

Extracting Resources Guide

Learning objectives:

- understand why non-renewable resource extraction becomes more difficult over time
- graph data based on experiment

Engineering connection:

As resources around the world begin to diminish, engineers are always exploring sustainable ways to do more with less. In all designs, engineers consider the pros and cons of using renewable and non-renewable resources.

Objective:

The object of this experiment is to recover as many resources (beans) as possible during each “work day” while keeping the sand in the mine.

- Your work day will last for 30 seconds, and then you will “close” your mine by placing the paper over it.
- At the end of each day, you will count and record the amount of beans you extracted that day.
- You are only allowed to mine with two Q-tips used as chopsticks (or something comparable), grabbing one bean at a time.

Note: Before you begin, have someone else (perhaps an adult at home or your teacher) prepare the sand and bean mixture for you.

Thoroughly mix the beans and sand so that some beans are visible, but others are buried.

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Materials	Mining worksheet	
<p>You will need:</p> <ul style="list-style-type: none">• plastic bin or aluminum baking sheet (approx. 4-5 inches deep)• 4-5 cups of sand (or rice)• 1 cup of dried white beans (or a similar in size item)• 1 piece of scrap paper (same size or larger than bin area)• 2 paper towels• timer	Workday	Number of beans extracted
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

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Follow-up questions:

- How hard was it to extract the resources at first? What about towards the end?
- What does this tell you about mining natural resources?
- What happened to the sand in your bin? Did any spill over? What do you think this could symbolize in the real world?

Graphing

Graphing: Use the data in your table to graph the number of beans you recovered each day. You can create your graph digitally or in print.

Be sure to include:

- a title
- a y and x-axis label
- an appropriate scale on y-axis
- labelled workdays on x-axis
- accurate data points

What is the shape of your graph?

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