

# Food Science Careers

**F**OOD SCIENTISTS impact your life every day! Product development specialists and food technologists develop all manufactured foods available in supermarkets and specialty groceries. Nutritionists and employees of the FDA research and assign the Nutrition Facts found on all food packaging. Food is produced and tested for quality assurance by food scientists. Food service facilities produce meals in schools, restaurants, hospitals, delis, and corporate offices.



## Objective:



Review food science careers and the education and skills required.

## Key Terms:



food scientist  
food technologist  
pilot plant  
quality assurance  
research  
test production  
troubleshooting

## Exploring Careers in Food Science

### SIX MAJOR CAREER AREAS

#### *Product Development*

Careers in product development involve creating new and improved food products. You may have noticed new food products in your grocery store. Those who develop the new prod-



## UNDER INVESTIGATION...

### LAB CONNECTION: Design a Sensory Evaluation: Be a Sensory Scientist

Part of food product development includes sensory evaluations. The flavor of a food is affected by appearance, taste, odor, mouth feel (texture), and sound. Select a food that has a variety of types. For example: A water sensory evaluation might include tap water, boiled and cooled tap water, filtered water, and bottled water.

All food must be of the same serving size and be held at the same temperature. If differences in the food could be determined by sight, such as milk chocolate and dark chocolate, you might design the sensory evaluation as a blind taste test. To get uniform evaluations, eliminate distractions and bias. Assigning each taste test sample a three-digit code number is a way to help eliminate bias. (The letters A, B, C or the numbers 1, 2, 3 have a built-in bias associated with them.)

Design a sensory evaluation chart with a rating scale of 1 to 5 or descriptive words for the sensory qualities of the food. Keep the samples out of sight until the sensory evaluation. Get some friends together, and complete a consumer panel sensory evaluation. Tally your results, and see which sample is ranked the best. Then, note any surprises in the results.

ucts include food technicians, scientists, and nutritionists. They work in food laboratories and experimental kitchens.

### Quality Assurance

Careers in quality assurance (QA) deal with the quality of foods and food products. Work activities include producing and preserving nutritious food products, and packaging, storing, and transporting quality food products. What have you noticed about the wide variety of packaging and methods of preservation of foods in your grocery store? List the top 10 food packaging solutions you find in a local grocery or school food service facility.



**FIGURE 1.** Experimental kitchens look just like restaurant kitchens. Food technicians must create many variations of a recipe during the development of a new product. Can you distinguish between the tastes of individual ingredients? Would you be a good food taste tester?

## Production

Production careers involve preserving, sorting, grading, packaging, and shipping food products. Occupations related to production include supervisors and plant managers. Most sorting, grading, and packaging are done in a factory.



**FIGURE 3.** A Flexo press is used to print labels for all types of packaging. “Flexography” is another term for “surface printing.” The press can print on plastic, metal, paper, and cellophane.



**FIGURE 2.** A conveyor belt is used in an industrial food production factory. What food product is being produced on this production line? Next, think about other ingredients that may be added to make the final food product or numerous other food products. What role(s) did the food scientist have in the production of this product?

## Sales and Service

Sales and service careers involve preparing advertising materials and making sales calls to sell food products. What are the differences between the ways restaurants and families buy foods? Do you enjoy talking with other people? Do you enjoy researching a product so you can relate that knowledge to others? If so, you may make an excellent sales and service representative.

## Regulation and Compliance

Careers in regulation and compliance involve enforcing food industry regulations. These regulations are set by local, state, and federal governments to help protect consumers. Job duties may include inspecting processing plants and conducting lab tests. Federal agencies that offer jobs related to regulation and compliance in food science include:

- ◆ FDA—Food and Drug Administration
- ◆ USDA—United States Department of Agriculture

- ◆ USDOC—United States Department of Commerce
- ◆ EPA—Environmental Protection Agency

## Food Service

Food service careers involve the preparation and service of food. Work settings include restaurants, bistros, delis, and cafeterias. Food service occupations include chefs, sous chefs, cooks, bakers, managers, cashiers, and servers. A sous chef is the second in command in the kitchen after the executive chef. The sous chef is often the sauce chef, too.



**FIGURE 4.** The FDA regulates Nutrition Facts and food labels. This is a Nutrition Facts label from a can of diet soda. How can you tell it is from a diet soda? How would the Nutrition Facts label change for a regular soda?

