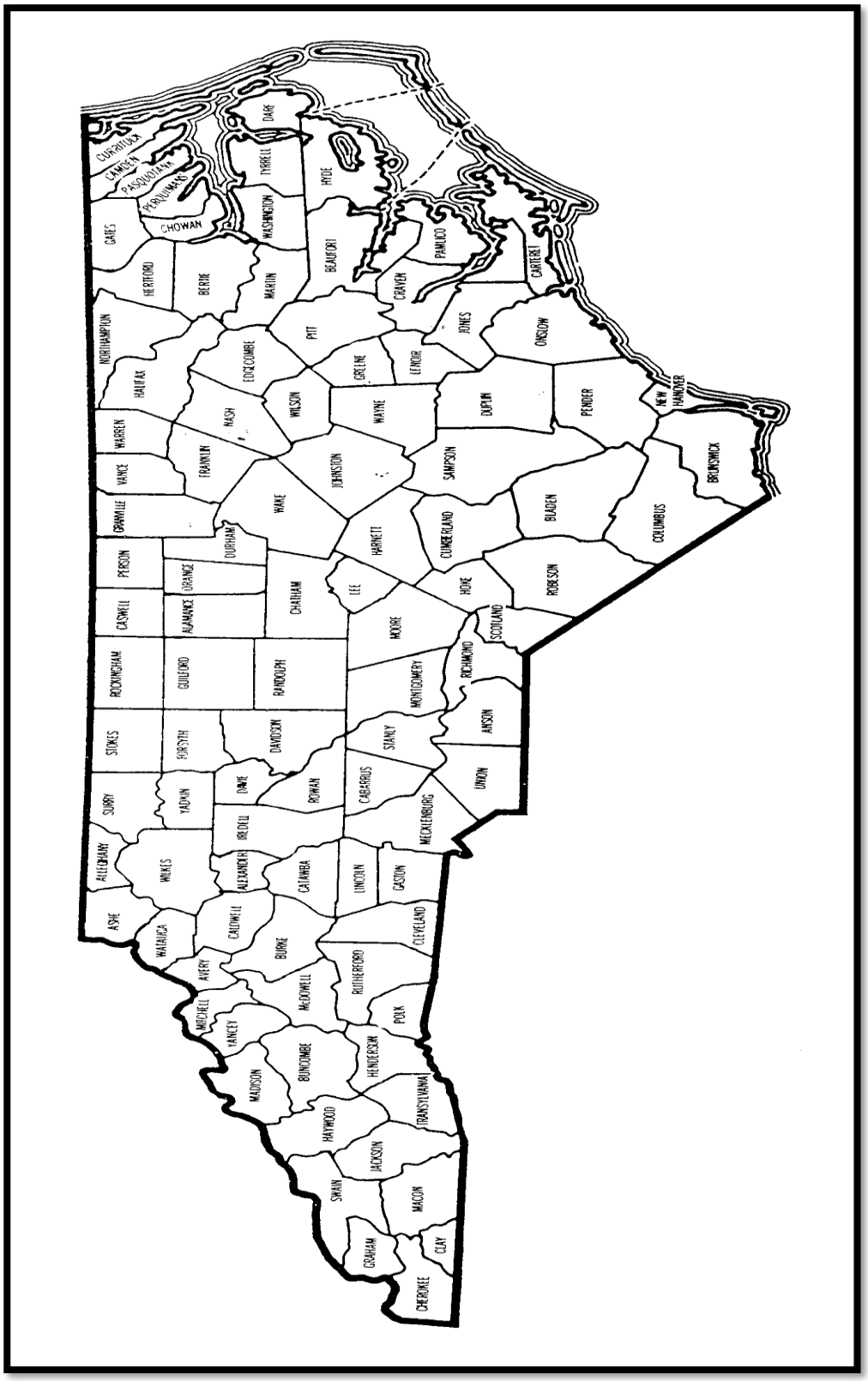
1. Using the provided county map of North Carolina, locate and color your county in green.

2. Gold has been found in almost of all of North Carolina counties. Locate each major mining county in the following list and color those counties on the map in red.

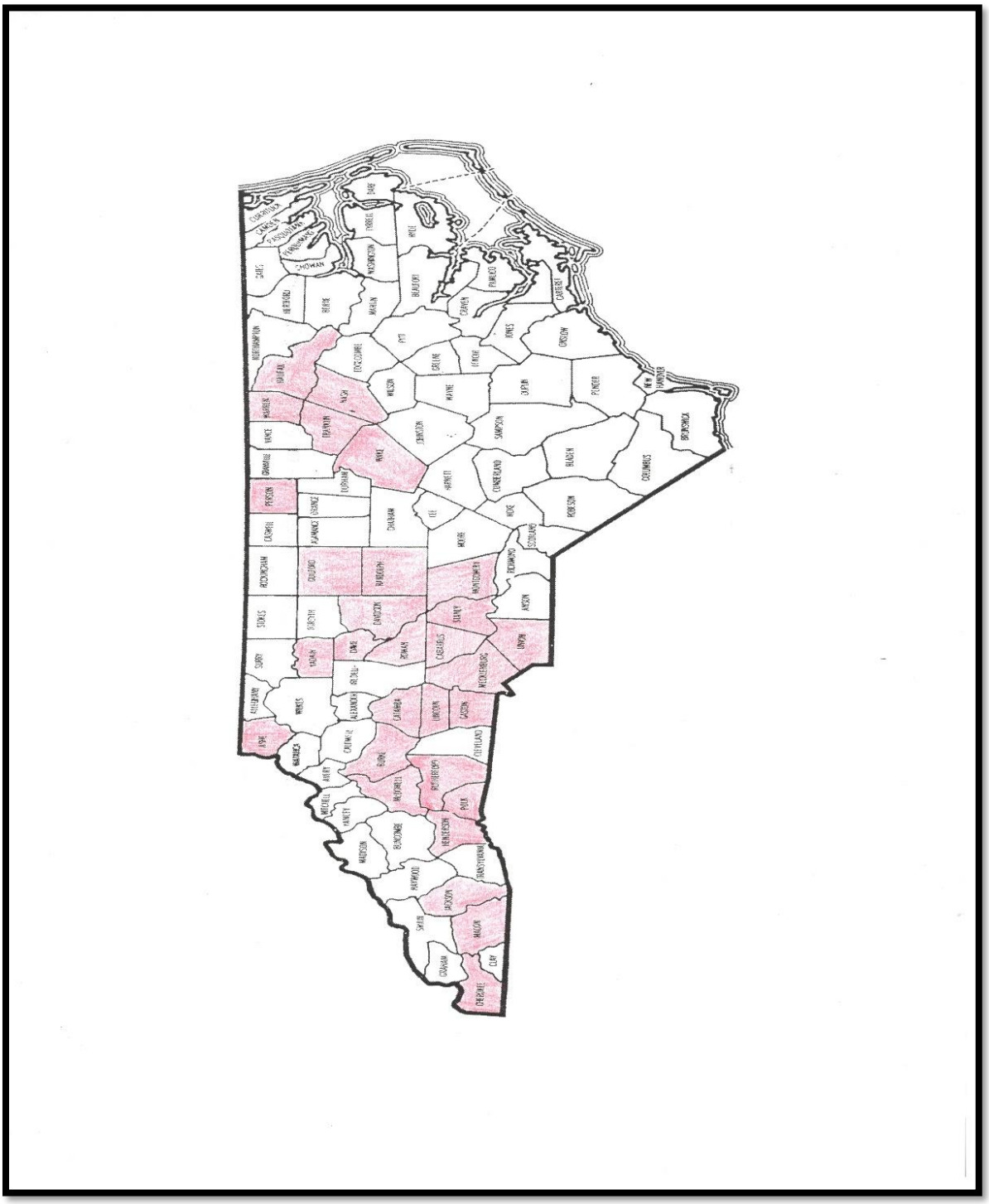
Ashe	Burke	Cabarrus	Catawba	Cherokee
Davidson	Davie	Gaston	Guilford	Franklin
Halifaz	Henderson	Jackson	Lincoln	Macon
McDowell	Mecklenburg	Montgomery	Nash	Person
Polk	Randolph	Rowan	Rutherford	Stanly
Union	Yadkin	Wake	Warren	

3. Using various resources, identify and list the other kinds of mining done in these areas.

North Carolina County Map



North Carolina County Map Answer Key



Social Studies

Section V: Group and Individual Projects

Objective: Students delve deeper into mining history by completing either a group or individual project.

