Lesson Plan

Choc Chip Mining

Where do you find rocks and minerals? (In the ground) We have to dig, or 'mine' these rocks and minerals out of the ground so that we can use them to make all sorts of useful things.

There are two different ways of mining minerals out of the ground. If the minerals are close to the surface and spread out, then we develop an 'open cut' mine. An open cut mine is like a giant sand pit (refer to poster). If the mineral is deep down underground then we develop an underground mine. An underground mine is like a huge spiral drive-way, where very large trucks and other mine machines can drive up and down the underground mine (refer to poster).

Today you are going to have the chance to do some underground mining and some open cut mining. Today you are going to mine the very valuable chocolate chips out of a chocolate chip cookie, pretending that the chocolate chips are the gold, or diamonds or whatever mineral you want to dig up and the biscuit is the ground that you're trying to get the minerals out of.

Explain what you have to hand out to each student – Choc chip mining sheet and two toothpicks. After these have been handed out explain what the oval on the sheet is. The oval is the mining lease, it is the area of land that you have permission to use. You're allowed to use all of the area inside the oval.

Explain that the first thing you need to do when you get your biscuit is explore the land to find where the minerals are. You need to know where they are do you know where to dig. When you get your biscuit explore and count to see how many choc chips are in your biscuit. Students aren't to use their toothpicks at this stage or eat any part of the biscuit.

Once students have counted the chips, explain that the next step in the mining process is to dig the minerals out. To do this they use their two toothpicks to dig as many choc chips out of the biscuit they can. They need to mine them from the top of the biscuit like an open cut mine, from the bottom of the biscuit, like an underground mine and they can break their biscuit open to explore further.

After they have been mining for a few minutes stop them and explain that once the mineral has been mined out of the ground, the mining company then processes the minerals and then exports them. Processing means that the minerals crushed, water is added, it's heated up and made clean. Give the students a minute to process and export their minerals (choc chips) into their stomach (eat the choc chips).

Once the choc chips have been eaten tell the students that they must now rehabilitate the land. Explain what rehabilitation is. To rehabilitate their biscuits they must put their biscuits back together so that their biscuit looks almost the same as the biscuit they had before they started. Give them a couple of minutes to do this. Congratulate those who have rehabilitated well.

Choc Chip Mining - Junior

There are a number of different processes which need to take place in the minerals and energy industry before a mineral can actually be sold and used to make products or produce energy.

1. Collect two mining tools (toothpicks).
2. Put your biscuit in the middle of your placemat inside your **mining lease** (the red oval).
3. Start **exploring** and **mining** (extracting) choc chips with your tools. Make sure that you stay within your mining lease at all times. You will be fined if you damage the environment outside your mining lease.
4. Once your mining lease has expired, stockpile your choc chips and then **process** and export them into your stomach (eat the choc chips).
5. Now **rehabilitate** your minesite by putting your mining lease back to the way it was before you started mining (as best you can).
6. When your mine has been closed, you may eat the rest of your biscuit.

How many choc chips did you mine? _____

Circle the process which you found **most difficult** when mining for choc chips.

Exploration (Looking for choc chips)

Extraction (Getting the choc chips out)

Rehabilitation (Putting your biscuit back together)

Processing (Eating your biscuit)

CME

Choc Chip Mining - Senior

There are a number of different processes which need to take place in the minerals and energy industry before a mineral can actually be sold and used to make products or produce energy.

EXPLORATION
First, funds need to be raised to begin **exploration**, purchase equipment and pay wages. Your company has been successful in securing a loan of **$60 000** from the banks to buy your equipment, your **mining lease** and pay wages.

EXTRACTION
Next, a mine must be built to extract the mineral from the ground. Mining take two main forms: **open cut** and **underground mining**. You will be using both types to extract your choc chips. You must stay within your mining lease at all times during the mining process. If you damage land outside your mining lease, you will be fined.

PROCESSING
Minerals then usually undergo some form of **processing** before being transported for sale to a market. **Mechanical**, **chemical** and even **biological** methods are used to process the ore. You will use a combination of mechanical and chemical methods in your ore processing.

Each choc chip you extract and process will be worth **$10 000**.

REHABILITATION
Finally, the land must be **rehabilitated** and returned to self-sustaining or productive use. Your mine site will need to be rehabilitated by putting your biscuit back together so it looks like the biscuit you had at the start. If rehabilitation is not acceptable, you will be fined and may have your mining licence revoked.

