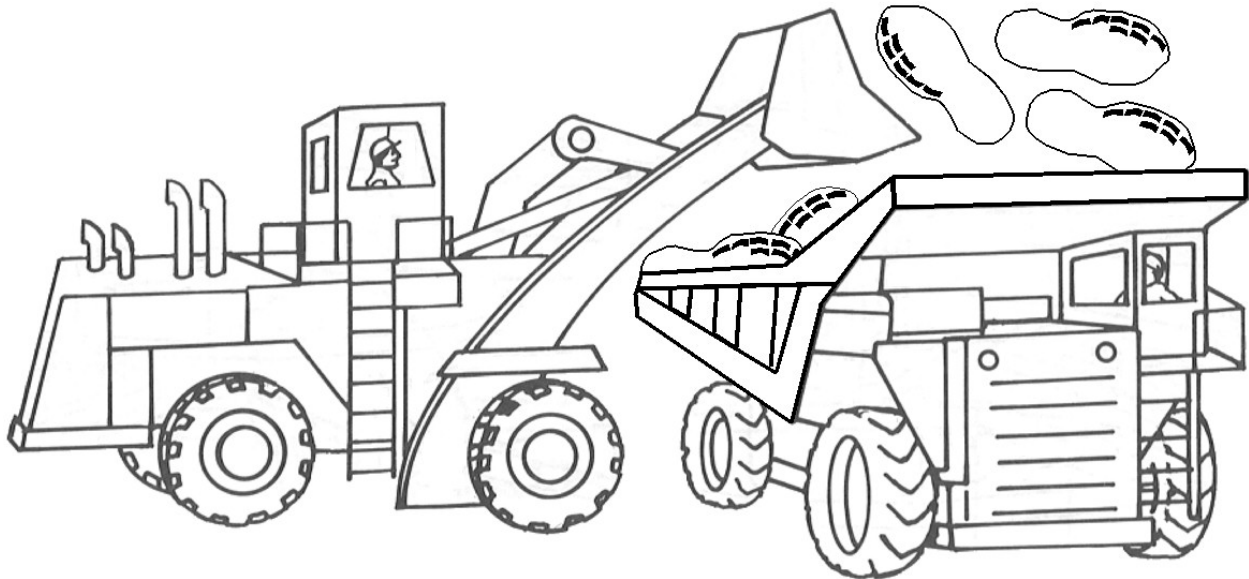


MINING IN A NUTSHELL!



Grades 4-5 NMA Activities, Nevada State Science Education Standard Correlation. Referencing Science Standards 2005 http://www.doe.nv.gov/standards/standscience.html						
	N.5.A.2	N.5.A.5	N.5.A.6	N.5.B.1	N.5.B.2	N.5.B.3
Mining in a Nutshell	X	X	X	X	X	X

PURPOSE: This activity will demonstrate the steps that are taken to find, extract, process, and use mineral resources.

OBJECTIVE: The students will be able to describe the major steps that a company must follow from initial discovery of a mineral deposit through consumption of a finished mineral product. The students will also be able to formulate ideas on ways to use waste products generated during mineral processing.

ITEMS NEEDED:

- * ROASTED PEANUTS IN THE SHELL -- 2-3 POUNDS
- * ASSORTED COLORS OF ENAMEL PAINT & BRUSHES
- * MAP OF ROOM SHOWING DOORS, TABLES, AND OTHER MAJOR FEATURES
- * BLENDER
- * VEGETABLE OIL, HONEY, AND SALT (OPTIONAL)

- * CELERY STICKS, CRACKERS, APPLE SLICES
- * PLASTIC KNIVES
- * ROCK AND MINERAL SAMPLES AND ASSOCIATED PRODUCTS
- * "FROM THE MINE TO MY HOME" POSTER (OPTIONAL: AVAILABLE FROM THE NATIONAL ENERGY FOUNDATION)

TEACHER'S NOTE: Before class, make the following preparations:

1. Paint spots of color on the unshelled peanuts using model paint or enamel. Use several colors, each of which can represent a different mineral. For example: Yellow = Gold, Blue = Silver, Green = Copper, Red = Iron, Black = Lead, White = Gypsum. For each color used, paint 25-30 peanuts.
2. Prepare a map of the room or location where this activity will be done. It should show major features like doors, windows, desks and tables, cabinets, etc. A simple drawing on 8 ½ by 11-inch graph paper should be sufficient. Provide copies for all students.

OR

- 2a. Have the students prepare their own maps of the items and features in the classroom. Provide graph paper for the map preparation. If you know the orientation of the room, place signs on the walls denoting NORTH, SOUTH, EAST, and WEST. Have the students orient their maps with NORTH at the top of the paper.
3. If you have them available, set out examples of various minerals and some of the products made from them.
4. Hide the peanuts in various locations around the room. You can group different colors together in the hiding places. (Several different minerals are often found together in nature.) Keep track of how many peanuts of each color are hidden.
5. Have the "FROM THE MINE TO MY HOME" poster available for the class recap discussion at the end of the activity.

