

NAME \_\_\_\_\_

APES

## COOKE MINING

### PROFITS, RESERVES, GANGUE AND RECLAMATION

#### COOKIE MINING:

The purpose of this activity is to provide an introduction to the economics of mining. This is accomplished through purchasing land areas and mining equipment, as well as paying for mining operations and reclamation. In return "student-miners" receive money for the ore mined. One of the goals is to make as much money as possible; a number of other goals will be discussed, in addition to the \$\$\$-motive.

#### MATERIALS:

Graph paper                      Mining tools                      Cookie (land containing ore)

#### INSTRUCTIONS:

1. Each miner is allowed to purchase equipment on credit from the Miners Federal Bank.
2. Each miner receives a sheet of graph paper.
3. Cookies represent a parcel of land. Some cookies contain more ore than others but must be reclaimed after the ore is extracted. Students should estimate the amount of time and money needed for mining, to purchase tools and time spent for reclamation compared to the amount of ore that they can expect to extract in order to make a profit.

#### 4. Cookies (Land) for Sale:

Archway	\$4.00
Chips Ahoy	\$7.00
Keebler Chips Deluxe	\$10.00

#### 5. Mining Equipment for Sale:

Flat Toothpick	\$2.00
Round Toothpick	\$5.00
Paper Clip	\$7.00

#### 6. Mining Costs: \$1.00 per minute

#### 7. Reclamation Costs: \$1.00 per square over the original count

- Sale of Ore (chocolate chips, M&Ms, nuts, raisins): \$2.00 per chip  
(broken chips can be combined to make one whole chip, total is at the discretion of the bank)

### PROCEDURE

- Estimate what you will purchase in order to make the most profit. After purchasing your land and mining tools, place your cookie on the graph paper and trace its outline. Count each square that falls inside the circle and count each partial square as a FULL square. Record in your data table.
- Without touching the cookie with your hands, use your mining tools to extract the ore from your land. Record the starting and ending time in your data table.
- After the cookie has been mined to the best of your ability, it must be put back into the circled area on the graph paper. This can only be done using the mining tools; NO FINGERS/HANDS allowed.

\*\*\*NOTE: No miner can use his fingers to hold the cookie. The only objects that can touch the cookie are the mining tools and the paper the cookie is sitting on.

### DATA

- Type of Cookie (land area): \_\_\_\_\_.
- Price of Cookie: \_\_\_\_\_.
- Size of Cookie (number of square units) \_\_\_\_\_.

Mining Equipment					
	Number		Cost		Total
Flat toothpicks	_____	x	_____	=	_____
Round toothpicks	_____	x	_____	=	_____
Paper clips	_____	x	_____	=	_____
<b>Total Equipment Cost</b>				=	_____

<b>Mining Minutes</b>
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	Number		Cost		Total
Time in Minutes	_____	x	_____	=	_____

<b>Chip Removal</b>
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	Number		Value		Total
Pieces of ore	_____	x	_____	=	_____

**Transfer your data to the worksheet below:**

Value of Ore					-
(minus)	-				
Cost of Land					
Cost of Equipment					
Cost of Time					
<b>Subtotal</b>	<b>=</b>				
(minus)	-				
Reclamation (total # of squares)					

\*It is possible to not have a cost for reclamation; if you do, you **MUST** subtract it from your profit.

**PROFIT OR LOSS** \_\_\_\_\_

**ANALYSIS QUESTIONS**

1. What type of mining was this exercise most analogous to?
  
2. Explain your procedure in terms of the following: *overburden, spoil, mine tailings, gangue.*

3. Were the minerals evenly distributed throughout the cookie mines? Do you think this has a real application?
  
4. Were you able to restore the land? Briefly explain why you were able or not able to do so.
  
5. What steps need to be taken to restore land after the overburden has been replaced? (You may have to research this yourself using the Internet, etc.)
  
6. How do mine tailings negatively impact the surrounding ecosystem? Be specific in your response.
  
7. How would you change the mining process (in the lab and in the real world) if you know in advance that the land must be reclaimed?