You have probably heard this phrase before, haven’t you? How can knowledge give someone power? And how can knowledge about food science give someone power?

Food is one of the three common factors of human existence, which are food, shelter, and clothing.

If we have food, we have life. Without food, life does not continue. People who have worked to study food and how we can maintain a steady supply of it are food scientists. Each one of us is better off because of this knowledge. We are going to jump into discovering what kind of power this knowledge can give individuals.
What are some common uses for brown paper bags, like the one on your desk? (allow time for student responses).

It may surprise you to learn that brown paper bags can also be used to demonstrate principles of food science. Currently, the fruit inside your bag is releasing ethylene gas, and the bag traps these gases inside. Once trapped, these gases help ripen the fruit faster. The opposite occurs when you place fruit in the refrigerator. Cool temperatures slow down the production of ethylene gas, causing fruit to ripen more slowly.

The study of science has allowed us to know that ethylene gas is given off by a fruit and that this gas allows it to ripen. This is just one of many processes in nature that have been observed and studied by scientists. Also, this reminds us that everything we do involves chemicals. We are chemicals. The foods we eat are chemicals. Studying the chemicals needed by our body and the chemicals in food is the focus of study in food science.

Now you know that a brown paper bag is not just used for packing your lunch—it is a tool used in food science as well!
There are three main reasons to study food science. We are going to look at each one of these areas separately, but think about each of these phrases and questions.

Individual advantages—How does food science benefit individual people?

Improving the world—How can food science benefit the world? Can the food supply be increased?

Protect the environment—How can food science benefit the protection of the environment?

Think about these.
By studying food science, you gain necessary knowledge to help you make better food choices in your diet. What is it that makes our bodies healthy? Specific nutrients such as calcium, phosphorus, and iron are needed for the body to function normally. These three are all minerals and inorganic chemicals. Likewise, there are organic chemicals that are needed such as vitamins C, A, and E. These each have the element carbon in them, which makes them organic chemicals. A food scientist becomes very familiar with what chemicals are in the body and what foods provide chemicals that are needed.

You can also learn how to keep foods safe. Food safety is based on the study of microorganisms. A microbiologist studies living cells that cannot be seen with the naked eye. Some microorganisms can be beneficial to us, and some can be very harmful. Knowing pH levels, temperatures, water activity, and cell growth rates are all involved in having food protected from harmful microorganisms.

Food science also gives you a sense of confidence in the kitchen. You will learn about the gelatinization of starches, the coagulation of proteins, and the emulsification of fats. These concepts are key understandings in producing high-quality foods.

With the knowledge you will gain about food, you will feel confident in trying new recipes and exploring your hidden talents in the kitchen.
Lab: Comparing Food Labels

- **Time:** 15-20 Minutes
- **Objective:** Students will compare nutrition fact panels found on food labels.
- **Materials:**
  - Food labels
  - Handout: Comparing Food Labels
- **Directions:** Use the food labels to completely fill in the handout. Use your observations to answer the “Analyzing Results” questions.

You will be given two different food labels. Your task is to read the labels and fill in the worksheet that you’ve been given. Transfer the required information from each of the two labels. Then look at this information and compare the products. What have you learned? Are the two products identical? If not, how are they different?

To complete the analysis, you must ask yourself which is “healthier”? This is a term used loosely when it comes to life in general. What is your standard for choosing a healthy food? What makes a food healthy? Your use of this term is integrated into interpreting whether the food label helps you understand what a healthy food is. Think about this as you analyze the results!
Studying food science helps us influence and improve many worldwide situations.

Food scientists work every day to help reduce world hunger. They do this through biotechnology research and by teaching communities to make better use of their available resources. Food scientists work with other professionals in agriculture and nutrition. The solution to this problem requires work from all the sciences, as well as planners of government services to meet the demands of feeding the world.

Biodiversity creates new plants and animals with desirable traits. This keeps the world from relying on only a few sources for our food supply. Plants can be genetically modified to use less water or to be resistant to pests. Also, teaching people how to grow their own crops and raise livestock can individually work to reduce hunger.

By studying the science of food, scientists are able to provide food items to the public that are healthy and safe for consumption. Storage of food and food distribution are key issues that must be addressed to get food to places where there is not enough food.

Lastly, food scientists and food technologists have developed food products that are quicker and easier to prepare. These items are known as convenience foods, and they are very helpful to busy families. However, you have to ask, “Are they the best nutritionally for families?” This question is being answered by food scientists and registered dietitians all over the United States.
Food scientists conduct research to help us protect and preserve our environment.

Two commonly used environmentally safe techniques are sustainable farming and integrated pest management. Integrated pest management controls pests with nonchemical deterrents. Farmers use helpful insects that will keep harmful insects away from crops or control pests with plant modifications to be pest resistant.

