

Chemistry of Organic Compounds— Experiment Summaries and Concepts



Models of Organic Compounds—Guided Inquiry

There are more than nine million organic compounds! What makes all these compounds different? Introduce the basic structural theory of organic chemistry by building molecules from the ground up using models. Students will actually use the reasoning skills of the scientific method as they follow this guided-inquiry activity to draw structural formulas of organic molecules, determine the general formulas of different classes of compounds, and develop the concept of isomers. Lecture is no substitute for holding models in your hands, rotating them and turning them upside down, or taking them apart and putting them together again a different way!



Making Soap—The Oldest Organic Reaction

Soap-making is an ancient craft and one of the oldest known chemical reactions involving organic compounds. It is also one of the best ways to show students what chemists really do. Chemists don't just mix chemicals to make new chemicals—they use chemicals to make things that people use every day! All students, no matter how laid-back or jaded, will be amazed and proud when they hold up a bar of soap they made themselves in the lab!

Preparation of Esters—Nature's Flavors and Fragrances

What do you taste when you bite into an apple or a banana? The first “taste” of any food is actually the aroma or fragrance of volatile organic compounds. In the case of fruits, the “organic” flavor is due to esters. Learn about the structure, preparation, and properties of esters with this great cooperative class project. With five alcohols and four carboxylic acids to choose from, the entire class can synthesize a wide variety of common esters that are used as fragrance and flavor additives. Discover why organic chemistry makes good “scents”!

Synthesis of Aspirin—From Natural Products to Painkillers

Aspirin, first synthesized in 1897, is one of the oldest yet most common drugs in use today. This one-time “wonder drug” is routinely prescribed today to prevent heart attacks and strokes, especially among the elderly. Students trace the path of discovery for aspirin from a natural folk remedy that was used for thousands of years to the first modern synthetic designer drug! The purpose of this experiment is to prepare aspirin (acetylsalicylic acid), determine its purity, and investigate its chemical properties.

Steam Distillation of Cinnamon—Cinnamaldehyde and Oil of Cinnamon

Looking for a way to introduce students to organic chemistry? Take them back to the roots of the science—the study of natural products. Steam distillation is the most common method for isolating essential oils, natural products that have been used since ancient times as perfumes, flavorings, and even medicines. Students obtain oil of cinnamon from cinnamon bark by steam distillation and observe the properties of cinnamaldehyde, the main chemical ingredient in oil of cinnamon. Discover the prized essence of a valuable spice!

- Covalent bonding
- Sigma and pi bonds
- Single, double, and triple bonds
- Isomerism

- Soaps and soap-making
- Triglycerides
- Saponification
- Surfactants

- Ester functional group
- Carboxylic acids and alcohols
- Esterification reaction
- Equilibrium

- History of aspirin
- Salicylic acid derivatives
- Esters and esterification
- Excess and limiting reagents

- Essential oil
- Steam distillation
- Solvent extraction
- Aldehyde functional group