



# 4-H Exploring Food Science

## North Dakota 4-H Project Sheet

4-H exploring food science projects are designed to help you complete hands-on experiments, prepare a variety of fun recipes, and enjoy learning about food ingredients, characteristics and safety.



- Learn about safe, healthful food preparation.
- Understand the functions of ingredients in different foods.
- Learn how food science principles play a role in food processing.
- Understand the chemical and physical reactions that occur in food.
- Demonstrate skills in following written and verbal instructions.

## Here's what you can do all year!

Unit 1: The Secrets of Baking	Unit 2: The Power of Protein Chemistry	Unit 3: The Inner Mysteries of Fruits and Vegetables	Unit 4: Be a Food Scientist!
<ul style="list-style-type: none"> <li>• Learn how to measure ingredients.</li> <li>• Learn about gluten development in baked goods.</li> <li>• Learn how leavening agents affect foods.</li> <li>• Conduct fun food experiments.</li> <li>• Make muffins.</li> <li>• Understand ingredient ratios in batter and dough mixtures.</li> <li>• Explore mixing methods.</li> <li>• Understand how altering a recipe affects the end product.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify parts of an egg.</li> <li>• Learn about protein coagulation in recipes.</li> <li>• Understand food safety principles applied to eggs.</li> <li>• Learn about egg properties and functions in foods.</li> <li>• Prepare chocolate soufflé.</li> <li>• Learn how to fold egg whites into a mixture.</li> <li>• Make fresh cheese using principles of acid and enzyme coagulation.</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct food science experiments.</li> <li>• Demonstrate your knowledge of osmosis and diffusion in food preparation.</li> <li>• Compare the nutrient content of fresh, frozen and canned vegetables.</li> <li>• Learn to cook fruit.</li> <li>• Understand how acidic and alkaline ingredients affect vegetables' color and texture.</li> <li>• Prepare cut produce to delay browning.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore food science careers.</li> <li>• Understand the difference between food science and food technology.</li> <li>• Learn about flavor principles.</li> <li>• Learn how to make a beverage.</li> <li>• Complete a sensory evaluation of different beverages.</li> <li>• Understand how to make smart beverage choices.</li> <li>• Learn about crystallization and caramelization.</li> </ul>

Pass it on!

Now that you know how, share it with others. Here are ideas to get you started.

### Citizenship

- Make homemade muffins using your new knowledge of leavening agents and mixing methods. Share them with older adults at a care center.
- Sell healthful foods and donate the funds to a worthy cause.

### Leadership

- Take responsibility for preparing cut produce to delay or prevent browning at home.
- Plan and help prepare soft and hard candies for dessert for a family meal.

### Communication

- Teach your family how to prepare vegetables in a way that retains nutrients and visual appeal.
- Design a poster about food science careers.
- Teach your friends how to fold egg whites or whipped cream into a mixture.

### Entrepreneurship

- Create your own beverage. Name and market your new product.



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### Here are Other Opportunities for Exploring Food Science:

- Research Dairy Science degrees and learn about what dairy scientists do.
- Explore careers in science, engineering or technology.
- Bring to the fair an exhibit (or piece of your project) that shows what you learned about food science.
- Experiment with making different foods that contain gluten.
- Meet others interested in food and food science.
- Research a professional food science organization to learn more about what its members do.
- Contact a food scientist, food chemist, food safety inspector or registered dietitian and ask if you can visit with him or her about his or her job.
- Consider taking more science classes when in high school.
- Think about what foods and beverages are most popular with your friends and family. Contemplate why these products are more popular than other products (for example: marketing, taste, nutrition).
- Attend the 4-H Youth Conference to hear motivational speakers and participate in workshops and a community service project. Bring ideas back to your community.
- Hold a food contest with friends; decide how a winner will be chosen, and evaluate the products you create.



### Exhibit Ideas

- Make a portfolio or display on egg components, properties and/or functions in foods.
- Make a portfolio or display on fruits that are prone to browning, vegetables that cook well or the nutrient content of different fruits and vegetables.
- Prepare muffins, quick breads, popovers, biscuits, cookies or a beverage.

### 4-H Resources

- What's on Your Plate? Exploring Food Science  
<http://4-h.org/parents/curriculum/food-science/>
- After Dinner Science  
<http://4h.missouri.edu/projects/ggprojects/docs/afterdinner-science.pdf>
- Wacky World of Edible Science  
<http://4h.missouri.edu/projects/ggprojects/docs/Wacky&EdibleScienceGuide.pdf>
- Steve Spangler—Food Science  
<http://www.stevespanglerscience.com/lab/experiments/category/food-science>

### Other Resources

- Eat Smart. Play Hard. Together  
[www.ag.ndsu.edu/eatsmart/](http://www.ag.ndsu.edu/eatsmart/)
- MyPlate (U.S. Dept. of Agriculture)  
[www.choosemyplate.gov](http://www.choosemyplate.gov)
- Kids a Cookin' - Kansas State Research and Extension  
[www.kidsacookin.org/](http://www.kidsacookin.org/)
- Picture-based Recipes  
[www.ag.ndsu.edu/globalfood/picture\\_recipes.html](http://www.ag.ndsu.edu/globalfood/picture_recipes.html)
- Energizers for Nutrition Education  
<http://www.extension.umn.edu/family/health-and-nutrition/professional-development/classroom-energizers/>

### Recordkeeping

- [Planning for My Project Adventure](#)
- [ND 4-H Project Plan](#)
- [ND 4-H Plan of Action](#)
- [ND 4-H Participation Summary for 11- to 19-year-olds](#)

Learn more at [www.ndsu.edu/4h/](http://www.ndsu.edu/4h/) or contact your county NDSU Extension office.