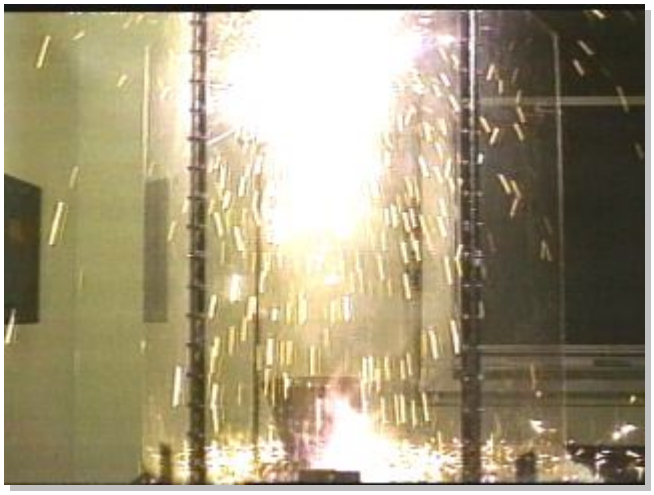

# #9660

## METALS 2

LANDMARK MEDIA, 2001
Grade Levels: 10-12
14 minutes

### DESCRIPTION

Shows the combustion of magnesium, a thermite reaction to form iron, and the chemical reactions of sodium and potassium with water.

### ACADEMIC STANDARDS

**Subject Area: Science – Physical Sciences**

★ Standard: Understands the structure and properties of matter

- Benchmark: Knows that substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties (See Instructional Goals #1, 2, 3, and 4.)
- Benchmark: Knows factors that influence reaction rates (e.g., types of substances involved, temperature, concentration of reactant molecules, amount of contact between reactant molecules) (See Instructional Goals #1, 2, and 3.)
- Benchmark: Knows that many elements can be grouped according to similar properties (e.g., highly reactive metals, less-reactive metals, highly reactive nonmetals, almost completely nonreactive gases) (See Instructional Goal #2.)

### INSTRUCTIONAL GOALS

1. To demonstrate the violent reactivity of sodium and potassium in water.
2. To point out that hydroxides are formed when sodium and potassium react with water.
3. To show that magnesium burns brightly in a flame to form magnesium oxide.
4. To demonstrate how iron can be extracted from an oxide ore by the thermite process.

### VOCABULARY

1. alkaline
2. aluminum
3. barium peroxide
4. indicator
5. iron (III) oxide
6. magnesium
7. magnesium hydroxide
8. magnesium oxide
9. phenolphthalein
10. potassium
11. reaction vessel
12. reactivity
13. reducing agent
14. sodium
15. sodium hydroxide
16. thermite reaction


**Captioned Media Program**
**VOICE** (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **EMAIL** info@cfv.org **WEB** www.cfv.org
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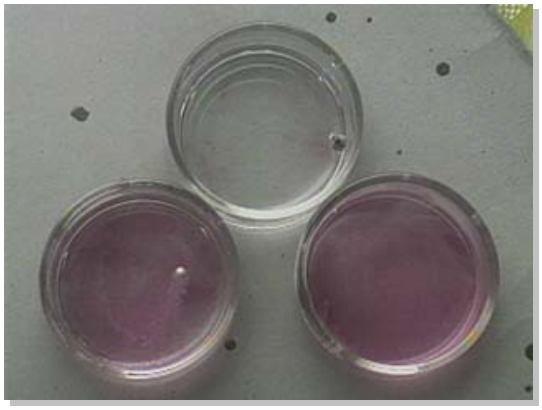
## BEFORE SHOWING



1. Review oxidation-reduction reactions.
2. List some general properties of metals.
3. Show some examples of indicators and determine their colors in acidic and basic solutions.
4. Place strips of zinc, copper, and iron in a beaker of water. Observe the results. Explain that the video will show that some metals do react with water.
5. Explain that some metals are found free in nature and others are found in ores. The video will show how one metal can be extracted from its ore.

## DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause at the scene showing the close-up view of a piece of sodium. Note the brown coating around the metal. Discuss its purpose.
3. Pause at the scene showing the piece of sodium reacting with the water.
   a. What would happen if the knife used to cut the sodium was wet?
   b. Why did the piece of sodium become shaped like a tiny ball when it reacted with the water?
4. Pause at the section showing the reaction of potassium with water. Compare the movement of the potassium on the water with that of sodium.
5. Pause at the section that shows the magnesium glowing brightly in the flame. What would be a practical use of magnesium because of this property?
6. Pause at the scene showing the indicator becoming red in the magnesium hydroxide. What is this indicator?
7. Pause at the scene showing the reaction vessel before the fuse is ignited. Review the location of each chemical before the reaction begins.

## AFTER SHOWING

### ► Discussion Items and Questions

1. How are sodium and potassium like other metals (iron, copper, and zinc)? How are they different?
2. Why was phenolphthalein used in the experiment?
3. Why do sodium and potassium occur in nature only in compounds?
4. When magnesium burns brightly in a flame, what compound is formed? When this compound is placed in water, what happens?
5. What is the purpose of each chemical in the thermite reaction? What temperature will this reaction reach?

### ► Applications and Activities

1. Research and report on the precautions that must be taken when storing and handling sodium and potassium. Create a lab safety list for these two metals.
2. Sodium and potassium are members of the alkali metal group. Research and list names and properties of other members of this group.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3. Carefully burn a strip of magnesium ribbon in a flame and test the solution with other indicators such as litmus, bromothymol blue, and methyl orange.
4. Obtain a pH meter and demonstrate how it is used to detect acidic and basic solutions.
5. Research the history of the flashbulb. Include information about using magnesium ribbon in the bulbs and some of its drawbacks.
6. Research practical uses of the alkaline solutions of sodium, potassium, and magnesium.
7. Report on the field of pyrotechnics and the chemicals used to make fireworks and other special effects.
8. The thermite reaction can reach temperatures around 3000°C. Change this Celsius reading to Fahrenheit using the correct formula.
9. Report on the uses of thermite.
10. Research methods used to extract iron from its ores.

## RELATED RESOURCES

- Electrolysis & Corrosion #9655
- Metals 1 #9659
- Organic Acids #9663
- The Reactivity of Elements #8878


### World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

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- **CHEMISTRY COMES ALIVE!**

http://jchemed.chem.wisc.edu/JCESoft/CCA/CCA3/MAIN/THERMIT/PAGE1.HTM
Describes and illustrates a thermite reaction.

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- **THE ALKALI METALS**

http://www.chemtopics.com/elements/alkali/alkalif.htm

Contains brief profiles and pictures of the alkali metals.

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- **PHOTOFLASH BULBS**

http://www.darklightimagery.net/flashbulbs.html

Traces the history of the development of the flashbulb. Includes a section on the use of magnesium.


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