

Mining for MMM-Minerals

Materials

For the teacher:

- stop watch
- scale
- bucket of pennies

For each student:

- 4 soft chocolate chip cookie
- toothpicks
- pencil
- data recording sheet
- small weigh boat

Mining Rules

1. Your mine will earn \$1000 for every gram of chips mined.
2. You will be charged \$100 for every 5 minutes of mining.
3. You will be fined \$100 for each piece of cookie that breaks off. The more damage caused, the more you lose.

Suggested grade levels: 4th-5th

Louisiana GLEs

Grade 4: SI 1, 2, 3, 4, 7; ESS 62; M 7, 8, 12, 13, 14

Grade 5: SI 1, 2; ESS 31; N 8

Source

Activity adapted from museum educator, Brooke Swanson, University Wisconsin-Madison

Supplemental information

See Mineral Information Institute for more educational information.



In this activity students will get an understanding of where minerals come from and the environmental impact of mining

Background

Some large rock outcrops contain abundant minerals. These rocks are said to have 'mineral deposits'. A mineral deposit that can be mined for profit is called an ore. Silver, gold, bauxite, and asbestos are examples of ores that we mine in the United States. Mining requires unearthing and removing these minerals. Mineral mines tend to cover a very large area and may reach deep into the Earth's surface, however, less than 0.2% of the land area of the United States and Canada is used by mining to produce all the minerals we use everyday. Mining does not come without a cost and may cause environmental damage. Abandoned mines are often reclaimed after the mining is abandoned.

Procedure

1. Distribute mining materials to students (cookie, toothpicks, pennies, and data sheet).
2. Explain to each student that each penny is equal to \$100 dollars. So they start out with \$1000.
3. Explain the mining rules (See side column).
4. Have students weigh and record weight of weigh boat.
5. Start mining and record the start time.
6. Use the toothpick to carefully dig out the minerals. You may look at the bottom of the cookie, but can only mine it from the top.
7. To process the minerals separate the crumbs from the chocolate chips. Record the ending time in minutes.
8. Calculate the total mining and processing time.
9. Assess the land damage (number of cookie pieces that broke off during mining).
10. Place the minerals in the weigh boat. Record weight in grams.
11. Compute the value of minerals.
12. Compute the total profit (or loss) from the mining.

Calculations

Total mining and processing fee (\$100 per every five minutes): \$ _____

Land damage: # of broken cookie pieces X \$100 = \$ _____

Total Land Damage + Chip Mine Fee: \$ _____

Record the value of your minerals (\$1000 for every gram in the cup): \$ _____

Profit: Total Mining and Processing Fee: \$ _____ + Total Land Damage Fee: \$ _____ = Total Cost \$ _____

Value of Minerals \$ _____ - Total Cost \$ _____ = Total Profit \$ _____