The time from exploration to actual production of a commodity can be tens of years but you will have **five minutes** to extract as many choc chips from your mine as you can. Once you have finished the activity, fill in the details below.

No. of Choc Chips mined: _____ x $10 000 = $ _____
(Chocolate value)

Chocolate value $ _____ - $60 000 (Bank debt) = $ _____
(Production profit)

Subtract any fines received during mining or after rehabilitation to realise your actual profit

Production profit $ _____ - Fines received $ _____ $ _____ $ _____ $ _____

Actual profit (or loss) $ _____

Cookie Mining Activity

PURPOSE: The purpose of this activity is to give the player an introduction to the economics of mining. Each buyer buys 'property', purchases the 'mining equipment', pays for the 'mining lease and operation', and finally pays for the 'reclamation'. In return, the player receives money for the 'ore mined'. The object of the game is to develop the mine, safeguard the environment, and make as much money as possible.

MATERIALS:

Play money ($25M for each student)
Grid paper (1 sheet per student)
Chocolate chip cookies (1 per student)
Toothpicks (flat and round)
Paper clips

INSTRUCTIONS:

1. Each player starts with $25M of play money.
2. Each player receives a Cookie Mining sheet and a sheet of grid paper.
3. Each player must buy his/her 'mining property' which is a chocolate chip cookie. Only one 'mining property' per player. At least 2 types of cookies should be for sale; one cheaper one with fewer chocolate chips and another more pricey cookie with more chocolate chips.
4. After buying the cookie, the player places it on the grid paper and, using a pencil, traces the outline of the cookie.
5. Each player must buy his/her mining equipment. More than one piece of equipment may be purchased. Equipment may not be shared between players. Mining equipment for sale is;

Flat toothpick	$2.00 each
Round toothpick	$4.00 each
Paper clips	$6.00 each

6. Mining costs $1.00 per minute.
7. Sale of a chocolate chip mined from a cookie brings $1.00 (broken choc chips can be combined to make one whole chip).
8. After the cookie has been mined, the cookie fragments and crumbs should be placed back into the circled area on the grid paper. This can be accomplished using the mining tools – No fingers or hands allowed!
9. Reclamation costs are $1.00 per square over the original count. (Any piece of cookie outside of original circle counts as reclamation).
10. Complete Cookie Mining sheet.

COOKIE MINING RULES

1. Players cannot use their fingers to hold the cookie. The only things that can touch the cookie are the mining tools and the paper on which the cookie is sitting.

2. A player can purchase as many mining tools as desired: the tools can be different types.

3. If the mining tools break, they are no longer usable and a new tool must be purchased.

4. The players that make money by the end of the game win.

CME

Price List

Premier Choc Chip Cookie	$ 7.00
Standard Choc Chip Cookie	$ 2.00
Flat Toothpick	$ 2.00
Round Toothpick	$ 4.00
Paper Clip	$ 6.00
Mining Cost	$ 1.00 per minute
Reclamation Fine	$ 1.00 per square

Sale of Choc Chip	$ 1.00 per whole chip

COOKIE MINING COSTSHEET

1. Type of cookie _____ **Price of cookie** $_____

2. Equipment used
   - Flat Toothpick _____ x $2M = $_____
   - Round Toothpick _____ x $4M = $_____
   - Paper Clip _____ x $6M = $_____

   Equipment cost $_____

3. Mining _____ minutes x $1M

Cost of mining $_____

4. ***TOTAL COST OF MINING*** (price of cookie + equipment cost + cost of mining)
   $_____

5. ***TOTAL VALUE OF CHIPS*** (Number of chips removed _____ x $1M)
   $_____

6. ***RECLAMATION FINE*** (Reclamation: _____ squares x $1M)
   $_____

How much did I make?

INITIAL BUDGET $25M
TOTAL VALUE OF CHIPS + $_____

= $_____ (Total 1)
TOTAL COST OF MINING - $_____

=$_____ (Total 2)
RECLAMATION FINE - $_____

= $_____ (Total 3)

PROFIT (+) OR LOSS (-)

Total 3 $_____
INITIAL BUDGET - $35M

= $_____ Profit (+) or Loss (-)

CHOC CHIP MINING

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NAME YOUR MINE: _____

How many choc chips did you extract? _____