

Title: Birdseed Mining

Essential Question: How do we extract minerals from the earth in an efficient and sustainable way?

Grade: 6-8, K-12 adaptable

Time: 15-30 minutes

Overview

Students will be introduced to the topic of mining by going “mining” for beads inside a container of birdseed. They will learn the basic process of mining, the value of different minerals, environmental considerations when mining, and why reclamation is important.

Assessment

Can students:

- Explain how minerals are extracted from the ground?
- Explain how we know where minerals are underground?
- Describe the process of reclamation?

Vocabulary

- Mining
- Reclamation
- Excavation
- Permitting
- Geology

Materials needed

- Plastic baggies or buckets with lids
- Birdseed mix
- multi-color beads
- optional “tools” for mining: spoon, tweezers, straws, etc.

What to do in advance

1. Prepare bags or buckets of birdseed and beads.
2. Gather mining tools if providing
3. Print copies of worksheet

Teaching

Gear up:

Give each student a bag of birdseed with the beads inside. Ask students to look inside the bag but **don't** open it. Do you see anything of value inside? If you do, what are some ways that you could get those things out?

Introduce mining, the complex process of extracting minerals or metals from the earth. Tell the students that only relatively small amounts of these valuable minerals are mined out of very large masses of rock or earth. Ask: if we are extracting from the earth, what do we want to make sure we do or do not do?

Explore:

Tell the students they will be playing the role of miners and trying to extract their valuable items out of the bag. Tell them it is going to be quick, that they will only have 1 minute to do so. But we will give them 5 minutes to think of a plan and gather necessary “tools”. Encourage them to grab something to put the things on (like a plate or bowl) that will represent their mill and they can gather equipment such as a spoon, tweezers, etc. (do not give them hints as to what to grab). Tell them that they cannot use their hands, and that anything that comes out of the bag must stay out of the bag.

Tell them that all the colored beads are minerals, some of them “have value”. Do not say any more than that before the mining begins. They will have some beads that are not worth anything. The value of the beads are as follows:

Gold/yellow beads – gold - \$60 a piece
Dark blue/black bead – coal - \$40 a piece
Orange beads – copper - \$30 a piece
Pink beads – cultural resource – **COST** \$50 a piece
Sunflowers – reclamation – **COST** \$10 a piece
All other seeds & beads – waste - \$0

Once students are ready, have a timer set for 1 minute (can do longer for younger students, but don’t make it too long!). When you say go, students start their mining process. They are trying to mine as many beads as possible and sort them according to color. When the time is up, have the students tally up their beads and how much they made on the worksheet. Tell them that the pink beads represent a cultural resource, which is something we don’t want mined out of the ground, so each cultural resource you dig up you must pay for. The sunflower seeds represent reclamation, meaning the cost to clean up the land when you are done. They will subtract that total from their profit to see how much money they made during their mining operation.

Generalize:

- What was hard about mining? What was easy?
- What tools would you have used if you had them available or could do it again?
- How do we know what minerals are underground and where to look for them?
- Do you think it is expensive to operate a mining project?
- Why is it important to be careful about the land that you mine on and around, and why do you think mining companies have to pay for reclamation?

Extensions:

- The birdseed and beads can be inside a closed bucket, to make the game more difficult. Students are to choose equipment without knowing what they are looking for. After one round, discuss with students why in real life, miners would have information about the mineral they are looking for and the area they are mining in. Play a second round in which students get the opportunity to change their tool and make a plan with their partner before the round starts.
- This can be used as an introductory activity to Mine a Pie.

Birdseed mining worksheet

Mineral/Metal ore recovered from Mine:

Type of bead and mineral/metal ore	Price	Value
Gold/yellow bead = GOLD Number of beads:	x \$60	= \$
Dark blue/black bead = COAL Number of beads:	x \$40	= \$
Orange bead = COPPER Number of beads:	x \$30	= \$

Mineral/Metal ore Calculations:

TOTAL value. **ADD** gold, coal, and copper values = _____

Number of **PINK** beads _____ x \$50 =

(Pink beads represent a cultural resource that must stay in the ground. Each one mined is a fine for you! Examples of a cultural resource are: burial grounds, artifacts, historic sites)

TOTAL value **MINUS** cultural resource fine = _____

Reclamation Cost:

Number of **SUNFLOWER** seeds _____ x \$10 = _____

SUBTRACT reclamation cost from total value after fines

GRAND TOTAL = _____