



Introduction

by Gary W. Brudvig, Professor of Chemistry and of Molecular Biophysics and Biochemistry

Do you want to teach science that is relevant to everyday experiences? Look no further than your kitchen. We all are familiar with cooking. Yet, most people do not realize that cooking is chemistry. The aim for this seminar was to discuss the science related to cooking. Cooking offers a wealth of hands-on activities and opportunities to learn about chemistry. In this seminar, we explored questions such as: Why does baked bread smell so good? Why do egg whites become opaque when cooked? What makes bread rise? Why don't oil and vinegar mix? Why are jalapeño peppers hot? and What makes popcorn pop? Learning about the Chemistry of Cooking is a great way to make science relevant to the everyday lives of our students.

My own interest in science stems from my hands-on experiences as a child. Therefore, many cooking activities and demonstrations were included in this seminar – at least one hands-on activity, and frequently several, in each seminar meeting. These cooking activities were chosen so that they could actively involve the students and at the same time illustrate the scientific principles related to cooking.

The book by Robert Wolke entitled “What Einstein Told his Cook” was used as the primary reading for the seminar. The seminar began during our two meetings in May with a discussion of how the perception of flavor is a combination of taste and smell. To illustrate this, the Fellows in the seminar paired up to experiment with the perception of flavor when taste and smell are presented separately. During our meetings in July, each Fellow prepared a cooking activity. These included making pancakes, making Navajo fried bread, making cupcakes, making cornbread, making honeycomb candy, making mayonnaise, making salsa, making caramel apples, popping corn, analyzing the tarnishing of spoons from the acid in ketchup, analyzing bacterial contamination, and extracting the fat from chocolate. These demonstrations provided opportunities to delve into chemistry and provoked lively discussions. A highlight of the seminar was the guest presentation by Professor Elsa Yan who teaches a course at Yale on the “Chemistry of Cooking” in which we learned about the temperature required for browning of chicken and how to make frozen ice cream balls using liquid nitrogen. We all enjoyed sampling the results of the cooking activities.

The curriculum units developed from this seminar are suitable for elementary to middle school to high school students. In all of the units, the science content is integrated with language arts, mathematics and social studies to provide a balanced program that meets the literacy requirements of the school system. The Fellows have prepared extensive lists of materials that can be used in the classroom or as resources. These materials include books that the students can read, textbooks that the teachers can use, demonstration sourcebooks, suppliers of equipment and many addresses of sites on the world wide web. All of the Fellows developed units around a theme or activity related to cooking. Information on the math and science principles related to the cooking activities, as well as connections to the everyday lives of students, is provided in the curriculum units.

The units include many excellent cooking activities that will engage the students' interest and teach them about math and science.

I would encourage all teachers of elementary through high school students to review these curriculum units. These materials provide a valuable resource for incorporating topics of science and society related to the "Chemistry of Cooking" into the classroom.

Gary W. Brudvig

<https://teachers.yale.edu>

©2023 by the Yale-New Haven Teachers Institute, Yale University, All Rights Reserved. Yale National Initiative®, Yale-New Haven Teachers Institute®, On Common Ground®, and League of Teachers Institutes® are registered trademarks of Yale University.

For terms of use visit https://teachers.yale.edu/terms_of_use