

SMASH LAB

Fluidized Sand

Teacher's Guide



Grade Level: 9–12

Curriculum Focus: Science

Running Time: 41 minutes

Program Description

A team of scientists speculate whether or not they will be able to stop a bank robber in his tracks. They hypothesize that they can do it through the use of sand fluidization. After days of preparation and lots of sand, they perform the test.

Learning Objectives

After viewing the program and participating in discussion, students will be able to:

- Describe how air pressure fluidizes sand;
 - Understand the importance of research before experimenting;
 - Know how other materials can become fluidized;
 - Identify how a control in an experiment is necessary to collect accurate data;
 - Explain how science experiments drive scientific progress.
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Classroom Connections

What is the difference between quicksand and fluidized sand?

Describe the other materials Nick and Deanne test for fluidization. How did each material compare to sand?

What are some reasons sand is a good material to use for this experiment?

How much air pressure is needed to make sand a fluid? How does the Smash Lab team get air to reach the sand pits?

The Smash Lab team uses fluidized sand to stop a bank robber. What are some other uses for fluidized sand?

Classroom Activities

Set up a sand experiment to determine sand's composition. Collect different samples of sand (for example, dry sand, wet sand, sand from a beach, sand from a sandbox, etc.) and spread it out over black paper. Students should use a microscope or magnifying glass to study it in-depth. Students should notice the different shapes, sizes, and colors of the sand particles. Students should come to the conclusion that each grain is different (for example, sand found in North America is mostly quartz. Pink grains usually get their color from tiny bits of coral and other animals. Jewel colored grains are usually bits of broken glass that has been smoothed by the sand and waves, etc.) Finally, students should drizzle vinegar on the grains of sand. If any grains give off bubbles, they were once part of a living creature.

Target Vocabulary*

fluidization - to cause to flow like a fluid

gravity - the gravitational attraction of the mass of the earth, the moon, or a planet for bodies at or near its surface

pressure - the application of force to something by something else in direct contact with it

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Academic Standards

National Academy of Sciences

The National Academy of Sciences provides guidelines for teaching science in grades K-12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.

This lesson plan addresses the following national standards:

- Physical science
- Science as inquiry
- Science and technology
- Science in personal and social perspectives