

## Using Food Science as a Thematic Unit

While rethinking the math and science program for my high school's ninth- and tenth-grade students, we found that the math, English, and social studies teachers had the same goal—to maximize learning in all subject areas. To help meet this goal, we decided to apply research and writing activities (all related to the same theme) across the disciplines of science, math, language arts, and history. We used food science as one of our thematic units.

Much like forensic science, food science is a subject area that only recently has found a place in middle and high school science curricula. Local and national news media have reported outbreaks of foodborne illnesses for well over a decade. As more and more reports connect *Escherichia coli* (*E. coli*) cases to fast-food restaurants and family barbecues, the public's level of awareness on this subject has increased. News investigations into a variety of pathogens, such as *Salmonella* and *Listeria*, as well as diseases such as Bovine Spongiform Encephalopathy (BSE) or "Mad Cow Disease," have further propelled food science into the mainstream.

### A coordinated effort

As already mentioned, my fellow teachers and I developed activities focused on food science for science, math, language arts, and history classes. For the science class, biology students studied bacteria and participated in food science activities such as cross-contamination labs and outbreak investigations, which came from the FDA/NSTA *Science and our Food Supply* program ([www.nsta.org/288](http://www.nsta.org/288)). We also scheduled

guest speakers, such as experts from our county and state Departments of Health, the United States Department of Agriculture (USDA), and the touring USDA Food Safety Mobile ([www.fsis.usda.gov/food\\_safety\\_education/food\\_safety\\_mobile/index.asp](http://www.fsis.usda.gov/food_safety_education/food_safety_mobile/index.asp)).

During the same period of time, the nonscience classes investigated related issues that were integrated through timeline research and writing projects (for a list of Internet sites that contain food science timelines, refer to "On the Web" at the end of this article; in addition, a complete food science timeline is available with the online version of this article at [www.nsta.org/high\\_school#journal](http://www.nsta.org/high_school#journal)).

The food science theme provided a focus for the math classes, where students conducted investigations using temperature conversions, measured heating and cooling rates, and calculated food's "Danger Zone" (the temperature range in which most bacteria can grow—usually between 4°C and 60°C). Math students also used data from our state Department of Health's "Annual Communicable Disease Report" ([www.doh.wa.gov/Notify/list.htm](http://www.doh.wa.gov/Notify/list.htm)) to create and interpret charts and graphs.

In language arts classes, students wrote essays related to scientific concepts and mathematical data from their other classes. English students wrote cause-and-effect papers related to outbreak investigations that were evaluated for style, mechanics, voice, format, and scientific content.

Perhaps the most successful integration came when we looked for

connections between the science of food safety and topics in the social studies and history curriculum. In no time at all, connections were almost jumping out at us. In the social studies classes, mock "Senate Hearings" on food safety allowed students to apply concepts they learned in science class. History students studied how in 1862, almost one year into the U.S. Civil War, President Abraham Lincoln signed into law a bill creating the Department of Agriculture (USDA). The department was part of his plan to abolish slavery through the construction of an alternative to the colonial plantation system. Students also read from *The Jungle*, Upton Sinclair's 1906 depiction of the unhealthy standards and unsanitary conditions in the Chicago meatpacking industry. The public's reactions of horror and outrage to the book's tales of atrocious working conditions and repulsive food adulteration helped President Theodore Roosevelt push for new legislation that eventually led to the passage of The Pure Food and Drug Act and The Meat Inspection Act.

### Making connections

These coordinated activities allowed students to develop a level of understanding far beyond simply studying food science in the science class alone. By focusing the entire curriculum on the theme of food science and safety, we used our time and resources more efficiently and students connected what they were learning in all subject areas. Our previously isolated courses had become coherent.

Student response to this integration has been collected for two years. Students have commented that dur-

ing the hearings on scientific issues they “felt like professionals,” and that peers and adults took their research seriously. As a result of this integration, student writings have increased in depth and length. Students also continue to ask for more opportunities to hold hearings in which they present their research.

*Darin S. Detwiler is a member of USDA's National Advisory Committee on Meat and Poultry Inspection and is Math and Science Department Head at BEST High School, 10903 Northeast 53<sup>rd</sup> Street, Kirkland, WA 98033; e-mail: ddetwiler@lwsd.org.*

## On the Web

USDA History Collection: [www.nal.usda.gov/speccoll/collect/history](http://www.nal.usda.gov/speccoll/collect/history)

USDA History of American Agriculture: [www.usda.gov/history2/front.htm](http://www.usda.gov/history2/front.htm)

FDA History Timeline: [www.fda.gov/oc/history/default.htm](http://www.fda.gov/oc/history/default.htm)

American Society for Microbiology: [www.microbeworld.org/html/aboutmicro/timeline/tmln\\_0.htm](http://www.microbeworld.org/html/aboutmicro/timeline/tmln_0.htm)

Centers for Disease Control and Prevention Epidemic Timeline: [www.cdc.gov/eis/about/timeline.htm](http://www.cdc.gov/eis/about/timeline.htm)

Timeline of Microbiology: [www.timelines.ws/subjects/Microbiology.HTML](http://www.timelines.ws/subjects/Microbiology.HTML)

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