



Cookie Mining Lab (Room Copy)

Cookie mining: The purpose of this lesson is to understand the full cycle of mining minerals. We will glance at the economics of mining and its effect on the environment. Students will be purchasing “land” (cookie) and “mining equipment” (toothpick, forked toothpick, paper clip). You will not be allowed to touch the cookie with your hands once

you start extracting “minerals” from chocolate chip cookies. In return, you will be paid for minerals extracted.

Your goal is to make as much money as possible and preserve an in-tact environment. State and Federal regulations state that we must put the area we mine back as close to original condition as possible. It is cheaper and easier to do less damage while we are mining than to repair it after the mining. You will mine the cookie (land) for minerals (chocolate chips) and then restore the land (reclaim the land through the process of reclamation) once you have finished mining. You will need to mine the minerals, quantify your minerals, reclaim the land, and complete the profit/loss worksheet. Manage your time wisely. Time is money in the mining industry!

Instructions:

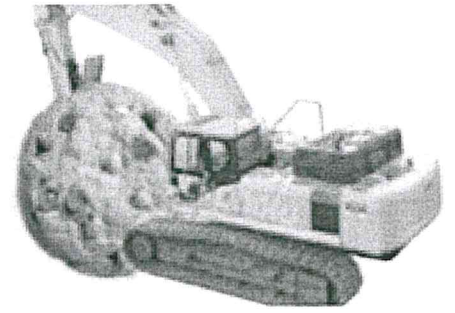
1. Each miner starts with **\$19** dollars of play money.
2. Each student will fill out a Cookie Mining Worksheet
3. Each student must choose (buy) their own mining “land” ~ cookie.
 - Chips Ahoy Cookie ---- \$5
4. After purchasing “land”, place cookie on grid sheet in the "Pre-mining Land Use Area" and use a pencil to outline the cookie. Count each square that falls inside the circle. **Count partial squares as a full square.** Survey the land for potential mineral resources, **color/shade boxes** where potential minerals are located.
5. Look at the cookie from a side view and sketch the cookie in the "Pre-Mining Topography Area".
6. Each student must buy their own “mining equipment”.
 - a. Bamboo Fork ---- \$6
 - b. toothpick ---- \$4
 - c. Paper clip ----- \$5
7. The sale of one “mineral” mined from a cookie results in a \$2 profit. *Broken chocolate chips can be combined to make one whole chip.*
8. You will have 10 minutes maximum to mine your cookie (on paper towels)! See Mining Regulations for how to mine your cookie.
9. Push the earth (cookie) together on the "Post-Mining & Reclaimed Land Area" graph to reclaim the land. Try to put the earth back together the way it was originally. Trace around it once you have reclaimed the earth the best you can. Count the squares and record it on your worksheet (partial squares count as a whole). **This can only be accomplished using the mining tools ---- no fingers or hands allowed.** Draw a side view of your reclaimed land in the "Post-Mining & Reclaimed Topography" part of your graph.

Mining Regulations:

1. No student may use hands or fingers to hold cookie. The only things that can touch the cookie are the mining tools and the paper on which the cookie is sitting.
2. A student can purchase as many mining tools as desired **AT THE BEGINNING OF THE LAB ONLY;** cannot be shared with other miners.
3. If a mining tool breaks it is now unusable, and another tool must be used.
4. Only one piece of land may be purchased.
5. The students who make money at the end win! (But everyone wins...you get to eat your cookie!)



Cookie Mining Worksheet



Name: _____

Date: _____

COSTS

A. LAND ACQUISITION COSTS (PRICE OF COOKIE)

Name of property _____ Total Land costs \$ _____

B. EQUIPMENT COSTS

Forked toothpick _____ x \$6= _____

Round toothpick _____ x \$4= _____

Paper clip _____ x \$5= _____

Total equipment costs \$ _____

C. MINING/EXCAVATION COSTS (CHIP REMOVAL)

Time spent mining (min.) _____ x \$1 labor = _____

Total excavation costs \$ _____

D. RECLAMATION

(Original number of squares covered before cookie was mined = _____)

Squares in addition to original outline after reclamation _____ x \$1 labor = _____

Total reclamation costs \$ _____

PROFIT

E. MINING VALUATION

Number of whole chips mined _____ x \$2 = _____

Gross profit \$ _____

CALCULATING NET PROFIT/LOSS

Start up Funds \$ 19

+ Gross profits _____ =>

Total mining costs (A+B+C) _____

+ Total reclamation costs (D) _____ =>

Total Revenue _____

minus

Total Expenditures _____

= NET PROFIT / LOSS _____

Answer the following questions. Turn your completed page when done.

