SMASH LAB
Fireproof House
Teacher's Guide

Grade Level: 9–12 **Curriculum Focus:** Science **Running Time:** 41 minutes

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Program Description

A team of engineers hypothesize that a substance called aerogel will be able to protect a house from fire. The only problem is devising a plan to cover an entire house with this grainy material. A quilt is designed out of fireproof material and hoisted up using a hydraulic system. The plan is tested as a team of firemen watch.

Learning Objectives

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

- Describe how aerogel and carbon x are fire resistant;
- Understand the importance of research before experimenting;
- Know how infrared radiation poses as a threat during fires;
- Identify how a control in an experiment is necessary to collect accurate data;
- Explain how science experiments drive scientific progress.

Classroom Connections

The Smash Lab team wants to use aerogel to protect a home from fire. What is aerogel? Describe its characteristics.

What is carbon x? How is it flame retardant?

What were some of the concerns of making the experiment on a large scale? How does the Smash Lab team remedy these concerns?

Explain how infrared radiation and radiant heat differ. Which poses as a greater threat during a fire?

How does the Smash Lab team deploy the fireproof hood over the house?

Classroom Activities

People who live in areas that are prone to natural disasters like wildfires, floods, earthquakes, and hurricanes are often criticized for choosing a dangerous location in which to reside. Students should map areas in the United States that are prone to natural disasters. Students should explore reasons why people would live there. What are some precautions residents can take when living there? Students should research insurance options as well as home designs.

Target Vocabulary*

armature - an organ or structure for offense or defense

infrared - situated outside the visible spectrum at its red end; radiation having a wavelength between about 700 nanometers and 1 millimeter

radiant heat - heat transmitted by radiation as contrasted with that transmitted by conduction or convection

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