Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2020 Volume II: Chemistry of Food and Cooking

Introduction to Chemistry of Food and Cooking

Guide for Curriculum Unit 20.02.03
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The process of cooking, baking, and preparing food is essentially an applied science. It changes the chemical and physical nature of the food, during which molecules in ingredients react to form new compounds and/or change in physical states, bringing new textures and flavors. This unit will inform high school students about some fundamental concepts in an important area of science - food chemistry. The students will review differences between chemical compounds and mixtures (solutions, suspensions, colloids, and emulsions). They will learn about common chemical reactions (e.g., Maillard reaction), and physical changes (e.g., emulsification) in food processing. They will then focus on organic chemistry by studying various functional groups, such as alcohol, aldehyde, ketone, carboxylic acid, etc. They will examine these functional groups in molecules that are commonly found in food, including carbohydrates, proteins, and fats. This unit is for high school Chemistry and Physical Science classes. It requires about 12 class periods in roughly 2.5 weeks. The goal is to strengthen students' knowledge in organic and general chemistry to prepare them for college biochemistry, general chemistry, and organic chemistry classes. The unit can be used also for middle-school 7th- and 8th-grader as an introduction to physical and chemical processes.

(Developed for Chemistry, grade 10; recommended for Chemistry, grade 10, and AP Chemistry, grade 11)