## EDUCATION FOR FOOD SCIENCE CAREERS

The level of education required for a career in food science depends on your desired career. The education level varies from high school diploma, to two-year degree, to bachelor's degree. On-the-job training or an apprenticeship may also be required.

### Food Inspection and Safety Educational Requirements

A career in food inspection and safety requires a bachelor's degree in family and consumer sciences, food science, agriculture, or biology. Experience in food production or processing and training courses may also be required.

### Food Service Industry Educational Requirements

A career in the food service industry requires a minimum of a high school diploma and on-the-job training. A two- or four-year degree in culinary arts is required to become a sous chef or a chef. Some food service careers may also require an apprenticeship or further training.

### Food Retail and Wholesale Industry Educational Requirements

A career in the food retail or wholesale industry requires a high school diploma and frequently a bachelor's degree in business or marketing. Some jobs may require additional occupational training.

## Research and Development Educational Requirements

A career in research and development requires a minimum of a two-year college degree plus on-the-job training.

## Marketing and Communications Educational Requirements

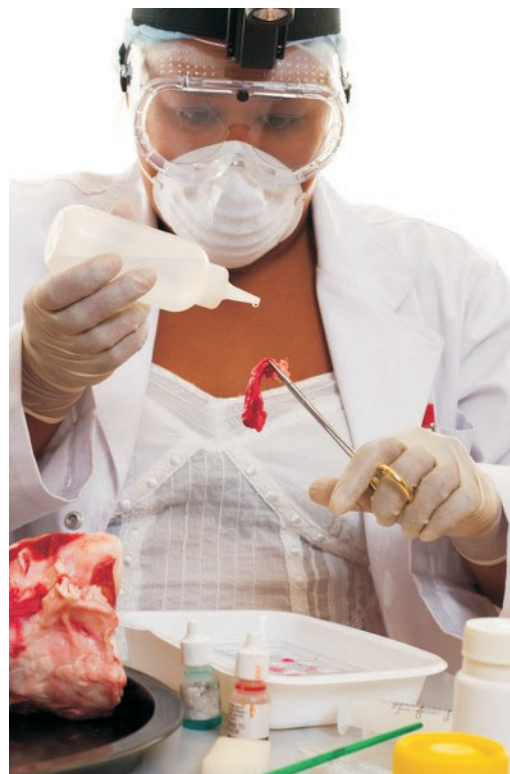
A career in marketing and communications requires a bachelor's degree in marketing and sales or business. Work experience may likely be required for advancement.

## FOOD SCIENCE PROFESSIONS

The two main professional occupations involved in food science and the food science industry are food scientist and food technologist. Both career areas require a significant amount of education and training. Each is important in ensuring a safe, wholesome food supply. Many entry-level jobs related to food science may require less education and training.

### Food Scientist

A **food scientist** is a person trained in the chemistry, physics, and biology of food and food systems. At a minimum, a food scientist earns a bachelor's degree in food science. Usually a food scientist



**FIGURE 5.** Food scientists and technologists help meet consumer demands for food products that are healthy, safe, tasty, and convenient.



## DIGGING DEEPER...

### UNCOVERING ADDITIONAL FACTS: New Coke vs. Coke Classic

Sometimes sensory evaluation does not help in product development and marketing. New Coke was introduced several years ago as a new formula for original Coke. New Coke went through two years of taste tests and research. All the taste tests indicated that New Coke was preferred to original Coke. However, the company did not take into consideration the emotional attachment people had to original Coke. The public started hoarding original Coke, which was being removed from store shelves. What happened? Original Coke was renamed Coke Classic and was brought back to the market. New Coke was removed from the market shelves. The product development specialists neglected to find out if the public wanted a different type of Coke before starting the research and development program.

holds a master's degree or a doctorate in food science, with training in a specialized area. One of the most important skills required of a food scientist is that of research. **Research** is the process of asking questions, seeking answers, using controls, and collecting data. The nature of work for a food scientist includes developing new food products or altering existing food products. Food scientists work for universities, the food industry, and government agencies.