Group Projects

Have students split into small groups and choose one of the five following project sections. After researching their chosen section, have the groups present their findings to the rest of the class.

1. Economy:
    a. Have a discussion amongst your group about how and if you used gold in the last 24 hours.
    b. Using the internet, encyclopedia, and other sources, research the past and present uses of gold. Why did the uses of gold change or expand?
    c. Research the properties of gold to see if that is why the uses of gold evolved over time.
    d. Teach the class how gold has changed throughout the years and why the uses of gold have changed.

2. Types of Mining:
    a. Research the two forms of mining (Focus on Gold Mining)
        i. Placer Mining (Above Ground)
        ii. Lode Mining (Below Ground)
    b. Find the difference and similiarities (if there is any) between the two different types of mining.
    c. Research the various tools and techniques used in each form and where each form was mostly used.
    d. Teach the class the difference between the two forms of mining. Discuss the different tools used and the different techniques associated with each type.

3. Technology:
    a. Read “Squeezing Gold from a rock” to get a basic understanding about the evolution of machinery in regards to mining.
    b. Using other sources, find out more about the arrastra, the chilean mill, and the stamp mill.
    c. Research the similaraties and differences between each of the different types of machinery.
    d. Give a brief history lesson of each machine to the rest of the class. Focus on when each machine was introduced and why when the next machine was created they would switch to using it.

4. Dangers of Mining:
    a. Research the dangers involved with mining in the times of John Read. Focus on the more common dangers faced by miners at the time like cave-ins, bad timbering, and blasting practices.

b. Reasearch how saftey practices have changed in the time of John Reed to today. What are the differences in the saftey standards?
c. Teach the class how saftey standards have changed throughout time and discuss new saftey devices used today in modern mining.

5. Transportation:
    a. Discuss amongst your group some of the following points
        i. In order to mine for gold, the owners of the mines had to get machinery from larger cities that were often many miles away.
        ii. After the gold was mined, the miners had to transport the gold to the cities fo it could be assayed and sold.
    b. Disucss what you think was the main forms of transportation at the time.
    c. Research the following
        i. How machinery and gold was transported to and from Reed and other gold mines?
        ii. What the road conditions were at the time.
        iii. Did the creation and expansion of the railroads effect mining in any way and what those effects where.
    d. After researching the above questions present your findings to the rest of your class. Teach them the early ways of transporting gold and machinery to where they need to be and how the introduction of the railways effected that transportation.

6. Communication:
    a. Discuss the following in your group:
        i. Like transportation, communication was quite different in the past. For instance, the Chilean mill dates back to ancient times, but it was not heard about in the Reed Gold Mne area until much later. Also, people in Europe knew how to mine underground for gold long before this process was discovered at Reed. These and many other instances make a person wonder, “Why did they have to rediscover this knowledge?”.
    b. Brainstorm possible problems with communicating during that time.
    c. Research the different types of communication that existed during the 1800s when Reed Gold Mine operated.
    d. Reed the “The Kelly Family and Reed Gold Mine.” Excerpt on the next page. With your group discuss how communication could have affected the Kelly’s during their involvement with the mine.
    e. Present your findings with the rest of your class. Describe the early forms of communication used at Reed Gold Mine and how communication has evolved over time. Also describe how modern communication could have helped the Kelly Family better operate Reed Gold Mine.

Squeezing Gold from A Rock

In 1825, Matthias Barringer from Montgomery County, North Carolina, was panning for gold in the creek that ran through his farm. Along the lower part of the creek, he found many small gold nuggets, but as he followed the creek upstream there were none. He realized that at some point the gold must have washed out of the rocks on the bank of the creek. As he walked along the stream, he spotted some white quartz rock and broke it open with a pick. To his surprise, he found lots of gold in the quartz. With that discovery, the era of lode mining, or underground mining, began.

After Barringer's discovery, a method to extract the gold from the quartz rock needed to be developed. Pieces of quartz that had large amounts of gold could be struck with a hammer until the rock broke and the gold could be picked up. But the small specks of gold in the quartz often remained. Was it possible to get more gold if you crushed more quartz?

The miners needed a way to crush the quartz after it came out of the mine. The first invention was the arrastra, a platform of granite cobblestones that an ox or a horse could pull a large granite stone across. The "dragstone", being larger and heavier than the quartz, would crush the quartz into a powder. Arrastras were slow and not very efficient.

The miners then borrowed an ancient grinding stone idea, the Chilean Mill that originally was used to grind grain and crush olives in ancient times. The Chilean Mills were made of granite were hard enough to crush the quartz. Mercury was added to the base stone and the upright wheel- stones to grinding the ore. North Carolina gold miners already knew that gold is attracted to mercury the same way iron is attracted to a magnet, so as the Chilean Mills crushed the quartz rock the mercury attracted the gold. That allowed much more gold to be recovered.

The process was still too slow, so after the 1849 California gold rush, miners invented the "modern" stamp mill. Large steam or water powered stamps, which were like giant hammers, would fall onto the ore, and crushed it into powder. The cast iron stamps weighed over 700 pounds each. The noisy cast-iron machine worked much faster than the earlier stone crushing mills but actually left more gold behind in the powdered rock.

The Kelly Family and Reed Gold Mine

Oliver S. Kelly was born on December 23, 1824 in Green Township, Ohio. At the age of 28, Kelly left his Midwestern home and headed west, hoping like so many others to strike it rich in California's gold fields.

He learned plenty about mining, and became a prosperous businessman, but returned to Springfield, Ohio to start the O.S. Kelly Company and enter the political arena. He became a member of the Springfield City Council for six years and mayor for two.

Oliver's oldest son, O. Warren Kelly, was born in Springfield in 1851. When he was 18, Warren left to study German in Europe. He later entered a partnership with his father in a Colorado silver smelting plant.

In late-1894, Oliver and Warren Kelly, along with Dr. Justin Lisle, visited Reed Gold Mine on a shopping expedition. All three were looking for a gold mine to buy, and on January 10, 1895, they purchased Reed Gold Mine.

On December 6, 1898, Warren ordered a ten-stamp stamp mill to be constructed at the foot of Middle Hill near a deep part of Little Meadow Creek. The mill was probably delivered around January of 1899 and was in use by spring. Early attempts to exploit the area failed.

In 1899, Warren bought Dr. Lisle's share of the Reed and sent his eldest son, Armin, to be the next superintendent. Armin arrived in March of 1899 and began directing several underground mining ventures. He had discovered a small stringer vein above the 90-foot level of a shaft in an old stope. The ore in the area reportedly boasted an assay value of more than $20,000 per ton. But during the next year, very little gold was produced at the Reed. Armin returned home to Springfield by 1900. Armin went back to Reed for visits now and then, and found his father sinking Engine Shaft to a depth of about 150 feet. Warren wasn't having any luck either, however, and Reed Gold Mine officially ceased underground operations in 1912.

