



Yale-New Haven
Teachers Institute®

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

The Physics of Cooking: How Energy Conservation and Thermodynamics Can Improve the Lives of Millions

Guide for Curriculum Unit 20.02.02

by Nicholas Farrell

Food is an important part of our lives, yet there is a lack of understanding around the energy contained in food and how to properly prepare it. With the adult obesity rate above 42% in the United States and approximately 48 million cases of food poisoning each year, there is an apparent need for education around our eating and cooking practices. The application of physics can help solve these problems and the focus on food can make physics topics more engaging for students. This unit is designed for 11th and 12th grade physics students as a culminating activity for the topics of energy and thermodynamics. Prerequisite knowledge for this unit includes vectors, forces, work, energy, kinetic energy, and potential energy. Working in small groups, students must apply their knowledge of the topics listed above along with their newly acquired knowledge on thermodynamics to calculate the energy contained in a food sample, the amount of exercise to expend an equal amount of energy, and to experimentally determine the thermal diffusion constant of their food sample. Students will also be required to individually discuss the significance of their investigations and the limitations of their experiment in a concise, one-page summary paper.

(Developed for Science and Sustainability, grade 11; recommended for Physics, grade 12)

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