

Extension 3.1 c & 3.2 a,b

Cookie Mining

You will be working with a partner in this activity. The purpose of this activity is to simulate a mining operation. In order to make the simulation economically valid, many of the costs associated with real mining operations will be considered. Several of the economic considerations in this simulation follow.

- ☛ A land area will be purchased from the bank.
- ☛ The land area will be surveyed and quantified.
- ☛ Mining equipment will be purchased from the bank.
- ☛ A mining operation will be undertaken, with the cost for each minute of the mining operation included in the total operating costs.
- ☛ At the conclusion of mining operations, the reclamation of the land area is required, with a fine assessed for any part of the land area that is not successfully reclaimed.
- ☛ The ore that was mined will be sold back to the bank to offset the start-up costs of the mining operation.

While the goal of this simulation is entirely economic, that is, to make as much money as possible. There are many goals other than economic goals that must be considered in a real mining operation. Although it is not possible to include all of the social and environmental implications of mining in this simple simulation, they must not be forgotten, and you should be prepared to discuss them in class.

Materials

- 2 chocolate chip cookies Mining tools graph paper

Procedure

1. Each miner must obtain a sheet of graph paper and purchase a land area (cookie), on credit, from the bank.
 - 🕒 Cookie \$1200 each
2. Each miner may purchase any combination of the following mining equipment, on credit, from the bank (at least two items must be purchased).

🕒 Paper clip	\$500/ea
🕒 Toothpick	\$300/ea
3. Following the purchase of the cookies and mining equipment, place each cookie on the graph paper, trace the outline of the cookies, determine the area of the cookies by counting the number of squares that fall inside the line (**count partial squares as full squares**), and record the area of the cookies.
4. Place the cookies back inside the circles, and start a timer to keep track of the time it takes to mine the chocolate chips from the cookies. (Leave the time on until you reach step #10)
5. **Once mining begins, the cookies are only to be touched by the mining tools. The cookies may not be touched with fingers or hands. You may not blow crumbs off the paper at any time. Any part of the cookies that falls off the graph paper is considered to be “lost,” and should not be retrieved until the simulation is complete.**
6. Attempt to dig out as many chocolate chips as possible. The chocolate chips represent ore, and will be sold to the bank to offset the start-up costs of the mining operation. Whole, clean, intact chocolate chips will be purchased by the bank for \$500 each, “dirty” chocolate chips will be purchased for \$200 each, and partial chocolate chips will be purchased for \$100 each (partial chips must be combined to form the amount of ore in one chip).
7. **The cost of an ongoing mining operation is \$50 per minute.**

8. After the cookies have been mined, reclamation must be attempted. Try to place all that remains of the cookies back into the circled area on the graph paper using the mining tools (remember, no fingers or hands allowed). Draw additional circles around each crumb that is not placed back in the circle, and count the number of squares that fall inside all circles.
9. The fine for unsuccessful reclamation is \$50 per square (in excess of the original number of squares).
10. When all mining and reclamation is complete and you are ready to sell your chocolate chips to the bank, arrange them in such a way that they may be easily counted, record the end time of the simulation, and raise your hand.

Mining Information

Cost of Cookies = _____

Mining Equipment Costs

Paper Clip _____ x \$500 = _____

Toothpick _____ x \$300 = _____

Mining Equipment Costs = _____

Time Cost

Minutes Spent Mining _____ x \$50 = _____

Cost of Mining Operations

Cost of Cookies + Mining Equipment Costs + Time Cost = _____

Reclamation Cost

Initial Size of Cookies (in squares) = _____

Final Size of Cookies (in squares) = _____

Total Reclamation Cost = Final Size of Cookies – Initial Size of Cookie x \$50 = _____

Mining Revenue

Number of Whole Chips Removed _____ x \$500 = _____

Number of “Dirty” Chips Removed _____ x \$200 = _____

Number of Partial Chips* Removed _____ x \$100 = _____

Total Mining Revenue = _____

* To sell partial chips, the partial chips must be grouped together so that their total size includes at least the amount of chocolate as an intact whole chip.

Bottom Line (Profit/Loss)

Mining Revenue – Cost of Mining Operations – Reclamation Cost = _____

Questions—Write out and respond to the following questions.

1. Were the minerals and rocks evenly distributed throughout the cookie mines?
2. Were you able to remove all the chips (rocks and minerals) from the cookie
3. What is the most difficult part of mining the chocolate chips from the cookie?
4. Explain the mining techniques used to mine the chocolate chips.

COOKIE GRAPH

