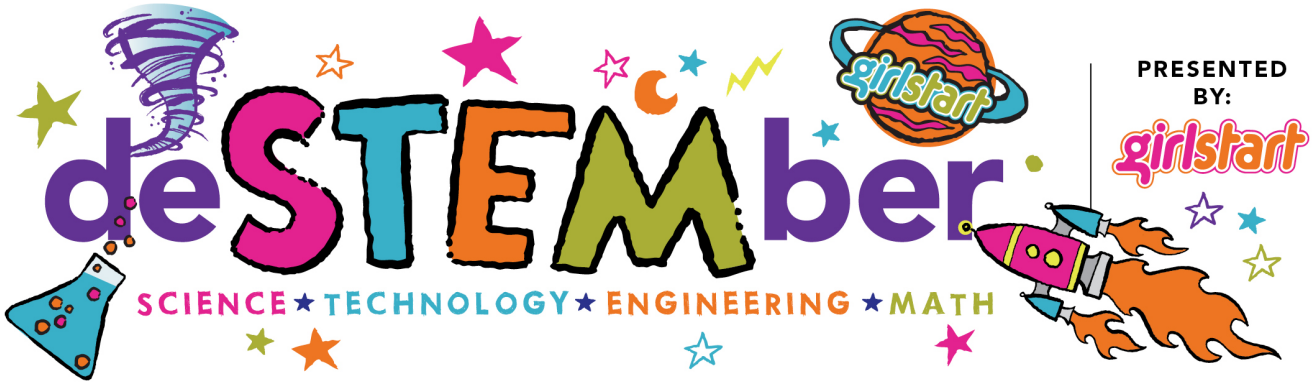

Gold Diggers

Rocks that contain large amounts of minerals are called mineral deposits. Silver and gold are examples of mineral deposits people mine for a profit, however, mining companies have to take into consideration the impact their mining practices have on the environment. Using yummy chewy chocolate chip cookies, practice your mining skills and calculate if mining for chocolate chip "mineral deposits" is worth the cost to the environment.

TEKS:

6.1A Apply mathematics to problems arising in everyday life, society, and the workplace.
6.3D Add, subtract, multiply, and divide integers fluently.

Materials:

- Chewy chocolate chip cookies
- Toothpicks
- Clear straws
- Ruler with centimeters
- Paper plates
- Watch or clock
- Gold Diggers Activity Sheet (attached below)

How To:

1. To start, set a cookie on top of your paper plate. Just looking at the top surface of the cookie, count how many chocolate chips (minerals) you see and record the number on the *Gold Diggers Activity Sheet* (attached below).
2. Using toothpicks, carefully dig out the "minerals" starting at the top of the cookie and working your way down.
3. Then, "process" your mineral deposits by separating the chocolate chips from the cookie crumbs. Record your start and stop times so you know exactly how long it takes you to mine and process the cookie. Multiply your total minutes by $20.00 for the 'Mining and Processing Fee.'
4. Next, calculate the 'Total Land Damage Fee.' Do this by multiplying the number of cookie pieces by $100.00 for "land damage" and adding this product to the 'Environment Impact Fee' ($100.00).
5. Using a straw, pick up each mine mineral so that you see the chocolate chips stacking up inside of the straw. Use the centimeters side of your ruler to measure the amount of "mineral material" in the straw and multiply this number by $500.00 to get the 'Value of Minerals.'

How To (continued):

6. Finally, determine your overall 'Profit.' Add the 'Total Land Damage Fee' and the 'Mining and Processing Fee' together to get your 'Total Cost.' Then, subtract the 'Total Cost' from the 'Value of Minerals' to see how much you profited off of your mining skills!

The STEM Explanation:

Some rocks, called mineral deposits, contain large amounts of minerals. A mineral deposit that can be mined for profit is called an ore, such as silver and gold. Sometimes there are problems with the mining of ores. A mine may reach deep into the earth's surface, making these minerals very difficult and costly to retrieve, or can cover a large area that, when dug up, may cause environmental problems.

Career Connection:

As worldwide demand for minerals and metals soars, more pressure than ever before is being placed on the earth's fundamental resources. Using sophisticated processes and technological advances, *mineral process engineers* extract and refine valuable minerals from raw ores. They also work to protect and restore the environment. Mineral process engineers create new products from materials that were once considered waste, cleaning up the landscape while promoting economic growth.

Resources:

- http://www.acareerinmining.ca/en/resources/MineralProcessEngineer.pdf
- The Mailbox, Intermediate, June/July 1998, p. 31

Gold Diggers Activity Sheet

Mining and Processing

1. Number of minerals you can see on the surface of your cookie _____
2. Start time _____
3. Stop time _____
4. Total mining time _____
5. Mining and Processing Fee $20.00 for every minute used for mining.

Total mining time _____ ✕ $20.00 = _____ **Mining and Processing Fee**

Land Damage and Mineral Value

1. Environmental Impact Fee = $100.00
2. Land Damage: number of cookie pieces that broke off as you mined _____

   # of cookie pieces _____ ✕ $100.00 = $_____ Land Damage
3. **Total Land Damage Fee**: Impact Fee $100.00 + Land Damage _____ = $_____
4. Gather the mined chocolate chips with a straw.
5. Use centimeters to measure the chocolate in the straw _____cm
6. Calculate the value of your mineral ($500.00 for every cm of mineral in the straw)

   $500.00 ✕ _____cm = $_____ **Value of minerals**

Gold Diggers Activity Sheet

Profit

Mining and Processing Fee $ _____

+

Land Damage Fee $ _____

Total Cost $ _____

Value of Minerals $ _____

–

Total Cost $ _____

Total Profit $ _____