Part 1: QUESTIONS:

1. Were the minerals (chips) evenly distributed throughout the earth (cookie)? _____
2. Do you think the distribution was a good model for the way the minerals are distributed throughout the earth in the real world? _____
3. Explain the differences between the Pre-Mining Area drawing and the Post-Mining & Reclaimed Land Area drawing. _____
4. There were crumbs of earth (cookie) that were on the towel, fell on the floor, or maybe even blew away while you were mining. How does this affect the reclamation process?

5. Were you able to completely restore the land? _____
Why or why not? _____
6. Examine your topography (side view) drawings from Pre and Post Mining. Describe the differences that you observe. _____
7. Explain why the earth would be better or worse after the mining and reclamation? Give evidence and reasons. _____
8. Do you think the mining process would be faster or slower when you know there are reclamation rules that must be followed? _____
9. Describe what you learned about surface mining's relation to reclamation of the land from this activity. _____

10. How did this activity show you how mineral resources can impact an area both environmentally and economically? _____

Part II

Plot your account balance as the mining process progressed:

Funds at the beginning (T_1)	\$
Funds after buying the mine (T_2)	\$
Funds after buying the equipment (T_3)	\$
Funds after selling the coal (T_4)	\$
Funds after reclamation (T_5)	\$

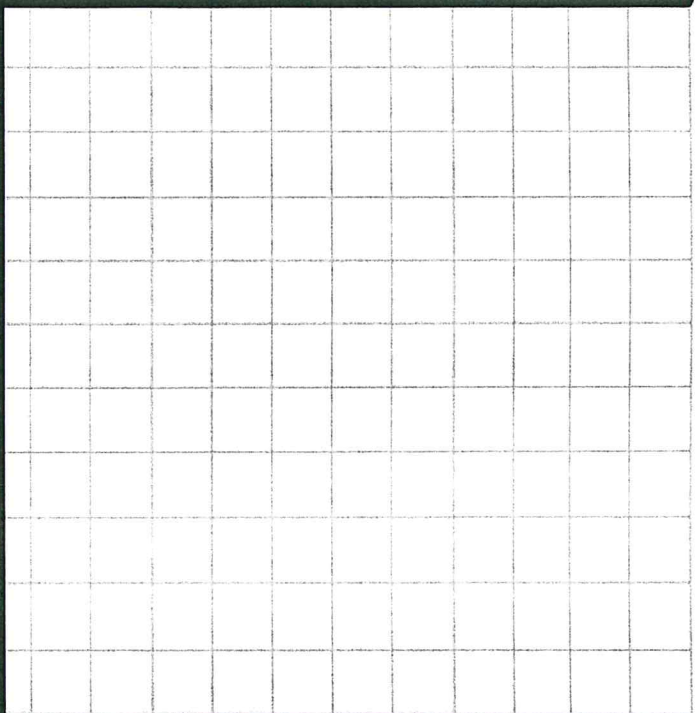
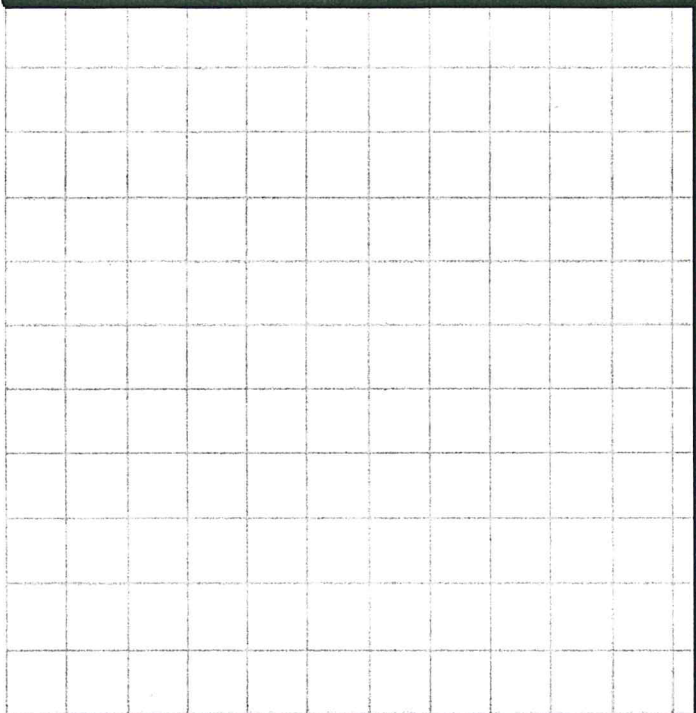
Chips (profit) (T_4)

Pre-Mining Land Use

(#partial + #full squares covered= _____)

Post-Mining Land Use

(#partial + #full squares covered= _____)



Pre-Mining Topography (side view)

Post-Mining Topography (side view)