Research has shown that planting foods that are acclimated to an area grow more efficiently than those that are not. Research has shown which crops require the most water and nutrients (fertilizers) and those that require the least.

This is what research can do. Traditional plants may or may not be the most efficient as far as water use is concerned. Farmers look for techniques that require less plowing, less pesticide use, and less use of fossil fuels. Farmers read research that gives techniques for soil preservation and reduced soil erosion. Food scientists and farmers work together to get the most food produced on the least amount of land.
Now that you know why people study food science, do you see yourself as a food scientist? Being able to say you are helping to feed the world would be a wonderful way to use your life. It is important to find out where you can study food science once you graduate high school and pursue a college degree.

Watch the video clip of an alumna from Washington State University as she discusses her degree and career options.
Now it is time for you to get serious about the potential study of food science. Let’s imagine you are looking for the best university program that would allow you to get a degree in food science. Because colleges and universities have such good websites, you can find a great deal of information about the study of food science at the collegiate level.

Identify three universities with a major in food science. What would you have to study? Use the handout, “Where to Study Food Science?” to have a checklist of questions to ask as you investigate. Complete the questions on the handout.

Now that you have the knowledge, which, as you may remember can be called power, draw conclusions about what you think is the best program. Why do you think this? Reflect this in a poster board presentation on one of the school’s programs.

To complete this assignment, write a professional quality letter to the dean of the school you have chosen asking for specific information to be sent to you. Tell why you are interested in the information. Make sure this is information that is not available on the website.

Both the poster presentation and professional letter will be graded using a rubric. I will give you a copy of the grading rubric and you should use it as you prepare materials. The benefit of this activity is to see what is required of someone getting a degree in this field and to discover information that is not provided by the university website.
Complete this sentence:
Food science can help solve global issues by....

We will pause here and talk about this a little before you make an entry. Think about your answer. We will go around the class. Each of you will state your answer. Listen to classmates. They may mention something you had not thought of. When all have shared, I will give you time to write your answer. Underline your part of the sentence that expresses your original idea. This should leave part of the statement unmarked, highlighting what you learned from others.
Ponder this a moment. Just how fast is the population growing? In the United States? In other countries? What is affecting our ability to produce food? Is there as much farmland available today as there was before? What causes there to be less farmland? What does the future hold?

Think about these things. Then be prepared to stand and give your 90-second speech.
Day 2 – Journal Entry

Food Science promotes environmental protection through...

Do you think the environment needs protecting? In what ways do soil, air, and water need protecting?

If you were a food scientist, what would you do to be involved in environmental protection?

Think about these questions as you make journal entries.
Here we are back to the term health. Define the term health. What components are involved in health?

We inherit genetic makeup, which some researchers say will be very important in the future definition of health.

Our genetic makeup may determine how one person uses a nutrient while another person has a different use of the nutrient. Understanding how food science can impact health is a complicated issue.

Think about these things as you prepare your 90-second speech.
Day 3 – Journal Entry

- I can better manage my health using food science principles by…

Have you defined health? What components are there, and which ones are affected by your understanding of food science? What are food science principles?

Principles are statements of truth that generalize the study of food science. For example, one principle would be that nutrient-dense foods allow the highest intake of nutrients needed for a healthy body.

What other principles can you think of? Think about fresh foods of all kinds and what they can provide the body. How can the food scientist be involved in getting these foods to consumers?
For your 90 second speech, discuss sustainable farming and how it has impacted agriculture around the world.
Day 4 – Journal Entry

One thing I have learned from this lesson that I can apply to my eating habits is...

For your journal entry, write one thing I have learned from this lesson that I can apply to my eating habits is...
Now we are taking one broad step toward making the application of food science to the greater good of the whole population or the public. Broadly, food scientists and other researchers and scientists who investigate how we can have the freshest, most nutritious foods are involved in improving public safety. We can be safe because we have protection from harm. Food can provide nutrients to make our immune systems protect us from infections. We can also watch out for microorganisms that make food harmful to us. What statement will you make about food science and public safety?
References/Resources


- Food Science at WSU
  Source: TeacherTube.com
  Running Time: 3:24 minutes
  Release Date: January 30, 2009

  Taste tomorrow. Everybody has to eat. And that means that there are more jobs for Food Scientists than there are graduates with food science degrees. A WSU alumnus with a food science degree explains the duties of a food scientist.


- Approved Undergraduate Programs (Food Science)
  The Institute of Food Technology
  http://www.ift.org/knowledge-center/
References/Resources Cont.

- Food Scientist Quotations
  Bringing over 18,000 quotes to you everyday
  www.Proverbia.net
  http://en.proverbia.net/citastema.asp?tematica=482

- Quote World-Famous Food Quotes
  Over 15,000 quotations and famous quotes
  www.QuoteWorld.org

- http://www.quoteword.org/quotes/10318
- http://www.quoteword.org/quotes/6122
- http://www.quoteword.org/quotes/4117

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