Almost 23 years later, the Kelly family hired Frank Cox to reopen the mine and work several veins on the surface of Upper Hill. Little was found and operations soon ceased once again. During height of the Great Depression, the Kellys allowed anyone to pan freely along the creek if profits from any large nuggets were shared with the family.

In 1971, after owning the mine for three-quarters of a century, the Kelly family donated their historic mining acreage and sold the remaining portion of their property to the state of North Carolina. Reed Gold Mine became a state historic site in 1976 and remains the only underground gold mine open to the public in North Carolina.

Individual Projects

Have students choose one of the following two project sections. After researching their chosen section, have the students present their findings to the rest of the class.

1. North Carolina Nicknames:
    a. Share this fact:
    North Carolina early on earned a reputation as an economically slow state, for which it was called the Rop Van Winkle State. That reputation presisted, even after gold was discovered. At the time people expected very little to come from North Carolina. Still by 1828, North Carolina earned another nickname: the Golden State.
    b. Have the students research other nicknames associated with North Carolina and dicuss the various Nicknames discovered as a group.
    c. Let the students create their own nickname based on their experiences living in North Carolina and have the students share their created nicknames.

2. Gold Mints:
    a. Share the following facts with the students:
        i. Before 1831 all coins made from North Carolina gold were minted at the United States Mint in Philadelphia
        ii. In 1831 Christopher Bechtler and his son Augustus began the minting of gold coins in Rutherford County.
        iii. In 1837 the Charlotte branch mint opened for business.
        iv. In 1838 the Charlotte branch mint began making gold eagle coins.
    b. Have the kids read a brief history about both the Betchler and Charlotte Mints in the sections found below.
    c. Let the students design their own coin and let them present them to the class.
    d. Have the students write a newspaper article detailing the opening day of the Charlotte Branch Mint in 1837.

The Bechtler Mint

In the early 1800s, gold and silver money were difficult to come by in North Carolina and other southern states. North Carolina was the country's biggest gold producer until 1848, but the only official place to make coins was the federal mint in Philadelphia, Pennsylvania. No local mint meant very few coins were available locally. It also meant a long and dangerous trip north for southern miners to sell their gold. A German immigrant named Christopher Bechtler soon provided an alternative.

Christopher Bechtler was born in the Grand Duchy of Baden in Germany around 1782. He immigrated to America with his son, Augustus, and nephew, also named Christopher, in 1829. The family eventually settled in Rutherfordton, North Carolina. Bechtler started as a jeweler and watchmaker but began minting coins in 1831.

The Bechtler Mint made coins in three values—the $5 "half-eagle;" the $2.50 "quarter-eagle;" and the first American gold dollars. Bechtler also designed and made all his coining equipment himself. He developed a reputation for honesty, and his coins were highly prized because of their accurate weight and gold content.

Throughout the 1830s, North Carolinians tried to convince the federal government to establish a branch of the federal mint somewhere in the South. They were successful in 1837, when the federal branch mint opened in Charlotte, North Carolina. It provided some competition for the Bechtler Mint, but the Bechtlers continued to be successful, and by 1840 they had coined over two million dollars in gold.

Christopher Bechtler died in 1842, passing the business to his son, Augustus. When Augustus died in 1844, his cousin Christopher took over the mint and continued to make coins until 1852. Even after the Bechtler Mint closed, Bechtler coins continued to circulate and were accepted as currency for many years. The Bechtler Mint in Rutherfordton, North Carolina, was one of only a few private mints ever operated in the United States.

The Charlotte Mint

In the early days of gold mining in America, the only place gold could be made into coins was at the federal mint in Philadelphia, Pennsylvania. Since the southern states were producing all the gold being coined, miners had to make a long trip north to sell their gold to the mint. No southern mint also meant no real standard form of money in the South. North Carolina began trying to persuade the U.S. government to build a branch mint in Charlotte. In 1835, Congress passed a bill to establish branch mints in Charlotte, North Carolina; Dahlonega, Georgia; and New Orleans, Louisiana. The Charlotte Mint was the first to be constructed.

The very first deposit received at the Charlotte branch mint was a gold bar worth $1,974.08, which belonged to Ervin & Elms, a dry goods firm. The mint purchased gold from miners or mining companies, refined it, and mixed the gold with other metals to make alloys. The alloyed gold was shaped into ingots, and then rolled out and stamped into blank coins called planchets. The planchets were tested to be sure they were the correct weight, and then they were stamped with a pattern in a coining press and given a ridged edge.

Coins minted in Charlotte had a “C” on the reverse of the coin, by the eagle’s foot and came in three denominations the $5 “half-eagle;” the $2.50 “quarter-eagle;” and the $1 “dollar coin.” For a fee, miners could also bring gold to the mint to be assayed, tested to find out the projected amount of gold per ton in the ore.

In 1861 North Carolina entered the Confederacy and the new government took control of the Charlotte mint. The mint closed the following year and was used only as office space for the Confederate naval yard. The building was also used as a hospital during the Civil War. When the war ended in 1865, Federal troops arrived in Charlotte and took over the mint to be their own headquarters. The Confederate War Department seal was later found in a vault at the mint.

The Charlotte Mint reopened in 1868, but only as an assay office. It never again produced coins, but the mint did buy local gold and made ingots to be sent to the mint in Philadelphia. The assay office was finally closed permanently in 1913. By that time, the Charlotte mint had produced $5,059,180 in gold coins and the assay office had done business valued at $10,163,660.

The mint had even been used as temporary workspace by Thomas Edison in 1901, when he came to North Carolina to experiment with extracting gold from rock using electromagnetics. Following Edison’s experiment, the Charlotte Mint sat empty until 1930, when it was scheduled to be destroyed. Thanks to the efforts of Mary Myers Dwelle, the building was saved. It was subsequently restored and moved to its present location and now houses the Mint Museum of Art.

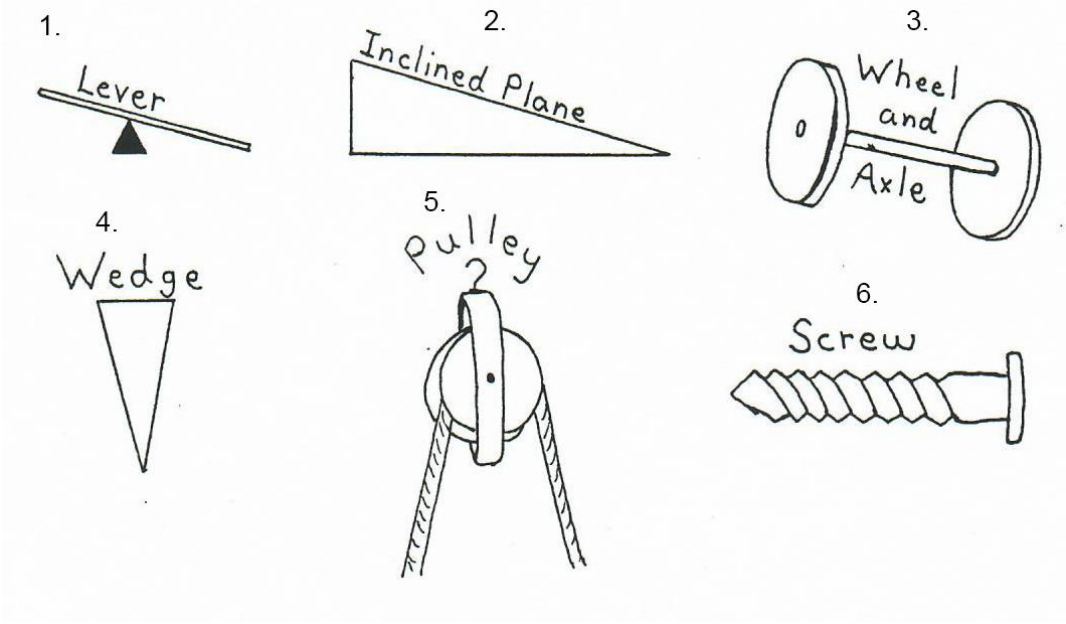
Technology

Section I: Mechanical Advantage

Objective: Students will learn about the mechanical advantage provided by both simple and complex machines and can complete a related activity.

