

### Correction Alert!

Figure 1 in last month's column, a representation of prime numbers transmitted from a distant solar system, contained a mistake. Due to an editorial error, the number 1 was included as a prime number. Our apologies to the author.

## Fast-food fact finding

During the middle school years, students begin to broaden their basic understanding of health issues and learn about the risks and benefits associated with their dietary decisions. One of the goals of the Standards at this age level is to develop a scientific understanding of health. This activity takes advantage of your students' knowledge of popular culture and the Internet by examining a staple of most students' lives—fast food.<sup>1</sup>

### Fast-food frenzy

The increasing popularity of the World Wide Web has made accessible numerous consumer information sites. Nearly every major fast-food chain has established its own homepage (for example, [www.mcdonalds.com](http://www.mcdonalds.com), and [www.burgerking.com](http://www.burgerking.com)) providing information on menus, promotions, company history, and nutritional analysis of its food. Using this information, students can begin to compare and contrast the nutritional value of menu items from different restaurant chains.

Specific categories students can examine include total calories, calories from fat, total fat, cholesterol, sodium, carbohydrates, and dietary fiber. You may ask how a typical fast-food meal compares with the recommended daily allowances set by the FDA.<sup>2</sup> The allowances suggest that average men need around 2,700 calories per day and women need around 2,000 calories per day to maintain a desirable weight. Middle school students typically require more.

The American Heart Association suggests limiting fat intake to less than 30 percent of daily caloric intake: no more than 50–80 grams of total fat and 300 milligrams of cholesterol per day. Sodium intake should fall between 1,100–3,300 milligrams, or 1/2 to 1 1/2 teaspoons per day.

Good nutrition is extremely impor-

tant for middle school students because it is during these few years that they may acquire 15 percent of their adult height, 50 percent of their adult weight, and a large part of their maximum bone mass.<sup>3,4</sup> (This is based on an approximation of human development between the years of 13 and 15.) This project alerts students to the failure of many fast foods to meet the recommended dietary standards for fiber and other important nutrients while exceeding those for fat, sodium, and other unwanted elements.

### Spreadsheet savvy

Because "data handling is at the heart of science," spreadsheets can provide a valuable tool to extend student investigations.<sup>5</sup> You can create templates in advance that highlight aspects for comparing fast-food products (see Figure 1). Students could expand their investigation by including as many fast-food chains as possible (to provide an accurate overview of fast food).

After entering the initial data into a spreadsheet, students can add additional information and manipulate the data to study the relationships among different categories. For instance, an important concern with most fast food is the percentage of calories from fat. (See page 37 in the April 1998 issue of *Science Scope* for how to determine this value.) Students can simply enter the formula into a spreadsheet to calculate this percentage automatically.

Students can also make use of spreadsheet functions such as SUM (for the total calories of a meal) and AVERAGE (for the average amount of sodium in fast-food hamburgers). Graphing and plotting data can further enhance the students' understanding of the relationships among the data (see Figure 2). To spark ideas on what students can graph,

you can suggest investigating which chain makes the saltiest french fries or how the amount of fat relates to the calories in a burger.

After organizing the data collected, you might ask students higher-order thinking questions, such as Why are some burgers lower in fat than others? How might the way that this food is prepared affect these categories? Is a flame-broiled burger really better for you than a fried burger? What other categories for describing burgers can be added to the spreadsheet? How do condiments affect the burgers' nutritional content? and Which burgers give you more nutritional value for your money?

As students become more involved with exploring the Internet for raw data and company information, they may want to investigate related issues and sites. For instance, independent sites such as [www.Olen.com/food/book.html](http://www.Olen.com/food/book.html) provide consumers with quick nutritional facts on popular fast-food restaurants as well as healthier alternatives on fast-food menus. You may wish to prompt further student investigations by asking questions such as What was the first fast-food restaurant and when did it start? Why is fast food so popular in today's society? or How does the media affect our decisions on what and where we eat? This type of questioning gets students to ponder the relationships between technology, society, dietary decisions, and the risks and benefits that accompany a fast-paced lifestyle.

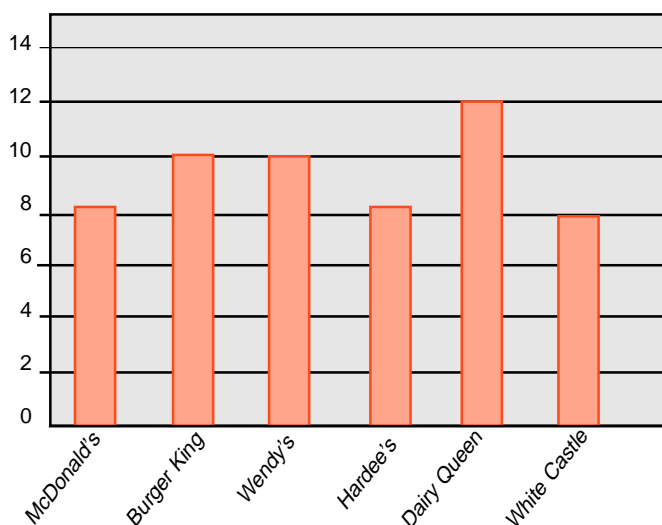
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**Figure 1. Fast food nutrition data for hamburgers**

Restaurant	Calories	Fat (g)	Cholesterol (mg)	Sodium (mg)
McDonald's	270	9	30	530
Burger King	260	10	30	500
Wendy's	270	10	30	560
Hardee's	260	9	20	460
Dairy Queen	290	12	45	630
White Castle	161	8	0	266

**Figure 2. Grams of fat in fast-food hamburgers**



### Fun food findings

This project integrates a number of research standards outlined in the *National Standards*.<sup>6</sup> For example, this in-depth analysis of fast food focuses on Life Science Standard C, regulation and behavior, and also emphasizes personal health, measurement, and the statistical analysis of data. Given a popular and familiar topic to explore, students will embrace the Internet and spreadsheet software as tools for learning. Integrating projects like this into the science curriculum allows students to make real-world connections between scientific data and their everyday lives.

### References

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3. Chicoye, L., M. Jacobsen, and G. Landry. 1997. "Getting Teens Fit and Well-Nourished: Shaping the Future." *Patient Care* 31(12): 72-74.
4. Sinclair, D. 1978. *Human growth after birth*. London: Oxford University Press.
5. Pogge, A. and V. Lunetta. 1987. "Spreadsheets Answer 'What If . . . ?'" *The Science Teacher* 54(November): 46-49.
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