

MINING IN A NUTSHELL

(Lower grade level version)

STANDARDS

See summary of National Science Education Standards.

Original: <http://books.nap.edu/readingroom/books/nses/>

Standard concept	General Standard	Specific Standard	General Standard	Specific Standard	General Standard	Specific Standard
Grade Level		K-4		5-8		9-12
Science as inquiry (A)	Abilities ... to do ... inquiry	A.1.4.5	Abilities ... to do ... inquiry	A.1.8.4	Abilities ... to do ... inquiry	
				A.1.8.8		
	Understandings about ... inquiry	A.2.4.2	Understandings about ... inquiry	A.2.8.1	Understandings about ... inquiry	A.2.12.4
				A.2.8.3		
Earth and Space Science (D)	Properties of Earth materials	D.1.4.1				
Science and technology (E)	Understanding about science and technology	E.2.4.3				
	Distinguish between natural and human-made objects	E.3.4.1				
		E.3.4.2				
Science in ... Social Perspectives (F)	Types of resources	F.3.4.1	Science and technology in society	F.5.8.4	Natural resources	F.3.12.1
		F.3.4.2				
	Science and technology in local challenges	F.5.4.2				



MINING IN A NUTSHELL

(Lower grade level version)

INTRODUCTION

Minerals from the Earth are used for a wide variety of purposes. Gathering these minerals and their products is mining.

PURPOSE:

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

OBJECTIVE:

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

ITEMS REQUIRED:

- Roasted peanuts in Shell
- Enamel paint in assorted colors (yellow, blue, green, red, black, white)
- Small paint brushes
- Map of classroom
- Blender
- Vegetable oil and salt (Optional)
- Plastic knives
- Celery sticks, crackers, apples
- Rock and mineral samples
- Product examples for samples
- "From the Mine to My Home" Poster

TEACHER'S NOTE:

Before class, make the following preparations:

- 1) Paint spots of color on the unshelled peanuts using model or enamel paint. Use several colors; each will represent a different mineral.
 - a) Example: Yellow = Gold, Blue = Silver, Green = Copper, Red = Iron, Black = Lead, White = Gypsum.
 - b) For each color paint 25 to 30 peanuts.
- 2) Prepare a map of the room or location where you will be doing this activity.
 - a) It should show major features like doors, windows, desks, chairs, tables, cabinets, etc.
 - b) A simple drawing on an 8 1/2 by 11 inch paper should suffice.
 - c) Provide copies for each group.
- 3) Hide the peanuts in various locations around the room.



- a) You can group different colors together. (Several minerals are often found together in nature).
- b) Keep track of how many peanuts of each color are hidden.
 - i) You can locate and identify them on your master map.
- 4) Have the 'FROM THE MINE TO MY HOME" poster available for class discussion. (Available from National Energy Foundation, <https://www.shop.nef1.org/displayProductDocument.hg?productId=33>).

INSTRUCTIONS:

- 1) Divide students into groups of 4 to 6. Identify each group by a color, for example: a Red group, a Yellow group
- 2) Have the students look around the room to locate where peanuts colored with the color of the group are hidden.
 - a) One student from each group can be assigned to mark on their map where their colored peanuts are, and the number in each location.
 - i) **DO NOT REMOVE AT THIS TIME.**
 - ii) Relate the peanuts to the rock and mineral samples (the rocks may contain useful minerals, just like the whole peanut contains the useful nut within its shell.
 - b) By locating the hiding places, the students have completed the **EXPLORATION** phase.
 - i) Discuss various exploration methods shown on the poster.
- 3) In 3 to 5 minutes, have the students find and remove only the peanuts of their assigned color.
 - a) (You may choose to have one student from each color group do this and return the peanuts to their table or let each group go at one time.)
 - b) Once the group has their peanuts at their table they should count the number of peanuts they found and record that number on their map paper.
 - i) Does their count match the numbers on their map?
 - c) This represents the **MINING** phase.
 - i) Have the groups share their mining successes.
 - ii) Discuss various mining methods shown on the poster.
 - iii) Were they able to collect all of their colored peanuts in the time allotted?
- 4) Have the students shell their peanuts.
 - a) The peanuts and shells should be kept in separate piles at each table.
 - b) Shelling the peanuts represents one step of the **PROCESSING** phase.
 - c) Add all of the shelled peanuts to a blender(s), along with vegetable oil and salt (optional).
 - i) Turn on the blender so the ingredients become peanut butter. This is the second set of the **PROCESSING** phase.
- 5) Using plastic knives spread the peanut butter on the celery, crackers and apple slices.
 - a) This is the **MANUFACTURING** phase.
- 6) Eat the above manufactured items. This is the **CONSUMPTION** phase and the one enjoyed most by the students.
- 7) Brainstorm with the students on ways to use the waste peanut shells.



- a) This is the **RECYCLING/RECLAMATION** phase.
8) Use the poster “FROM THE MINE TO MY HOME” to recap the activity.

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 BRIQUETTES AND ACTIVATED CARBON

