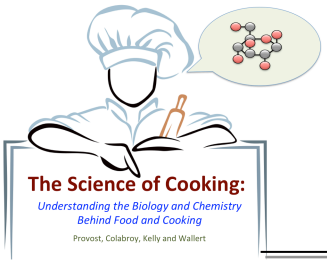


Course Learning Objectives and Content

Overview: The Science of Cooking: Understanding the Biology and Chemistry Behind Food and Cooking aims to serve science instructors and students through a topic that is approachable and relevant to everyone. Through the topic of food and cooking, fundamental principles of biology and chemistry can be taught to and learned by a broad population of undergraduate students. While this textbook is targeted for non-science majors, it can also serve as a resource for a topics course for majors in biology, biochemistry or chemistry programs.

Course Learning Objectives: The overall course learning objective for The Science of Cooking: Understanding the Biology and Chemistry Behind Food and Cooking is to enhance student understanding of fundamental scientific principles of biology and chemistry as well as the science of food and cooking. Students will learn and use methods of scientific discovery / inquiry, as well as disciplinary methods of chemistry, biology, and physics, to better understand the molecular basis of and importance of science in food, nutrition and cooking.

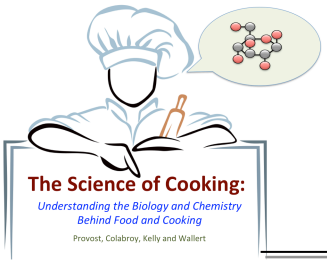
The student learning objectives for the course are:

- To understand basic scientific principles and process in the context of learning biological and chemical content
- To develop knowledge and practice in how science is conducted
- To critically think about science related concepts and their applications
- To identify and use scientific theory and concepts to evaluate claims about the natural world.
- To effectively communicate about scientific concepts and problems with peers
- To critically evaluate the scientific literature and the current state of science

Laboratory Learning Objectives: The laboratory component of a course that utilizes The Science of Cooking: Understanding the Biology and Chemistry Behind Food and Cooking will support student learning using guided inquiry and a self-designed scientific approach. Students will gain a deeper knowledge of the biology and chemistry concepts by practicing and applying their understanding of scientific concepts toward experiments that center upon food and cooking.

The student learning objectives for the laboratory are:

- To generate scientific knowledge by examining solutions to a problem.
- To calculate and apply rules of conversion and other dimensional analyses
- To manipulate and analyze observable facts and numerical data to arrive at an evidence-based conclusion
- To use experimental results to explain basic scientific concepts and theories of biology and chemistry.
- To design and conduct an investigation based in the scientific method



Course Learning Objectives and Content

Course Content: The Science of Cooking: Understanding the Biology and Chemistry Behind Food and Cooking will expose students to many fundamental elements of biology and chemistry, including evolution and genetics (e.g. genetic evolution of lactose intolerance and SNP changes in those who think that cilantro tastes like soap) to introductory chemical reactions (e.g. the amadori rearrangement involved in the Malliard reaction). These concepts are taught via text content, laboratory exercises, and guided inquiry activities.

Overview of Scientific Concepts: Students engaged in a course that utilizes The Science of Cooking: Understanding the Biology and Chemistry Behind Food and Cooking will gain introductory knowledge of biology and chemistry concepts that are relevant in their lives and practice in critical thinking about the scientific world around them. These specific biology and chemistry concepts that are covered in the text are listed below.

Biology

Cell theory, prokaryotic and eukaryotic cells, cell membrane and lipid biology, evolution, genetic flow and impact, protein structure function, enzyme function and simple kinetics, mutations and their effects on protein function, cellular respiration and metabolism, carbohydrate structure and function, lipid structure and function, photosynthesis, microbiology, yeast and bacterial biology, cell signaling, cellular physiology, nervous and taste transmission, energetics, energy transfer, ATP, defense against disease and plant ecology.

Chemistry

Atomic theory, molecular structure, covalent and non-covalent bonding, hydrogen bonding, matter and energy conversion, chemical periodicity, chemical nomenclature, chemical reactivity and thermodynamics, functional groups, acid base chemistry, chemical transformations, changes of matter, the basics of organic reactions, enzyme structure function and kinetics, electronic configuration, nuclear chemistry, equilibrium, redox reactions, biochemistry of macromolecules, protein structure and function, lipid and carbohydrate chemistry, hydrophobic interactions, thermodynamics of molecular interactions and reactivity, energy transformation, metabolism, chemical formulas