

**Lesson Plan #4 -
The History of the Comstock Mine**

Lesson Goal:

Introduce students to the history of the Comstock Mine and show the environmental impact 100 years later from the methods used to extract ore.

Concept to be developed:

The Comstock Mine produced gold and silver and played a key role in the development of Nevada. Mining allows access to valuable and necessary resources; however, there are often unintended consequences to the acquisition of these resources. Contamination at the Comstock Lode is a legacy of the mining era. Long-term damage has been caused by the use of mercury in the extraction process that has become toxic to humans and other wild life due to over exposure.

Skills to be developed:

1. Note taking. (standard and technology enhanced)
2. Research. (Standard and technology enhanced)
3. Gathering information.
(standard group - through packets) (technology enhanced - web sites)
4. Listening skills.

Objectives:

1. Know the importance of the Comstock Mine and it's importance in Nevada's history.
2. List valuable minerals discovered at the Comstock Mine.
3. Identify some of the extracting processes used to extract ore from the mine.
4. Explain the impact to the environment of the use of mercury in the extraction process.

Materials:

1. (Standard Group)
Packets of information from the web site: http://ndep.nv.gov/bca/carsonriver/criver_1.htm
(Technology enhanced)
Computers with an Internet connection or web whacker with a web site
2. Worksheet for EPA web site (both groups)

Safety Precautions

Supervise use of Internet
Verify Use of Internet Forms
Use a balanced approach between the good of the mines and the environmental impact of heavy metals.
Secure computer, projector and cords

Procedure -

Foundation:

In 1863 the Comstock Lode produced gold and silver and was instrumental in the development of Northern Nevada. The mines brought income, people and industry to the area and as a result, many boomtowns were born. At one time the mines located in and around Dayton, NV. Produced more than \$36 million per year in income and produced more than 560,000 tons of ore. 1863 was the largest year of production and by 1877 the bottom of the lode had been reached at 1,650 feet. The mines and mills provided jobs and supported many families in the area. These mines are unsurpassed in building boomtowns in Nevada.

Unfortunately, people in that era didn't realize the long-term legacy they would leave for future generations. This site has now been deemed a superfund site, which was caused from mercury-contaminated soils at the former mill sites and in adjacent waterways. This contamination covers more than a 50-mile length of the Carson River. The mercury contamination was caused by the use of mercury in ore processing.

Concept Development

- 1. (Standard group)** Pass out a packet of web sites that show the history of Comstock mining. Questions are based on the EPA web site listed above (see materials). In groups, have students answer questions from Worksheet.
(Technology enhanced) Show students the EPA web site using the projector and discuss. Break into groups, and have students access the EPA web site and research other web sites related to the Comstock Mines and The Superfund Site on the Carson River. If Web Whacker is used, have students access the EPSA site, and provide packets of other web sites to research.
- 2. (Standard Group)** Have students take notes in their journals of important information about The Comstock Mine (to be used for their debate at the end of the unit and test).
(Technology enhanced) Have students make a bibliography of web sites researched and take notes in their journals (to be used for their debate at the end of the unit and test).

Technology Integration Component

Students will access web sites to answer question on the study guide. They will also make a bibliography of web sites accessed. They will use interactive links.

Evaluation

Students will be observed throughout the activities.
Journals will be kept and evaluated showing web sites visited and research completed.
A debate will be conducted at the completion of the unit.
A test will be given at the completion of the unit.

Worksheet

Name _____
Date _____
Period _____

EPA Website - Lesson # 4

http://www.ndep.nv.gov/bca/carsonriver/criver_1.htm

OVERVIEW SECTION

- 1. The Carson River Basin was designated as what type of site by the “Superfund” Act I 1990?**
- 2. Have you ever heard of this type of site before? If so where?**
- 3. Why has the Carson River Basin been given this kind of listing?**
- 4. What are some of the health effects of mercury in humans?**
- 5. What four methods are used by the Environmental Protection Agency (EPA) to measure the contamination in The Carson River Basin?**

HISTORIC MINING SECTION

- 6. What year did mining start in the Carson River Drainage Basin?**
- 7. What valuable mineral was discovered?**
- 8. Where was it discovered?**

9. What two canyons were worked for these minerals?
10. What famous name was given to this mining area?
11. “Gold Canyon” had more _____; whereas “Six Mile Canyon” had more _____.
12. The ore was shipped to _____.
13. Was ore processing efficient at this time?
14. How was mercury used to extract the gold and silver from the “waste” rock?
15. What happened to much of the left over mercury?

Answer Sheet

Name _____
Date _____
Period _____

EPA Website - Lesson # 4

http://www.ndep.nv.gov/bca/carsonriver/criver_1.htm

OVERVIEW SECTION

- 1. The Carson River Basin was designated as what type of site by the “Superfund” Act I 1990?**
National Priority Listed (NPL)
- 2. Have you ever heard of this type of site before? If so where?**
The Leviathan Mine in Alpine County, California is one example of a NPL site within the Carson River watershed.
- 3. Why has the Carson River Basin been given this kind of listing?**
Because of extensive mercury contamination brought on by mining in the late 1800s.
- 4. What are some of the health effects of mercury in humans?**
Affects the central nervous system as well as the brain, kidneys and developing fetus.
Mercury can also bioaccumulate; that is, increase in concentration through the food chain.
- 5. What *four* methods are used by the Environmental Protection Agency (EPA) to measure the contamination in The Carson River Basin?**
1) site identification, 2) development of health standard, 3) soil sampling, 4) health survey of residents

HISTORIC MINING SECTION

- 6. What year did mining start in the Carson River Drainage Basin?**
1850
- 7. What valuable mineral was discovered?**
Gold
- 8. Where was it discovered?**
At the mouth of Gold Canyon, near Dayton

9. What two canyons were worked for these minerals?

Gold Canyon, Six Mile Canyon

10. What famous name was given to this mining area?

Comstock Lode

11. “Gold Canyon” had more _____ Gold _____; whereas “Six Mile Canyon” had more _____ Silver _____.

12. The ore was shipped to _____ San Francisco _____.

13. Was ore processing efficient at this time?

Initial ore processing techniques were slow and inefficient and a fair amount of trial and error experimenting went into the development of an effective ore-processing technique.

14. How was mercury used to extract the gold and silver from the “waste” rock?

Crushed ore is charged with mercury (approximately 10 percent of the weight of the ore) in the amalgamation pan. The amalgam is separated from the slurry and the silver and gold is separated from the amalgam with a retort (a vessel or chamber in which substances are distilled or decomposed by heat).

15. What happened to much of the left over mercury?

Mercury left over in the tailings piles has migrated over time, some by soil transport and some by rain washing it down into lower elevation areas.