Mechanical Advantage

A machine is a type of tool that makes work, such as lifting or moving things easier. There are six basic types of simple machines: 1. the lever, 2. the inclined plane, 3. wheel and axle, 4. the wedge, 5. the pulley, and 6. the screw.



Simple machines can work alone or can work in combinations. If two or more simple machines work together, it creates a complex machine**,** which combines their individual work properties.

Reed Gold Mine required a great deal of heavy work using several different types of machines. Without the use of both simple and complex machines, work would have been much harder on the miners, and increased amount of time to complete the daily tasks required at the mine.

The effectiveness of a machine can be determined by calculating the mechanical advantage. This can be used to see how much easier a job has become as well as how much help one situation compares to another. The formula for mechanical advantage is:

$$\text{Mechanical Advantage} = \frac{\text{Load}}{\text{Force}}$$

For instance, if a rock weighed 100 pounds and it took 50 pounds of force to lift, the mechanical advantage would be "2" because 100 ÷ 50 = 2. If the same 100-pound load could be lifted with a force of 25 pound, then the mechanical advantage would be "4" because 10 ÷ 25 = 4. The higher a number is for the mechanical advantage, the easier it has become to do the work.

Wheelbarrow Activity

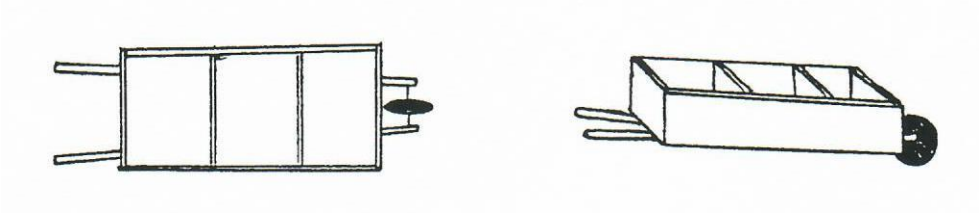
This activity will demonstrate the how placement in a wheelbarrow to see if it affects the mechanical advantage of the machine. A wheelbarrow is a complex machine, made of a wheel and axle and the end of two levers.

Materials:

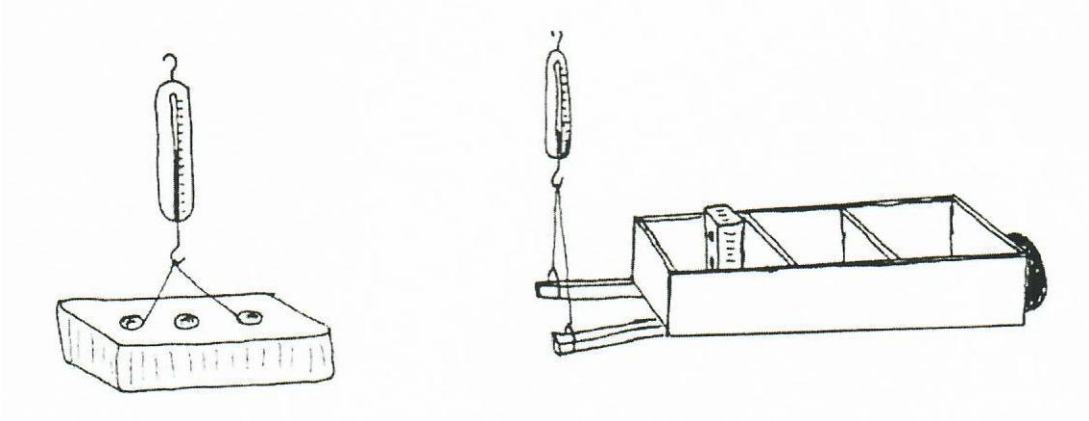
- Calculator
- Spring scale
- Wheelbarrow
- Heavy objects to weigh

Note: The formula to determine mechanical advantage is load ÷ force.

Divide the wheelbarrow into at least three sections. The more sections, the more data can be collected.



Using a spring scale, weigh the load you will be placing into the wheelbarrow. Then place the load into each section and use the same spring scale to measure the force needed to lift the handles.

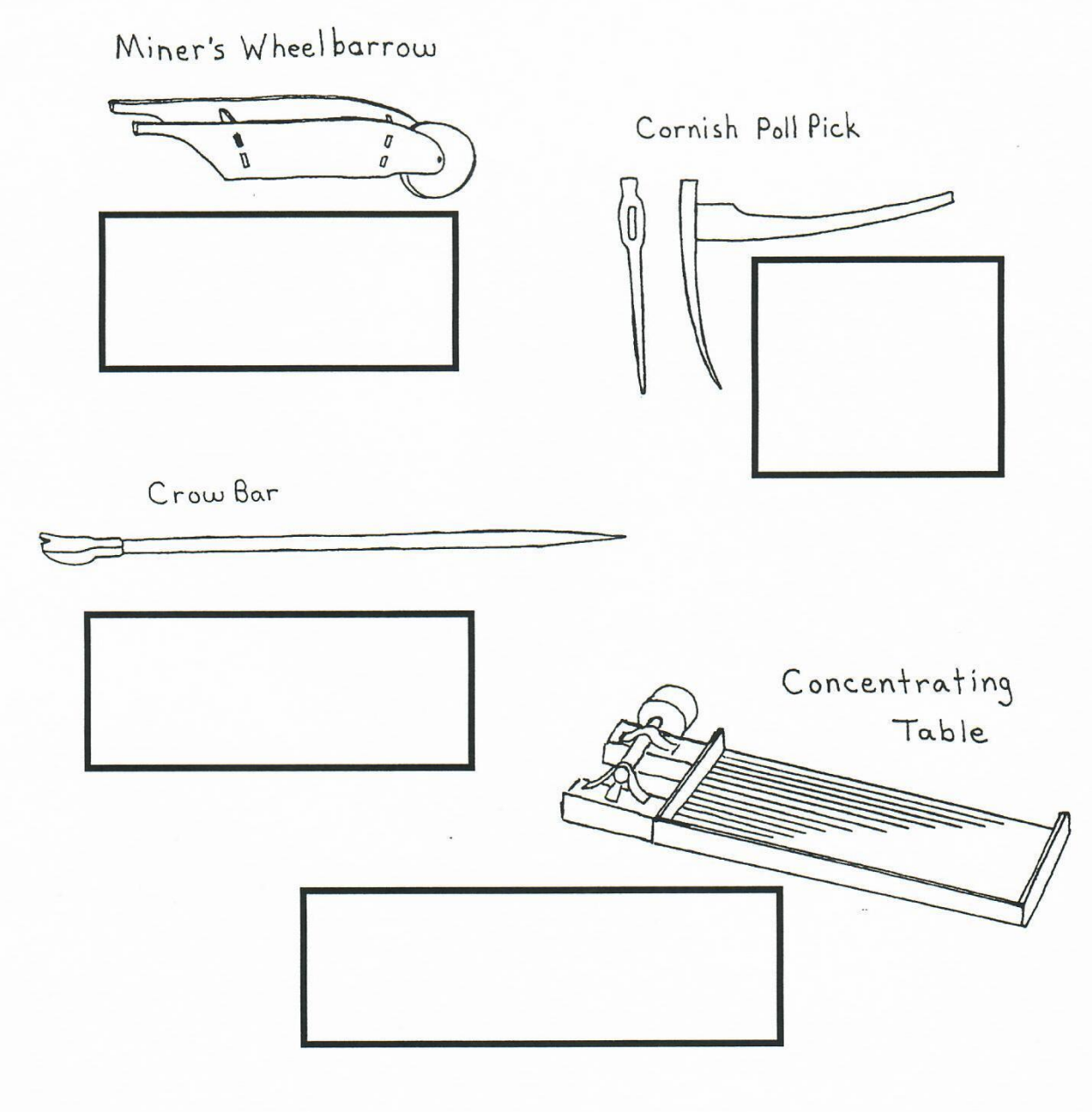


Calculate the mechanical advantage each time and see if it makes a difference where the load is placed in the wheelbarrow. How would a wheelbarrow be designed to give the greatest mechanical advantage?

