



## 2011 FLL CHALLENGE

# the project

## THINK ABOUT IT

Food begins to spoil from the moment it is harvested. For centuries, people have worked to protect their food and keep it safe.

Did you know that if you lived with hunters and gatherers in 12,000 B.C., you might have helped to make baskets or clay pots to protect your family's food? If you grew up in the days of ancient Romans, you might have helped to dry fruits and vegetables. In medieval Europe, your chores might have included helping to salt, smoke, pickle, or ferment the food you grew. Your food had to last from harvest-to-harvest through the freezing winters and hot summers. In the pioneer days in North America, you might have cut and hauled ice in the winter. In summer, maybe you fetched your food from a cool spring house or root cellar. Each of these chores (done by people your age) helped keep food safe to eat.

### *Have you ever thought about how your food stays fresh?*

The technology might have changed over the centuries, but all these ways to keep your food safe are still used today. Maybe you fetch your food from an electric refrigerator or freezer instead of an ice box, spring house, or root cellar. Maybe you go to the cupboard for freeze-dried snacks instead of to a smoke house for heat-dried vegetables. Instead of a clay pot, maybe you open a glass jar, plastic food container, vacuum pack, or aluminum can.

### *Have you ever thought about who invented these things?*

With the invention of the microscope, scientists discovered bacteria, parasites, and other threats to our food and ourselves. Pasteurizing, refrigerating, freezing, vacuum packing, and irradiating became common as scientists and engineers found new ways to keep food safe for longer and longer.

### *Have you ever thought about how your food is protected from microscopic attacks?*

At the same time, other scientists and engineers discovered better fertilizers, pest killers, and medicines for farm animals. Inventors created new machines for planting and harvesting. These inventions allowed farmers to grow more food than their families and neighbors needed. Food began to travel farther and farther from where it was grown. Today, the food you eat might have traveled hundreds or thousands of miles before it got to you.

### *Have you ever thought about where your food comes from and how it stays safe to eat?*

What do a candle, a metal detector, a clay pot, vibrating molecules, smoke, a computer, salt, a laser, ice, and an invisible light beam have to do with your food? Each plays a role, either in preserving food or testing it for safety. Have you ever thought about that?

---

<http://usfirst.org/fll> • <http://firstlegoleague.org> • FLL® is the result of an exciting alliance between FIRST® and the LEGO Group.

FIRST® is a registered trademark of the United States Foundation for Inspiration and Recognition of Science and Technology (FIRST). LEGO® and MINDSTORMS® are registered trademarks of the LEGO Group. FIRST® LEGO® League, FLL®, Junior FIRST® LEGO® League, Jr.FLL™, and FOOD FACTOR® are jointly held trademarks of FIRST and the LEGO Group.

©2011 FIRST and the LEGO Group. All rights reserved. Official FIRST LEGO League (FLL) teams and FIRST LEGO League (FLL) Operational Partners are permitted to make reproductions for immediate team and Operational Partner use only. Any use, reproduction, or duplication for purposes other than directly by the immediate FLL team as part of its FLL participation is strictly prohibited without specific written permission from FIRST and the LEGO Group.



*How do a veterinarian, a factory worker, a physicist, a truck driver, a mathematician, a farmer, a microbiologist, a nutritionist, a doctor, a warehouse worker, a chemist, a grocer, a technician, an engineer, an inspector, and a programmer work together to keep your food safe? Each one played a role in making sure that the food you eat helps you grow and stay healthy. What does each one do?*

Your Project challenge this season is to investigate your food and find one way to improve its safe delivery to you. Some questions to consider while you investigate include: Where does your food come from? How is it grown? Where has it been? Who handled it? How did it get to your kitchen cupboard? Who protected it along the way? How did they prevent spoiling and contamination? How did they decide which food was good and which was spoiled or contaminated? Once you know about the threats your food faces and who helps protect it, do some research. What could go wrong? How could your food become contaminated or spoiled? How could your team help prevent one of those problems? How could your team protect or preserve your food?

### Identify a Problem

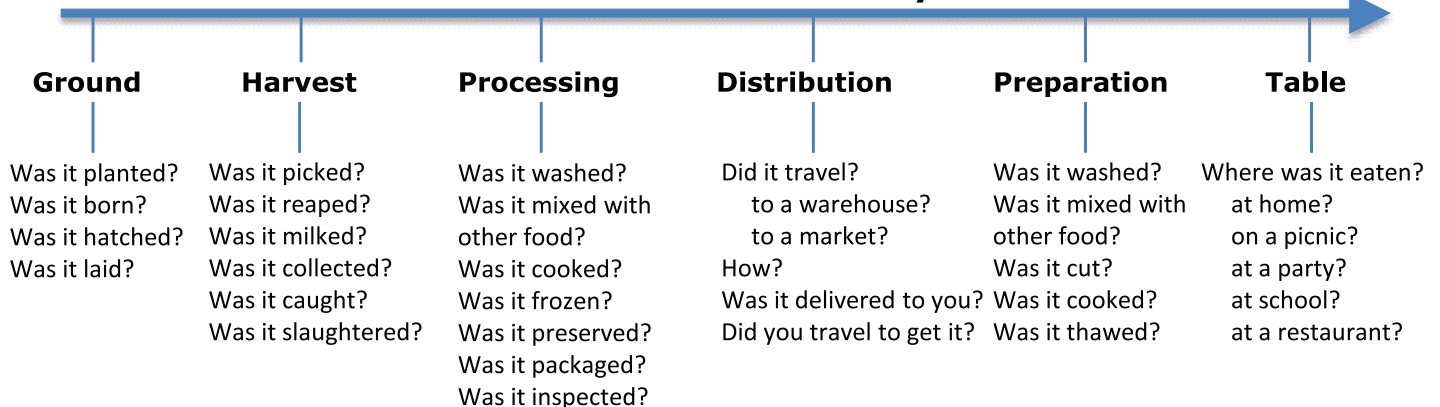
**Each Team Member** — Begin by looking around your own kitchen. What kind of food do you find there? Here are some things to look for:

- Dairy (milk, cheese, yogurt)
- Eggs (raw, cooked, dehydrated)
- Fruits or vegetables (fresh, frozen, dried, canned)
- Grains (rice, pasta, bread, cereal, seeds, nuts)
- Meat or seafood (fresh, canned, dried, smoked, or frozen)

**Each Team Member** — Make a list of 5 foods you found and how each one is stored. Now, find out how you got each one. Did you grow it yourself? Did you bring it home from a market or store? Was it delivered to you? Did you pick it from an orchard or garden? Did a relative, neighbor, or friend give it to you? Think about how each one was protected from contamination. Think about how each one was protected from spoiling.

**As a Team** — Next, take a look at each team member’s list. Talk about each food item on everyone’s list. Pick one food item for your team to research. Keep it simple; pick a food with fewer than 7 ingredients. You want to find out about every step your team’s food took in its journey from ground (where it was grown) to table (where it was eaten). You want to learn about all the possible contamination and spoiling problems. You will want to learn how these problems are detected and prevented now. Consider some of the questions in the Your Team’s Food Journey (below) as you explore all the possibilities. Learn as much as you can about each ingredient in the food your team chose.

### Your Team’s Food Journey





**As a Team** — After you learn about your food’s journey from ground to table, search out how and where your food could become spoiled or contaminated. Choose one problem that your food faces and research it. Your team’s challenge is to create an innovative solution that prevents or solves the problem your team chooses.

Maybe you will find that your food is in danger from a natural attack by parasites, bacteria, or other microbes. Maybe the problem your food faces is man-made (like fungus or weed killers, a pesticide, or toxic waste), a foreign object (a stone, dirt, glass, metal), a wrong ingredient, or medicine from a sick animal that made its way into the food. How could the problem happen? Think about it. Some resources you may use to look for information are: reports, books, magazines, and websites. Consider conducting a survey. Check with professionals who work in and around your community. Use any research tools you have available. Be prepared to share your information sources.

While you are researching your food’s journey and contamination and spoiling problems, find out about a professional who is working to keep your team’s food safe. Did a scientist, veterinarian, or engineer help in the growing process? Did an inspector check it? Who stored, shipped, preserved, or packaged it? Who tested it? Was a government agency involved? Who decides what is safe and what is not safe to eat?

---

### Create an Innovative Solution

Now that your team has decided on a contamination or spoiling problem, develop an innovative solution that will address the problem—a new idea or an improvement on something already being done. What is already being done to fix your team’s problem? What could be done? What will it take to make your team’s solution happen? How will your solution help protect your food? A great solution might take all the imagination and ingenuity your team can muster. It might seem so obvious that you wonder why the problem even exists.

And remember, the most important thing is to have fun.

---

### Share with Others

Now, tell others about the problem you researched and exactly how your solution can help. You choose how to share what you’ve learned. Give a talk. Create a website. Perform a skit. Make a comic book. Rap. Create a poster. Pass out flyers. Write a poem, song, or story.

Think about who is helped by your solution. How can you let them know? Can you present your research and solution to lawmakers, doctors, engineers, or groups who already help with your problem? What’s the best way to teach your audience about the problem and solution? Your presentation can be simple or elaborate, serious or designed to make people laugh while they learn.

---

### Present Your Solution at a Tournament

A list of the Project Awards your team can receive at a tournament and rubrics used by judges can be found at: <http://firstlegoleague.org/challenge/2011foodfactor>

**To be eligible for Project Awards your team must have a live presentation that:**

- Describes the contamination or spoiling problem your team chose to research
- Describes your team’s innovative solution
- Describes how your team shared its findings with others
- Uses media equipment only to enhance the live presentation



**During your presentation, also be sure that your team:**

- Describes the food your team chose and what you learned about that food's journey to your table
- Tells about at least one scientist, engineer, doctor, or other professional who is working on the problem
- Tells about the research your team did and the information sources that helped to define your problem and solution
- Can set up and complete your presentation in 5 minutes or less

Your presentation can include posters, slide shows, models, multimedia clips, your research materials you are limited only by your team's creativity. Remember, you want to leave a lasting impression

### **Need Help Getting Started?**

---

The *2011 Food Factor FLL Coaches' Handbook* contains more information about FIRST® LEGO® League, the Food Factor Challenge, tournaments, judging, and awards.

Information and resources are also available online.

- At <http://www.firstlegoleague.org> you will find general information.
- At <http://firstlegoleague.org/challenge/2011foodfactor> you will find the Project rubric. It describes what tournament judges are looking for and how your team's project work will be evaluated.
- At <http://firstlegoleague.org/challenge/2011foodfactor> you also will find the 2011 Topic Guide and links to information sources that can help your team start your research.

If you have more questions, e-mail [fillprojects@usfirst.org](mailto:fillprojects@usfirst.org) for Project support.