



# #9665

## SALTS

LANDMARK MEDIA, 2001

Grade Levels: 10-13+

16 minutes

### DESCRIPTION

Chemistry experiments with salts demonstrate the following: neutralization; neutral, alkaline, and acid solutions; preparing zinc sulfide and sodium chloride; and the formation of ammonium chloride.

### 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, 3, 4, and 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 Goals #1, 3, 4, and 5.)

### INSTRUCTIONAL GOALS

1. To demonstrate a neutralization reaction using hydrochloric acid and potassium hydroxide.
2. To point out the difference between neutral, alkaline, and acid solutions by using a universal indicator.
3. To demonstrate how the salt zinc sulfide is formed by igniting a mixture of zinc and sulfur.
4. To show how sodium chloride is formed by the reaction between sodium and chlorine gas.
5. To demonstrate the formation of the salt ammonium chloride through the reaction of ammonium hydroxide and hydrochloric acid.



### VOCABULARY

- |                       |                            |
|-----------------------|----------------------------|
| 1. alkali             | 8. porcelain dish          |
| 2. ammonia            | 9. potassium chloride      |
| 3. ammonium hydroxide | 10. potassium hydroxide    |
| 4. burette            | 11. potassium permanganate |
| 5. hydrochloric acid  | 12. sodium hydroxide       |
| 6. neutralization     | 13. titration flask        |
| 7. pellets            | 14. universal indicator    |

## BEFORE SHOWING

1. Display samples of various kinds of salts: table salt, salt used for melting ice, smelling salts, Epsom salt, bath salts, and garlic salt. Discuss both the general and the specific use of the term "salt".
2. List acids and bases found in common substances. Discuss the relative strength of each.

## DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause at the section showing the reaction between hydrochloric acid and pellets of potassium hydroxide. What are the advantages of using pellets versus crystals, flakes, or sticks in an experiment?
3. Pause at the section showing potassium chloride settling to the bottom of the test tube. Explain that one way of grouping or identifying salts is by their solubility in water.
4. Pause at the section showing the color changes of the universal indicator in the titration flask. Could the other indicators such as litmus and phenolphthalein be used as well? Why or why not?
5. Pause at the slow motion viewing of the reaction of zinc with sulfur. Should the bottles containing zinc and sulfur be left nearby while the mixture is heated?
6. Pause at the section showing the bottle containing sodium. Why must sodium be stored in oil?
7. Pause at the section where the presence of ammonia is proven by use of indicator paper. By what other means could the presence of ammonia be detected?
8. Pause at the section showing the ammonia reacting with the hydrochloric acid. Why is the ammonia able to reach the acid at the bottom of the container?

## AFTER SHOWING

### ► Discussion Items and Questions

1. What two chemicals are used in the video to produce the salt potassium chloride?
2. What is the reaction between an acid and a base called?
3. What color is the universal indicator in a neutral solution? In an alkaline solution? In an acidic solution?
4. In what other way may salts be formed?
5. Sulfur is yellow and zinc is gray. What color is the compound zinc sulfide?
6. What two chemicals are used to form chlorine in the experiment? Where does the excess chlorine gas go? What must be done before the sodium will react with chlorine?
7. What two chemicals are used in the video to form the salt ammonium hydroxide? Where do the two reactants come in contact with each other?

### ► Applications and Activities

1. Research the kinds of salts found in sea water and list their percentages.
2. Report on the high salinity of the Dead Sea in Israel and the Great Salt Lake in Utah.
3. Make a chart of salts and their uses. The following salts may be included: ammonium chloride, sodium bicarbonate, magnesium sulfate, silver bromide, and potassium nitrate.
4. Create a slide presentation on neutralization. Include the following:
  - a. definitions of acids, bases, and salts
  - b. explanation of the procedure

- c. pictures of reactants used
- d. sequential pictures of the reaction itself
- e. chemical equations describing the reaction
5. Research and report on practical applications of the neutralization process. The following may be included:
  - a. antacids
  - b. controlling soil acidity
  - c. laboratory safety (an acid spill is neutralized by pouring a base on it)
  - d. acid-base reactions in photography
6. Research other indicators that are used in titration experiments.
  - a. Include the criteria that are used to determine which indicator to use.
  - b. Make a chart of the colors of the indicators in acidic, alkaline, and neutral solutions.
7. Research the meaning of pH. Make a table showing pH values from 1 to 14 and list common examples of acids and bases that have those pH values. Note that substances with a pH value of 7 are considered neutral.
8. Demonstrate the use of an electronic pH meter for titration experiments.

## RELATED RESOURCES



- [Electrolysis & Corrosion #9655](#)
- [Metals 1 #9659](#)
- [Metals 2 #9660](#)
- [Organic Acids #9663](#)



### 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.

### LINKS TO CHEMISTRY EXPERIMENTS, DEMONSTRATIONS

[http://www.chemistrycoach.com/Links%20to%20chemistry\\_experiments.htm](http://www.chemistrycoach.com/Links%20to%20chemistry_experiments.htm)

Has a long list of sites that contain lectures, demonstrations, and experiments related to topics in chemistry. Includes experiments on acids, bases, and titration.

### SALTS

<http://www.sciencebyjones.com/salts.htm>

Defines and lists properties of salts. Includes information about salts in seawater, uses of salts, and preparation of salts.

**Journey into Science**