INSTRUCTIONS:

1. Divide students into groups of 4 to 6. Identify each group by a color, for example: The Red table, the Yellow table.....**OR** have the students at each table give their group a colorful mine name like the BLUE QUARTZ MINE or the RED DEVIL MINE. (The colors selected should be the same as the colors used on the peanuts.)

MINING IN A NUTSHELL! CONTINUED

2. Give the students 5 minutes to look around the room and locate where their colored peanuts are hidden. Each student should take their map and a pencil around with them and plot on the maps where they find each peanut of their color. **(DO NOT REMOVE AT THIS TIME!)** Relate the peanuts to the rock and mineral samples (the rocks may contain useful minerals just as the whole peanuts contain the useful nuts within their shells). By locating the hiding places, the students have completed the **EXPLORATION** phase. Discuss various exploration methods shown on the poster.
3. Next, in 3-5 minutes, have the students find and remove only the peanuts of their assigned color, and return with them to their group tables. Have each student count the number of peanuts they found and record that number. Have each student plot the locations and numbers of peanuts found at each hiding place on their maps. This represents the **MINING** phase. Have the groups share their "mining" success. You can then tell them what the total number of peanuts of each color were hidden, Discuss various mining methods shown on the poster. (Prizes could be awarded to the most successful "mining" group.)
4. Have the students shell their peanuts. The peanuts and shells should be kept in separate piles at each table or placed on separate paper plates provided to each table. Shelling the peanuts represents one step of the **PROCESSING** phase.
5. Have one student from each group bring their shelled peanuts to the **MILL SITE**, which is a blender or food processor set up on a table or desk in the room. Add the shelled peanuts to blender or food processor, along with vegetable oil, honey, and salt (if desired). Blend or process the ingredients into peanut butter. This is the second step of the **PROCESSING** phase.
6. Using plastic knives, spread the peanut butter on celery, crackers, and apple slices. This is the **MANUFACTURING** phase. (You can also have the students make "ore carts" to hold their peanut butter. These are made of celery sticks with carrot slices for wheels and round toothpicks for the axles.)
7. Eat the above manufactured items. This is the **CONSUMPTION** phase and the part that students will like the most!
8. Brainstorm with the students on ways to use the waste peanut shells. This is the **RECYCLING** phase.
9. Use the poster "FROM THE MINE TO MY HOME" to recap the activity.

MINING IN A NUTSHELL! CONTINUED

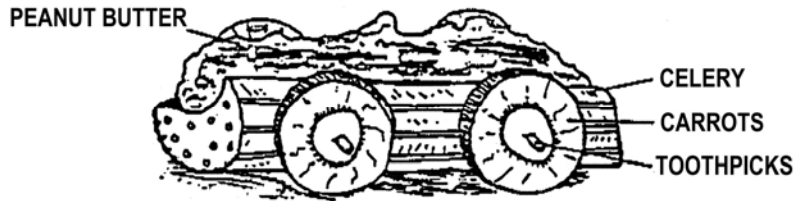
USES FOR PEANUT SHELLS

- * ROUGHAGE IN CATTLE FEED
- * POULTRY LITTER
- * PET LITTER
- * FILLER IN ARTIFICIAL FIREPLACE LOGS
- * CARRIER FOR AQUEOUS PESTICIDES AND FERTILIZERS
- * ABSORBENT FOR ORGANIC LIQUIDS
- * MUSHROOM-GROWING MEDIUM
- * MULCH
- * CARRIER FOR MOLASSES IN ANIMAL FEEDS
- * SEALANT IN OIL DRILLING MUDS
- * METAL POLISH
- * FLOOR-SWEEPING COMPOUND
- * CHARCOAL BRIQUETS AND ACTIVATED CARBON

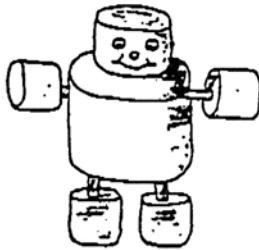
MINING IN A NUTSHELL! CONTINUED

Taste Tempters

- ▶ **Celery Carts** (also called Ore Boats or Ore Carts. See illustration).



- ▶ **Marshmallow Miners**
Fashion miners out of giant and miniature marshmallows and toothpicks as shown. Make hair out of shredded coconut (color with food coloring if desired). Use gumdrops for helmets and raisins, nuts or candies for decoration. Draw faces and clothes with a toothpick dipped in food coloring.



- ▶ **Open Pit Watermelon Mining**
Cut open a watermelon and use various utensils to approximate (imitate) various running machines - scoop out the watermelon and extract the juicy part (the ore) from the seeds.