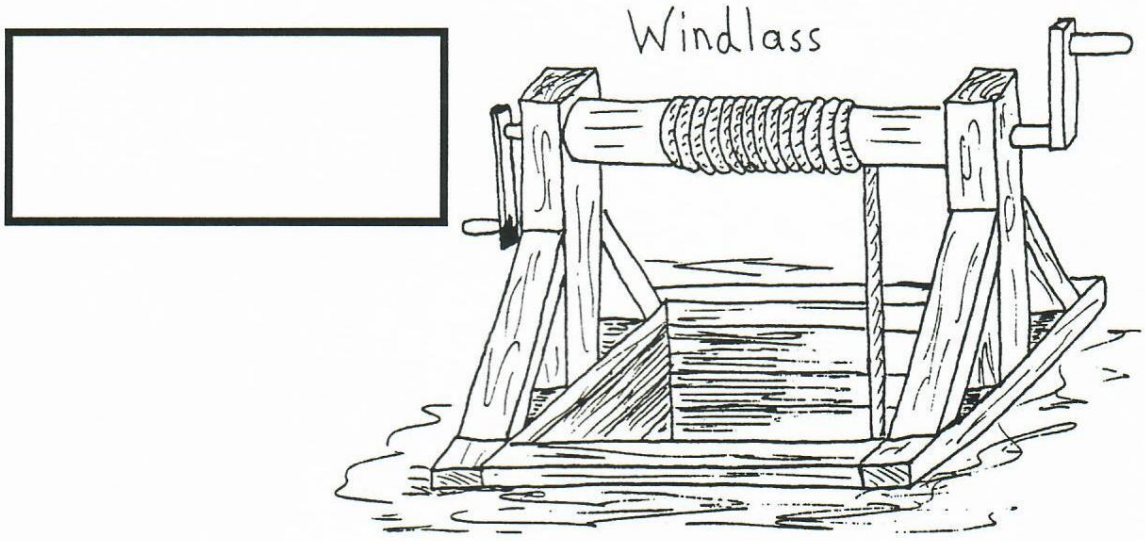
Miner's Tools

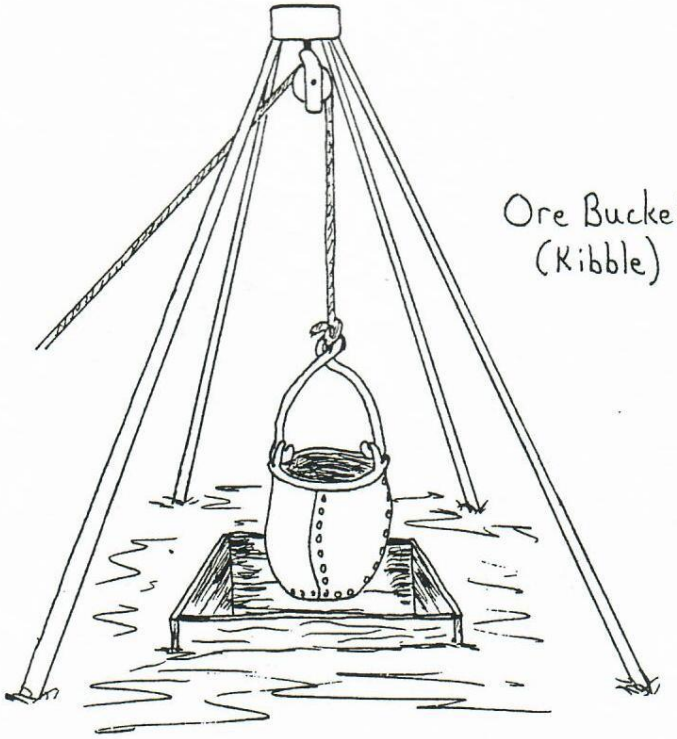
Shown below are sketches of some tools used at Reed Gold Mine during the 1800s and early 1900s. Which simple machine or combinations of simple machines can you find in each one? Write your answers in the box beside each miner's tool.

