



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Cookie Mining

SUBJECT AREA: Science - Earth Science, Environmental Science.

GRADE LEVEL: Eleventh through twelfth.

DURATION: 45 minutes to an hour; staff will need 30 minutes to set up demonstration.

AUDIENCE SIZE: 25 to 30 students.

OVERVIEW: Students act as mining engineers and simulate ore mining production by using chocolate chip cookies. They focus on the cost-benefit analysis of the chocolate "ore" production throughout the simulation, helping them to understand the cost of production and the importance of environmental regulation through the mining process. As students "mine" with tools such as paperclips and toothpicks, they keep records of their costs, including the land (cookie), equipment used and time spent. A key component of the simulation focuses on Florida's environmental laws that outline proper closure requirements at the conclusion of mining operations, a process known as reclamation.

OBJECTIVES:

The student will:

- Compare and contrast renewable and non-renewable resources.
 - Describe ecological and economic impacts of natural resource extraction through mining.
 - Explore the concept of cost-benefit analysis by assessing the economic, social and environmental costs and benefits associated with mining.
 - Define reclamation and determine its importance at the closure of a mining operation.
 - Explain the value of regulatory policies associated with mining operations and identify a federal policy that requires reclamation.
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SUNSHINE STATE STANDARDS:

SC.912.L.17.11 - Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife and forests.

SC.912.L.17.12 - Discuss the political, social, and environmental consequences of sustainable use of land.

SC.912.L.17.13 - Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

SC.912.L.17.14 - Assess the need for adequate waste management strategies.

SC.912.L.17.16 - Discuss the large-scale environmental impacts resulting from human activity.

SC.912.L.17.20 - Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

SS.912.G.3.3 - Use geographic terms and tools to explain differing perspectives on the use of renewable and non-renewable resources in Florida, the United States, and the world.

MA.K12.MTR.7.1 - Apply mathematics to real-world contexts. Mathematicians who apply mathematics to real-world contexts:

- Connect mathematical concepts to everyday experiences.
- Use models and methods to understand, represent and solve problems.
- Perform investigations to gather data or determine if a method is appropriate.
- Redesign models and methods to improve accuracy or efficiency.

ADVANCED PLACEMENT COURSE CURRICULUM:

Topic 5.9 - Impacts of Mining - Describe natural resource extraction through mining.

Topic 5.9 - Impacts of Mining - Describe the ecological and economic impacts of natural resource extraction through mining.

Topic 6.1 - Renewable and Nonrenewable Resources - Identify differences between nonrenewable and renewable energy sources.

Science Practice 6 - Apply quantitative methods to address environmental concepts.

Science Practice 7 - Propose and justify solutions to environmental problems.