## Food Technologist

A **food technologist** is a person trained in the chemistry, physics, and biology of food and food systems who is concerned with short-term problem solving in food systems. A food technologist usually has at minimum a bachelor's degree and often a master's degree in food science, chemistry, or biology. In food technology, practical hands-on experience in food science is important. The nature of work for a food technologist includes overseeing the production of large batches of food product. Food technologists have to be willing to troubleshoot to solve problems. **Troubleshooting** is the ability to view and understand the entire production process and identify trouble areas.



## DIGGING DEEPER...

### UNCOVERING ADDITIONAL FACTS: Biotechnology

Biotechnology—genetic engineering—is used when gene transfers are involved in the production of a new food product. Biotechnology helps increase crop yields; add nutrients; provide better taste, texture, and appearance; or reduce the need for fertilizers or pesticides. One genetically engineered plant is the FLAVR SAVR™ tomato. Genetic engineering allows the tomato to stay on the vine longer and to retain a firm texture for extended periods in the store. Genetically engineered animals have DNA recombined to produce superior animals. Genetically engineered pigs have less phosphorus in their waste to help prevent problems from agricultural runoff. Genetically altered salmon grow faster and come to market sooner. Many people have concerns about biotechnology in food.

The U.S. Food and Drug Administration offers information about genetically engineered plants and animals. In the Federal Register of May 29, 1992 (57 FR 22984), the FDA published its “Statement of Policy: Foods Derived from New Plant Varieties” (<http://www.farmtoconsumer.org/news/57-fr-22984-wl-new-plant-varieties.pdf>).



Genetically engineered tomatoes have a modified DNA sequence that helps them retain a firm texture for extended periods in the store.

## Pilot Plant and Testing Production

Food technologists often do product development work in pilot plants. A **pilot plant** is a scaled-down production plant designed to test a food manufacturing process. Food technologists work with food scientists to take successful products from this level to the full-scale production level. Products not tested at a pilot plant may be processed in test production.

**Test production** is the use of full-scale manufacturing facilities to make smaller batches of a new product.

## Quality Assurance

Food technologists also work with production scheduling and quality assurance. Scheduling production so that the right product is made at the right time is important in producing a good product at a good price. **Quality assurance** is the monitoring of the entire production process for compliance with health, safety, and product standards. Food technologists work at universities, in the food industry, and in government agencies.



**FIGURE 6.** Food technologists work at small pilot plants or do a test production in a full-scale manufacturing facility. This pilot plant is processing fresh mozzarella cheese.

## Summary:



The field of food science offers many career opportunities. Each career requires a different amount of education and training. Food science careers affect everyone daily. Food products are developed, tested, manufactured, analyzed for nutrients and safety, packaged, stored, advertised, sold, and prepared in food service facilities. A career in food science may be for you.

## Checking Your Knowledge:



1. What are the six major career areas in the food science industry?
2. What are the two main professional occupations involved in food science and the food science industry?
3. List the educational requirements for two different careers in the food science industry.

4. What is the difference between a pilot plant and a regular manufacturing plant?
5. How does biotechnology affect food?

## Expanding Your Knowledge:

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- ◆ Invite a local food science professional or a panel of food science professionals to your classroom to speak. Some examples of a food science professional are a restaurant manager, USDA food scientist, county restaurant health inspector, food production plant manager, baker, or food sales representative.
- ◆ Research the website “Cook’s Country” (<http://www.cookscountry.com/>), and see food science product development specialists at work. The site offers information on taste testing of featured products, pictures and recipes about the best way to prepare foods, recipe testing to make an improved product, and explanations about why the revised recipe is better. You can also watch some prior “Cook’s Country” TV programs on this website.

## Web Links:

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### Food Safety Assessment of FLAVR SAVR™ Tomatoes

<http://www.fda.gov/Food/FoodScienceResearch/Biotechnology/Submissions/ucm225043.htm#out7>

### Genetically Engineered Animals

<http://www.fda.gov/animalveterinary/developmentapprovalprocess/geneticengineering/geneticallyengineeredanimals/default.htm>

### New Coke and Other Marketing Fiascos

[http://www.nbcnews.com/id/7209828/ns/us\\_news/t/it-seemed-good-idea-time/](http://www.nbcnews.com/id/7209828/ns/us_news/t/it-seemed-good-idea-time/)

### What Is Biotechnology?

<http://www.bio.org/>