Screw Inclined Plane Wheel and Axle Pulley Lever Wedge



screw inclined plane wheel and axle pulley lever wedge





Miner's Tools Answer Key

Miner's Wheelbarrow

2 Levers
Wheel and Axle
Screws

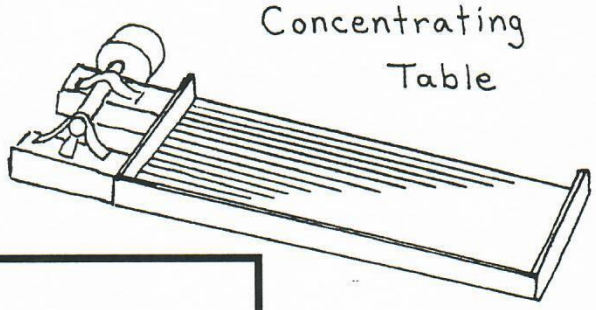
Cornish Poll Pick

Lever
Wedge
Screws

Crow Bar

Lever
Wedge

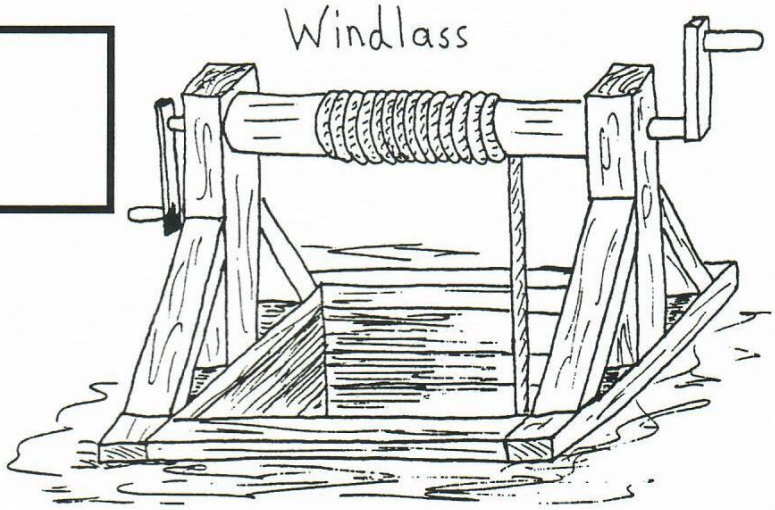
Concentrating Table

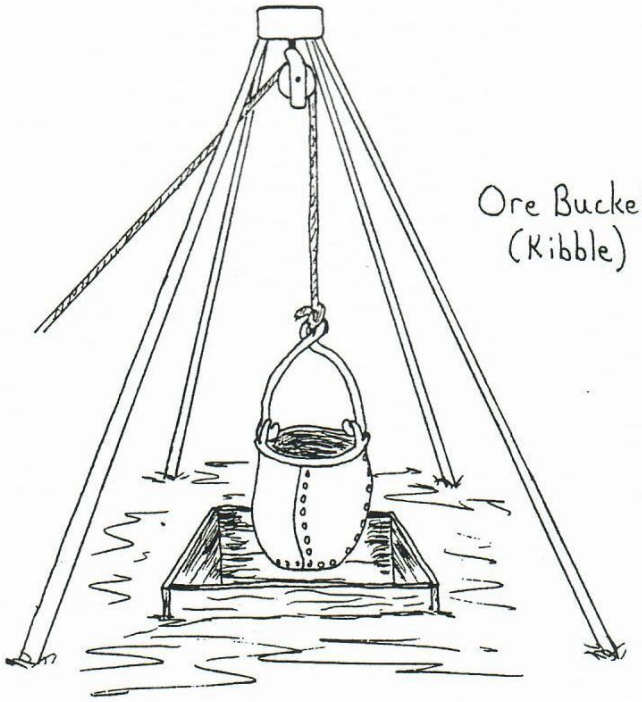


Inclined Plane
Wheel and Axle
Screws

screw inclined plane wheel and axle pulley lever wedge

Lever
Wheel and Axle
Screws





Pulley
Screws
Wheel and Axle

Technology

Section II: Mining Technology

Objective: Students will learn about several of the most common forms of mining technology, from the simple pan to the complex stamp mill and can complete a related activity.

Mining Technology

The miners at Reed Gold Mine used various forms of technology to trap and separate the gold, including chemistry, complex grinding machines, and gravity. The mining process ranged from simple items such and pans to complex stamp mills that crushed quartz while mixing with water. Miners learned how chemical compounds like amalgams could be used to catch smaller flakes of gold which would normally escape the collection methods used at the time.

The simplest technology used by miners was the pan, which may have been an ordinary cast iron frying pan with a broken handle in the early days. The miners knew by working dirt and water together the gold would naturally settle at the bottom. Part of this process is caused by the heavy density of gold, but also the effect of gravity. The lighter material, which gravity does not have as strong an influence, will wash away with the water, leaving the heavier material in the pan. Gold was generally the densest material found along Little Meadow Creek, along with iron. Both would be found together in the bottom of the pan.

Modern pans incorporate a series of ridges and sharp angles to help trap gold, keeping in the pan even with fast shaking back and forth. This allows the lighter material to be washed out at a faster pace, allowing more dirt along the creek to be checked through the day.

As gold mining expanded, larger devices able to move dirt faster were developed, including the cradle rocker and log rocker. Both required a constant source of water, so they were positioned beside a creek or fed water through a series of flumes running downhill.

The cradle rocker was designed after a baby's wooden cradle used during the 1800s. Half-circular pieces of wood were attached to the bottom, and a long handle to rock it back and forth. The top of the rocker had a section with a metal grate to shovel in the creek dirt. The bottom of the rocker had baffles or sections of wood to help catch the heavier material from washing out the end facing the creek. A thick cloth would be placed along to the bottom as well to collect heavier material, which could be removed by squeezing or wringing out over a bucket. While developed in the 1820s – 1830s, cradle rockers made from wood and later metal were used in gold mining for over 100 years, through the 1940s. Some miners still use similar equipment today to work through the dirt.

The log rocker, so named because the first designed used hollowed out tree logs, were designed to be used in multiples, with miners standing on a board and shifting side to side to mix the water and dirt together to make the mud. These began to replace cradle rockers by the 1870s and 1880s as the primary way to sift through large areas of dirt along a creek bed. Water would be fed through a flume and feed each of the rockers. The bottoms would have wooden ridges, cloth or even copper plates coated with mercury to trap the gold. The front of the rocker would be open or have slats to let the water run through, emptying into a small box to trap any smaller gold pieces.

At many North Carolina gold mines, both cradle rockers and log rockers were operated by women who were employed by mines as “sandwashers.” In addition to operating rockers, women and girls also panned in search of gold. Enslaved women also searched for gold—though they were not paid to do so.

Chilean Mills and Arrastra Stones

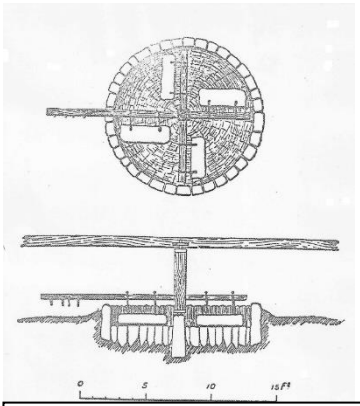
By the 1830s, miners at Reed Gold Mine and other North Carolina mines started using Chilean Mills and Arrastra Mills to crush the quartz and use mercury to extract the gold. How the Chilean Mill came to North Carolina remains a mystery, but this mining apparatus became the most common way to extract gold from quartz by 1830. The basic function involves a heavy base with one or two upright round stones slowly rotating and pulverizing the quartz while mixing with a solution of mercury and water. The gold became trapped by the mercury, which was later removed by heating this mixture in a retort, or large still.

The Chilean Mill that was used at the Furniss Mine in Cabarrus County, photographed in 1971. Notice how the upright stones would have turned inside the base to crush the quartz.

The October 27, 1829 edition of the *Western Carolinian* newspaper gave a fairly accurate description of Chilean Mill operation:

A large stream of water constantly runs into the tubs and keeps them full; the ore [crushed] from the stamp mill is…put in…the quicksilver. Each [runner] stone has two motions—one rolling around on its edge, turning on its axis; the other directly askew, as it is carried round by the shaft; thus greatly agitating the water, and giving it a motion like a whirlpool. The gold settles to the bottom…and is taken up by the quicksilver, forming an amalgamation…while the earthly and ferruginous particles float away…The water runs off from the [base] down an inclined plane, or a kind of spout 2 or 3 feet in width, the bottom of which is lined with skins…for intercepting and securing any of the finer particles of gold which have escaped the mercury in the tub…

Chilean Mills were operated so the stones would turn approximately 6 to 10 revolutions per minute. Too slow and the waste products would not wash away, too fast and the gold would wash out of the tub. The water had to be fed into the base at the right speed as well to keep it functioning properly. In contrast, Arrastra Mills had a crushing bed made of flat rocks between 8 and 12 feet in diameter where large rocks would be dragged across the surface in a circular motion. The Arrastra Mill did not need the large source of water like the Chilean Mill, and therefore made better use of the mercury and recovered up to 25% more gold.



The Arrastra Mill drawing is from: *Mines, Mills, and Furnaces: Industrial Archaeology in Wales.* D. Morgan Rees, 1969. The Arrastra stones would still move in a circular pattern across the flat rocks.

Power was originally supplied by mules or horses, but by the 1850s had been replaced with steam power. Reed Gold Mine had both Chilean and Arrastra Mills located in 1854 Engine house, and Chilean Mills along Little Meadow Creek for easier processing of gold. Both types of mills were used extensively in North Carolina mines through the 1850s, with some mines using them into the 1880s.

Stamp Mills

Stamp Mills, large machines crush quartz by raising and lowering a heavy metal crushing “stamp” against another metal shoe, had been used in North Carolina by the 1850s. Originally, most of the stamp mill was wooden, but by the 1880s everything was metal except for the main frame to hold everything in place.

