#9656

FLAME IN THE CHEMISTRY LAB

LANDMARK MEDIA, 2001
Grade Levels: 10-13+
12 minutes

DESCRIPTION

Tests the heat zones of a Bunsen burner and shows some elements' coloration when placed in the flame. Notes that chemistry is everywhere, in both natural and man-made components.

ACADEMIC STANDARDS

Subject Area: Science – Nature of Science

★ Standard: Understands the nature of scientific inquiry

- Benchmark: Uses appropriate tools and simple equipment (e.g., thermometers, magnifiers, microscopes, calculators, graduated cylinders) to gather scientific data and extend the senses (See Instructional Goal #3.)
- Benchmark: Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing experimental procedures, examining evidence, identifying faulty reasoning, identifying statements that go beyond the evidence, suggesting alternative explanations) (See Instructional Goals #1 and 2.)

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 for form new substances (compounds) with different characteristic properties (See Instructional Goal #5.)
- 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 Goal #4.)
- Benchmark: Understands that chemical reactions either release or consume energy (e.g., some changes of atomic or molecular configuration require an input of energy; others release energy) (See Instructional Goal #5.)

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INSTRUCTIONAL GOALS

1. To define chemistry.
2. To point out that chemistry is found everywhere.
3. To list four important questions to answer about chemistry experiments.
4. To describe the flame of a Bunsen burner and point out the temperature variations in different parts of the flame.
5. To demonstrate that certain compounds give off characteristic colors when burned in a flame.

VOCABULARY

1. substances
2. chemical reaction
3. Bunsen burner
4. carbonize
5. platinum
6. lithium
7. sodium
8. potassium
9. calcium
10. barium

BEFORE SHOWING

1. Select five numbers between one and ten. List as many numbers as possible that can be derived from the five numbers. Point out that it is often possible to develop many items from a small list.
2. Display several common substances found in the home (hand lotion, shampoo, cleanser, soap, cologne, toothpaste). Explain their relevance to chemistry. List other substances that contain chemicals.
3. Discuss different methods of identifying solutions of unknown chemicals. List physical and chemical properties that could be used as a means of identification.

DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause at the scene showing the Bunsen burner flame. Point out the tip of the inner blue flame where the temperature is the hottest.
3. Pause at the scene that shows the small flame burning at the tip of the thin tube. Discuss why it is possible for gas from the lower part of the flame to still burn.

AFTER SHOWING

► Discussion Items and Questions

1. How many chemical elements are there?
2. What is meant by the statement, “Chemistry itself is neither good or bad. It is we humans who decide whether chemistry will be used for good or evil”?
3. What are some ways in which chemistry is useful? What are some ways in which it can be harmful?
4. What happens to energy during chemical reactions?
5. What four questions should be answered when doing chemical experiments?
6. What is used in a school lab to heat substances?

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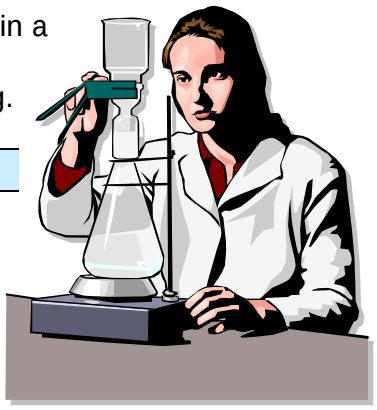
7. In which part of the flame did the paper carbonize the most? What is the approximate temperature of this part of the flame? Why is it important to know how the temperatures compare in different parts of a flame?
8. Is a flame always necessary for a chemical reaction to occur? What are some chemical reactions that can occur without a flame? (rusting of iron, rising of bread dough, souring of milk)
9. Why is a platinum wire specifically used for the flame test? (It is an inactive metal.)
10. What are the colors of the following metals in a flame?
    a. lithium
    b. sodium
    c. potassium
    d. calcium
    e. barium

► Applications and Activities

1. Research and list the chemicals that are found in the following:
    a. plants
    b. rocks
    c. air
    d. soil
    e. medicines
    f. cosmetics
    g. cleansers
2. Perform several basic chemical experiments in the laboratory. Answer the four questions mentioned in the video as they relate to the experiments.
3. Research the history of the invention of the Bunsen burner. Include other early apparatuses used in the lab to heat chemicals.
4. Research the temperatures in the lower, central, and upper part of the flame. Express them in both Celsius and Fahrenheit degrees.
5. Report on other metals that give off colors in the flame test. Describe what happens in the atom which leads to the formation of colors.
6. Place solutions of the chemical mentioned in the video in several test tubes. Label them as unknowns. Use the flame test to identify the solutions.
7. Draw a diagram of a firework shell and label the parts. Include the compounds that are responsible for the color of fireworks.
8. Display a package of special logs that give off colors when burned in a fireplace. Read the names of the chemicals used for this purpose.
9. Report on the use of sodium in making arc lamps for street lighting.



RELATED RESOURCES

- The Reactivity of Elements #8878

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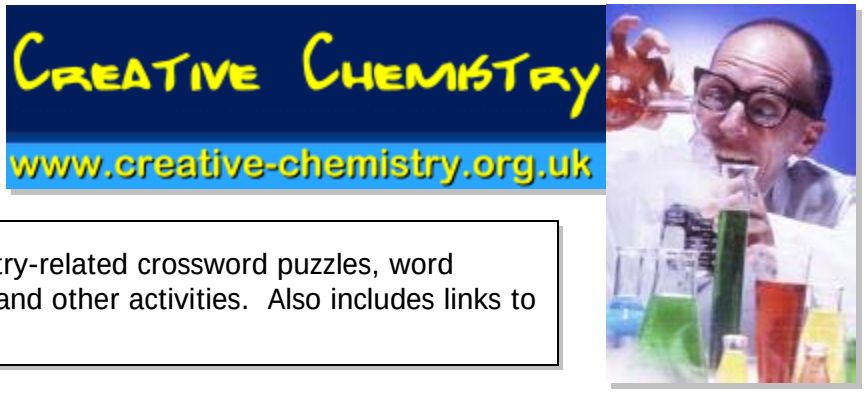
World Wide Web

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.

- **CREATIVE CHEMISTRY**



Has links that include chemistry-related crossword puzzles, word searches, Hangman puzzles, and other activities. Also includes links to flame test experiments.

http://www.creative-chemistry.org.uk/funstuff/index.htm

- **AN ASIDE ON THE BUNSEN BURNER**

http://dbhs.wvusd.k12.ca.us/Electrons/Bunsen-Burner.html

Explains the history of the development of the Bunsen burner.

- **HOW TO LIGHT AND ADJUST A BUNSEN BURNER**

http://ch185.semo.edu/labsafe/bunsen.html

Uses diagrams and verbal instructions to show how to light a Bunsen burner properly.

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