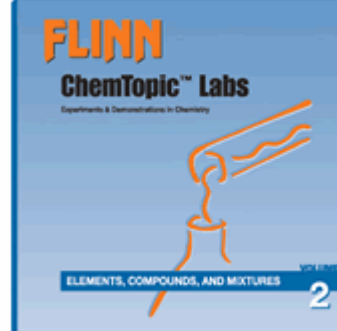


Elements, Compounds and Mixtures— Experiment Summaries and Concepts



Properties of Elements—Metals, Nonmetals, and Metalloids

All known elements may be classified as metals, nonmetals or metalloids based on similarities and differences in their physical and chemical properties. What properties distinguish metals from nonmetals? What properties of metalloids make them similar to both metals and nonmetals? The purpose of this microscale experiment is to investigate the physical and chemical properties of eight elements, sort the elements into groups, and classify them as metals, nonmetals or metalloids.



Percent Water in a Hydrate—Identification of an Unknown

Compounds that contain water molecules as part of their crystal structure are called hydrates. Are hydrates pure substances, or are they simply “wet salts,” that is, mixtures containing variable amounts of water? Use this simple analytical experiment to teach the law of definite proportions. Students analyze the percent water in a crystalline hydrate and identify the hydrate by comparison with the percent water calculated for a series of possible unknowns.

Paper Chromatography—Separation of Ink Pigments

The word chromatography is derived from two Greek words meaning “color writing.” The meaning of the word seems especially appropriate for this experiment—the results are literally “written in color” when different inks are analyzed by paper chromatography. Students will have a lot of fun as they discover the many ways pigments can be combined to make black ink. Use this classic activity to teach students about the characteristics of mixtures and pure substances.

Chromatography Challenge—Science, Inquiry, and Art

The challenge in this inquiry-based chromatography activity is to discover the color patterns produced by radial chromatography of different inks and to reproduce an original “art chromatogram” created by the teacher. What inks were used and how were they spotted onto the chromatogram? Students develop critical thinking and problem solving skills as they use logic and reasoning to answer these questions. See the inside back cover for color photos of the art of radial chromatography!



Separating a Mixture by Filtration—Physical and Chemical Changes

How are the properties and composition of a mixture affected by physical and chemical changes? The purpose of this experiment is to separate a mixture of charcoal and salicylic acid and to determine the percent composition of each component in the mixture. The experiment uses a dual approach, combining chemical reactivity and physical separation techniques.

Concepts

- Elements
- Physical and chemical properties
- Metals vs. nonmetals
- Metalloids

- Compound vs. mixture
- Law of definite proportions
- Hydrate
- Chemical formula

- Mixture vs. pure substance
- Separation of a mixture
- Chromatography
- Adsorption

- Compound vs. mixture
- Physical properties
- Paper chromatography
- Separation of a mixture

- Mixture vs. pure substance
- Homogeneous vs. heterogeneous
- Physical and chemical changes
- Filtration