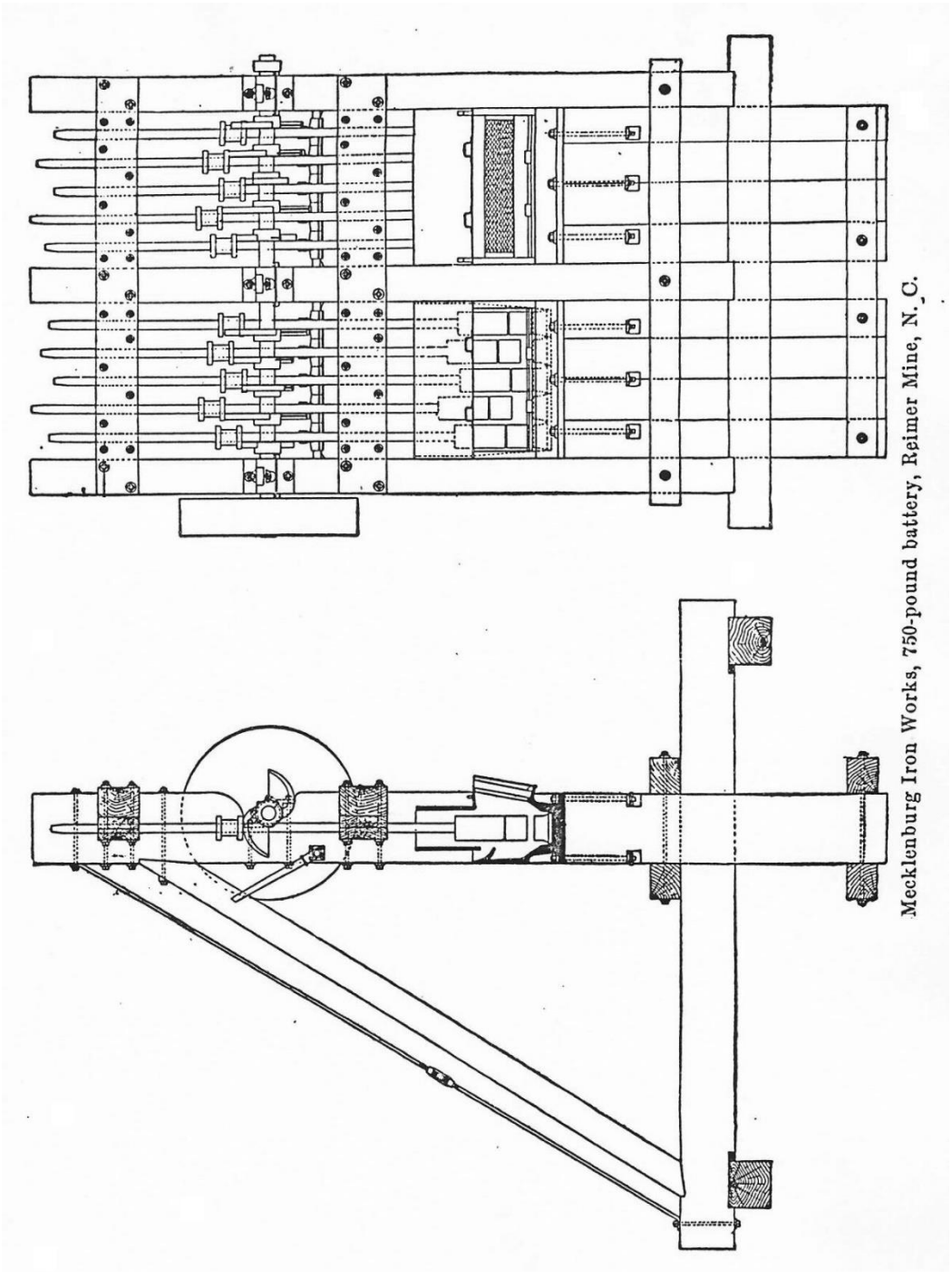
Quartz was taken from the mine, crushed into hand-sized pieces by a jaw crusher, and fed into the hopper on the stamp mill. The quartz then fell from the hopper and the stamps pulverized them into a fine sand. The fine sand was then mixed with water to form a slushy mixture, then forced over apron tables to collect the gold with mercury or drained onto a concentrating table to “shake out” the gold. This was a loud, laborious process, but could generate between $20.00 to $30.00 of gold per ton of quartz processed through the mill. The average 10-stamp mill could crush up to 10 tons of quartz in 12 hours, using 720 gallons of water per hour to keep it running smoothly.

The last stamp mill installed at Reed Gold Mine was built by the Mecklenburg Iron Works in Charlotte, North Carolina. It had 10 stamps, each weighing 750 pounds that would be raised by a camshaft and allowed to free fall against the shoes. Power was supplied by leather belts, called line shafts, driven by a steam engine.

Stamp Mills were the most efficient way to crush quartz to extract gold from the 1880s to the 1920s, but still could not recovery all the gold run through the machine. Smaller flakes of gold would still be washed away with the water, but hopefully collected by the concentrating table. These were noisy machines that required constant maintenance and replacement of parts. The stamps and shoes, made of cast iron, would have to be replaced every 180 days, or six months. The copper plates on the apron tables would have the mercury layer removed every few weeks to process for gold and reapplied to start the process all over again.

Reed Gold Mine kept the stamp mill in operation from 1895 to 1912, when they stopped mining. Other gold mines continued to use stamp mills into the 1930s, due to the amount of gold still processed in North Carolina. Only a handful of original stamp mills can be seen in operation today.

Reimer Mine Stamp Mill Diagram



The Reimer Mine was located in Rowan County near present day Granite Quarry. This mill was identical to the one purchased for Reed, which was a standard design from the Mecklenburg Iron Works.

