



# Illinois 4-H | Spark Ideas. Ignite Possibilities.

Do you have more questions than answers when you cook, bake, prepare, or think about your food? If so, explore the Food Science project where you will learn the answers to all of these questions and more! Food science is a mixture of chemistry, biology and physics. Explore the building blocks of food science in your own kitchen “laboratory”. Beyond how to cook, you will learn why and how things happen in all kinds of foods like breads, muffins, eggs, fruit, vegetables, cheese, candy, beverages and more.



## Exploring 4-H Food Science

### Spark Activity: Extra-Sweet Coffee Can Ice Cream

Food science is understanding how to put together the correct ingredients with the correct conditions to create a tasty new food, like ice cream. Follow this simple recipe to make a sweet treat!

**Materials:** 1/2 cup half and half or whipping cream, 1/2 Tbsp. brown sugar, 1 tsp. vanilla, 2 quart-sized zipper-lock bags, empty coffee can (or 1 gallon-size zipper-lock freezer bag), ice, rock salt

#### Experiment Instructions:

1. Fill the coffee can about half full with crushed ice and add about 1/3 cup rock salt to the ice. Put the lid on the coffee can and shake the ice and salt for about five minutes. You may need to wear your gloves or wrap the can in a towel because the temperature of the ice and salt will drop down to about 14° F.
2. Use a 1-quart size, zipper-lock bag to mix the following ingredients: 1/2 cup of half & half, 1/2 tablespoon brown sugar, and 1 teaspoon vanilla extract (optional for flavor).
3. Seal the bag tightly, allowing as little air to remain in the bag as possible. Then double-bag into the second bag, again pressing out as much air as possible. Too much trapped air may cause a bag to break open and using two bags decreases the risk of salt and ice leaking into the ice cream.
4. Place the two bags inside the coffee can with the ice and securely put the lid on top.
5. Find a friend or family member and take turns shaking your can. The more energy you put into it, the sooner you'll have ice cream. Your ice cream should be ready after about 15-20 minutes. Once mixed, remove the inner bags from the can and rinse them well with water. You don't want any salt water accidentally getting into your ice cream. Enjoy!

Try this again, experimenting with a new ingredient like a different “milk,” sweetener, or flavor extract.

## 4-H Project Levels and Goals

### Beginner

- Learn about leavening agents
- Conduct food experiments
- Explore mixing methods
- Learn how to make soft pretzels and muffins
- Learn about yeast
- Learn why and how holes develop in swiss cheese and compare swiss to cheddar
- Learn about food spoilage
- Learn parts of an egg

### Intermediate

- Learn about protein coagulation
- Learn egg properties and functions
- Prepare a chocolate soufflé
- Make fresh cheese
- Learn how to cook fruit
- Prepare cut produce to delay browning
- Learn about gluten development in baked goods

### Advanced

- Explore food science careers
- Learn about flavor principles
- Learn how to make a new beverage – from product formulation to labeling
- Learn about sugar crystallization and caramelization
- Learn about fermented foods
- Learn about osmosis and diffusion in food preparation

## Put Your Project Into Action

### Show Your Skills

- Create a display on how to cut fresh produce to prevent browning
- Compare different types of leavening agents used in baking and why different types are used
- Compare types of cheese and how they are made
- Demonstrate various egg properties and the purpose of each in food preparation

### Service and Leadership

- Bake homemade muffins, then donate them to a homeless shelter
- Volunteer for a free community meal site to prepare and serve fresh fruits and vegetables using your knowledge to prevent browning in freshly cut produce
- Teach a food science technique or concept to fellow club members
- Teach a county 4-H food science workshop

### Entrepreneurship

- Invent your own beverage, and name and market your new product

### Technology Connection

- Shadow a Quality Assurance professional at a local dairy, market or food production operation; ask what technology they use to do their job well
- Learn more about the equipment used

### Connecting with a Mentor

- Local baker
- Family or friend working in the field
- Higher education facility that offers culinary arts
- Professional associations and organizations like Registered Dietitians locally or Les Dames d'Escoffier in Chicago

### Events

- 4-H general project show
- Illini Summer Academies
- Illinois 4-H Food Advocacy Team
- Local / regional cooking or baking competitions
- Tour a food factory



### Careers for People Interested in Food Science

Food Scientist	Public Health Official
Research and Development Specialist	Test Kitchen Manager
Director of Quality Assurance	Recipe Developer
Flavor Chemist	Product Developer
Food Inspector	Food Product Entrepreneur
Food Engineer	Brand Manager

## Start a Conversation

What do you already know about preparing food safely?  
What do you think will happen if we don't use baking powder in our muffin recipe?  
What's the difference between using fresh produce versus frozen or canned produce for our recipe?

## Want to learn more?

[go.illinois.edu/4Hfoodscienceproject](http://go.illinois.edu/4Hfoodscienceproject)

## Explore more at Illinois 4-H!

[4-H.extension.illinois.edu](http://4-H.extension.illinois.edu)



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