

## 35. Chocolate Chip Cookie Mine

**Classroom Activity:** Mine the chips out of chocolate chip cookies while destroying as little of the cookie as possible.

**Grade:** 4 and 5

**Strand(s):** Understanding Earth and Space Systems (Grades 4 and 5)

This task addresses the following grade 4 specific expectation:

- analyse the impact on society and the environment of extracting and refining rocks and minerals for human use, taking different perspectives into account.

This task addresses the following grade 5 overall expectations:

- analyse the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources;

and the following grade 5 specific expectations:

- analyse the long-term impacts on society and the environment of human uses of energy and natural resources, and suggest ways to reduce these impacts

### Assessment Categories:

- Knowledge and Understanding
- Application

**Type of Activity:** Classroom/Science Lab

**Preparation:** 2 hours

**Time needed to complete the task:** 60 minutes

### Materials and Resources for Teachers:

chocolate chip cookie  
tooth pick

### Materials and Resources for Students:

chocolate chip cookies  
toothpicks



### Activity Description:

Discuss human's use of the environment.

Discuss mining and mining engineering.

Students are given two chocolate chip cookies and toothpicks. They are asked to predict how many chips can be extracted from the environment - the cookie using the toothpick as mining equipment.

They are given 2 minutes to extract as many chips as possible using only a toothpick. The chips recovered are counted and compared to the number of predicted. Students examine the cookie and describe the impact of the "mining" and consider ways of lessening the damage.

Students "mine" the second cookie using methods to protect the cookie environment they learned from the first cookie. The number of chips mined are counted and compared to the number extracted from the first cookie. Most likely, students mined fewer chips from the second cookie.

Discuss how mining engineers must extract as much material as possible from the ground while limiting damage to the earth.

**Tips:** Use homemade cookies as the store-bought kind are too hard and crumbly.

## 35. Chocolate Chip Cookie Mine (continued)

**Classroom Activity:** Design and build a device that uses hydraulics and/or pneumatics to create moving parts.

**Grade:** 8

**Strand (s):** Understanding Matters and Energy

This task addresses the following grade 8 overall expectations:

- analyse how the properties of fluids are used in various technologies, and assess the impact of these technologies on society and the environment;
- investigate the properties of fluids;
- demonstrate an understanding of the properties and uses of fluids.

and the following specific expectations:

- assess the social, economic, and environmental impacts of selected technologies that are based on the properties of fluids;
- follow established safety practices for using apparatus, tools, and materials;
- investigate applications of the principles of fluid mechanics;
- use technological problem-solving skills to design, build, and test devices that use pneumatic or hydraulic systems;
- use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- explain the difference between liquids and gases in terms of their compressibility and how their compressibility affects their usage;
- explain how forces are transferred in all directions in fluids (Pascal's law);
- compare the ways in which fluids are used and controlled in living things to the ways in which they are used and controlled in manufactured devices.

**Assessment Categories:**

- Knowledge and Understanding
- Thinking and Investigation
- Communication
- Application
- Teambuilding skills

**Type of Activity:** Classroom/Lab

**Preparation:**

Assemble materials

Time needed to complete the task: 5 hours (over several classes)