Stamp Mill Building Diagram

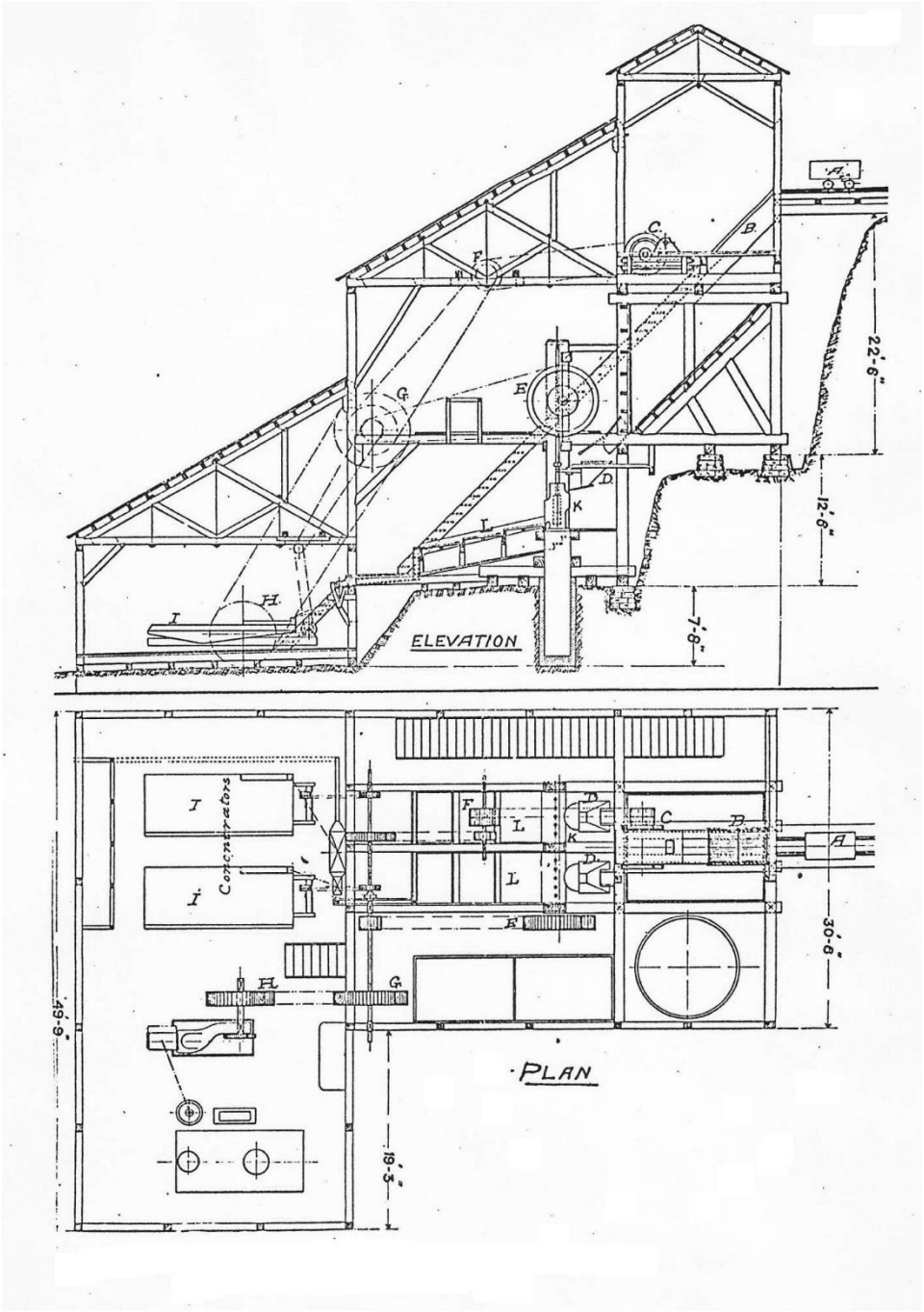


Diagram showing how a stamp mill building used gravity to feed the quartz into the mill, onto the apron tables and finally to the concentrating tables. Similar buildings were located across the U.S. from North Carolina to California.

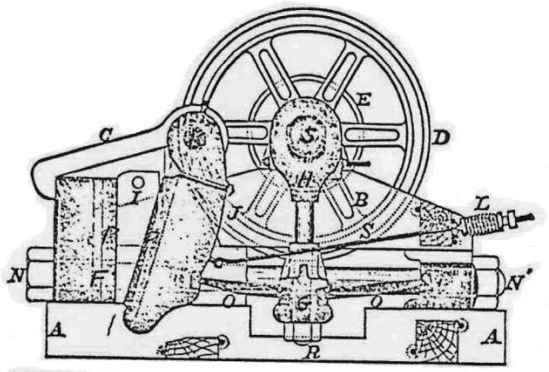
Jaw Crusher

One of the early issues in underground mining, or lode mining, was how to break the quartz down to manageable size to use in the Chilean or Arrastra mills. Early wooden and metal stamp mills may have been used to crush quartz for processing, but more than likely this was done manually using mine labor. That changed in the 1860s.

In the 1850s, a man named Eli Whitney Blake invented a device that crushed stones for roadways. Gold miners adopted it by 1861 to break down the quartz rock at California gold mines. Rocks were dropped in a wedge-shaped space between two iron jaws, one of which opened and closed on the other in short, successive reciprocating motions of about ¼ inch. As the stones were crushed by this motion, they fell lower into the wedge and were again made smaller. Finally, the particles reached the adjustable bottom of the jaws and passed out in the desired size, which ranged between 1" – 2" in diameter. It did not take long for the crusher to break up enough ore for a day's supply for a ten-stamp mill.

The jaw crusher would be located at the highest point of a stamp mill operation, which allowed the crushed rock to move by gravity into hoppers that supplied the mortar boxes and stamps. Otherwise, the rock would be moved by wheelbarrow to the mill to be manually loaded into the hoppers. Power for the jaw crusher was supplied by a steam engine located at the stamp mill. Line shafts, which used pulleys to drive leather belts, would turn the main wheel on the crusher.

The stamp mill currently in operation at the Reed Mine today has a concreate pad for a jaw crusher but does not use one today. The rock used in the mill must be manually loaded in the hopper, which will feed into the mortar box as the machine pulverizes the quartz. The Reed mill has two banks of five stamps, each with a separate rock hopper.



The Blake jaw crusher. *A–A*, lower timber frame; *B*, upper timber frame; *C*, clamps; *D*, flywheels; *E*, pulley; *F*, main frame; *G*, brushes; *H*, pitman half box; *I*, chucks; *J*, spring jaw; *K*, jaw shaft; *L*, spring on spring rod; *N–N*, main tension rod nuts; *O–O*, toggles; *P–P*, jaw plates; *R–H*, pitman; *R*, pitman rod nuts; *S*, main eccentric shaft.

Technology Vocabulary

- **Apron Table –** An inclined table connect to the mortar box on a stamp mill. Would have amalgamation plates on them to capture any gold that flowed over top them with water.

- **Arrastra –** A rude drag-stone mill for pulverizing ores that contained gold.

- **Camshaft –** A horizontal rotating piece of a stamp mill used to lift the stamps in the air before releasing them.

- **Chilean Mill –** A mill for crushing quartz, by rotating two stone wheels in a circle. Used to extract gold from white quartz.

- **Concentrating Table –** A table that shakes side to side in which finely-crushed ore and water flows downward. The heavier minerals separate from the lighter materials.

- **Cradle Rocker -** A device used for concentrating gold in small-scale placer mining operations. It rocks back and forth separating rocks and dirt from the heavier gold.

- **Crowbar –** An iron bar with a flattened end, used mostly as a lever.

- **Jaw Crusher** - An adjustable machine for crushing quartz to various sizes in order to prepare the quartz to be used at the Stamp Mill.

- **Kibble –** A large cast iron bucket used to lower miners in and out of underground mines and used to also bring the gold enriched quartz out of the mines.

- **Line Shaft -** Power was supplied by leather belts, called line shafts, driven by a steam engine.

- **Pan –** The action that involved washing gravel or dirt in a pan to separate out the gold.

- **Poll Pick –** A single-pointed miner's pick having a short poll or striking head.

- **Stamp Mill -** A large machine for pounding pieces of ore into a file gravel to separate gold.

- **Steam Engine –** An engine that uses the expansion or rapid condensation of steam to generate power.

- **Wheelbarrow –** A complex machine with a solid bottom using a lever and wheel used to transport material in a mine.

- **Windlass –** A type of winch used to lower buckets into a shaft and to hoist it up.

Technology Vocabulary Word Scramble

1. RPOAN EABTL _____
2. ARASATRR _____
3. MTSACAHF _____
4. CILAENH ILML _____
5. ECOIGNTNCNATR TEALB _____
6. LCRDEA OKRREC _____
7. RACWROB _____
8. AWJ UHECRSR _____
9. KBLBIE _____
10. LIEN THSFA _____
11. PAN _____
12. LLOP CIPK _____
13. STPAM ILML _____
14. TSMEA INGENE _____
15. OBREWLREAHW _____
16. SIDSLANW _____

Technology Vocabulary Word Scramble Answer Key

1. RPOAN EABTL	Apron Table
2. ARASATRR	Arrastra
3. MTSACAHF	Camshaft
4. CILAENH ILML	Chilean Mill
5. ECOIGNTNCNATR TEALB	Concentrating Table
6. LCRDEA OKRREC	Cradle Rocker
7. RACWROB	Crowbar
8. AWJ UHECRSR	Jaw Crusher
9. KBLBIE	Kibble
10. LIEN THSFA	Line Shaft
11. PAN	Pan
12. LLOP CIPK	Poll Pick
13. STPAM ILML	Stamp Mill
14. TSMEA INGENE	Steam Engine
15. OBREWLREAHW	Wheelbarrow
16. SIDSLANW	Windlass