Oklahoma 4-H Youth Development

Food Science
4-H Exhibit Preparation

Level II
9-11 years old

Baked Goods Recipes

2012

Check It Out... Level II Food Science

There are 21 Lessons/ Activities in the Level II Food Science Project manual. Each lesson will assist you in developing your knowledge and skills in this project area.

4-H members are encouraged to select lessons and work their way through each set. Your goal is to apply the information to your daily life - through meal planning, preparation and food selection.

Lessons include:

1. Measuring liquid and dry ingredients
2. Quick Breads
3. Bar Cookies
4. A Naturally Sweet Treat—Dried Fruit
5. An Apple a Day
6. Quick Dinners
7. Breakfast on the Go
8. Creative Cookies
9. Nutrition in a Nutshell
10. Golden Honey
11. Fruit—vitamin C
12. The Ketchup Connection
13. Can It Right!
14. Eggs Set a Nutritious Eggs-ample
15. Say Cheese!
16. Marvelous Muffins
17. Roll Out the Biscuit Dough
18. Dairy –Yogurt
19. Spill the Beans on Nutrition
20. Crazy About Cruciferous Vegetables
21. A

For what is the **Health** trained: *To resist disease; To enjoy life; and To make for efficiency.*

The Value of Exhibiting Project Work

- Teaches youth to appreciate high standards
- Teaches youth to observe closely
- Teaches youth to develop their reasoning ability
- Teaches youth to make sound and systematic decisions
- Teaches youth to improve their own work
- Teaches youth to develop the ability to concisely express thoughts

Excerpt from:
Volunteer Development Series 4H•VOL•107
Judging—A Teaching Technique

Baked Products Sample Score Cards

Muffins, Biscuits & Cakes	
1. Shape	20%
2. Crust	10%
3. Volume	10%
4. Crumb	25%
5. Flavor	35%

Cookies	
1. Shape	20%
2. Crust	25%
3. Crumb	20%
4. Flavor	35%

4-H'ers may use any recipe that fits the exhibit requirements according to the age group listed in the current State Fair Catalog. Exhibits are being judged on the quality standards listed for the product.

Purpose for Judging

"TO MAKE THE BEST BETTER" is the 4-H motto. How do we know what is best? How can we learn to make it better unless we learn standards and develop the ability to make sound decisions? Every experience, which helps us make wise decisions, enriches our lives. Good judgment is based on proper information and the ability to make wise decisions.

Any time a 4-H member exhibits a "project" they are asking to have "what they learned" evaluated through the product being exhibited.

Project work requires practice, just like an athlete must practice their technique.

Food Science Exhibits

- Three (3) Muffins
- Three (3) Rolled Biscuits
- Three (3) Baked Drop Cookies (see table page 6)

Recipes in this handout are from the food science manuals. 4-H'ers may use these recipes or any other that fits the exhibit requirements.

Exhibit will be disqualified if specifications are not followed.

Recipe Baking Powder Biscuits

Lesson 17, "Roll Out the Biscuit Dough" in Level II Food Science provides excellent information on techniques necessary for the "ideal biscuits."

Ingredients Needed:
2 cups enriched all-purpose flour, sifted
1 tablespoon baking powder
1/2 teaspoon salt
1/4 cup shortening
3/4 cup milk

Serving size and nutritional information located on page 7.

You be the Judge

Evaluate your biscuit—page 137
Food Science—Level II

- Preheat oven to 450°F. Make sure oven rack is in the middle of the oven.
- Measure dry ingredients and sift together into mixing bowl.
- Add shortening. Use a pastry blender/cutter to cut shortening into dry ingredients until mixture looks like big crumbs.
- Add milk to make a soft dough. Use a fork to mix lightly.
- Put dough onto a lightly floured board or breadcloth. Knead dough lightly 10-15 times. Pat or roll dough to ½-inch thickness.
- Dip biscuit cutter into flour and cut biscuits.
- Place biscuits about 2 inches apart on ungreased baking sheet.
- Bake at 450°F. for 12-15 minutes until lightly browned.
- Remove from oven and cool slightly. Makes 12 biscuits.

Tips:
For soft sides, place biscuits close together on ungreased baking pan.

Source: Oklahoma 4-H Food Science, Level II, No. 186, August 1987

Causes of Failure

Difficulty	Reason Why
Tough	Lack of fat
	Wrong flour used
	Too much liquid used
	Too much mixing or dough re-rolled
Pale crust	Oven temperature too low
	Too stiff a dough
	Flour on surface
Uneven shape	Carelessness in handling
	Uneven heat
Uneven brown	Uneven shape
	Uneven heat
Flat and heavy	Wrong proportion of ingredients
	Improper mixing
Coarse, porous grain	Improper mixing
Harsh, dry, crumb	Too stiff a batter
	Over baked
Hard crust	Too long baking
	Too high a temperature

Quality Standards for Biscuits

Size: Uniform, twice the volume of the uncooked dough. Rolled biscuits should reflect a standard cutting utensil.

Shape: Rolled biscuits: even, level top, straight sides. Symmetrical in shape with large volume. Drop biscuits: high not flattened. Irregular shape, uneven.

Crust: Rolled biscuits: Top fairly smooth, level and golden brown. Drop biscuits: pebbly surface, golden brown with no burned peaks. Golden brown bottom not burned. Crisp crust but not hard when broken and free of excess flour.

Grain: Uniform, circular cells distributed throughout. No elongated/packed cells. Rolled biscuits—flaky.

Texture: Rolled biscuits: Creamy, white, slightly moist, tender and light crumb. Not doughy. Separates in flaky layers. Drop biscuits: Course texture, tender crumb.

Smell: Fresh smell, not like rancid fat.

Flavor: Pleasing without a bitterness.

Scoring: Excellent—Blue; Good—Red; and Needs to be Improved—White

Source: Rolled Biscuits Judging Criteria Sheet No. 596, April 1986/2000

Recipe Plain Muffins

Lesson 16, "Marvelous Muffins" in Level II Food Science provides excellent information on techniques necessary for the "ideal muffin."

Fair Exhibit must be a plain muffin.

Serving size and nutritional information located on page 7.

Ingredients Needed:

2 cups all-purpose enriched flour, sifted
3 teaspoons baking powder
1/4 cup sugar
1/2 teaspoon salt
1 cup milk;
1 large egg, beaten
1/4 cup vegetable oil

You be the Judge

Evaluate your muffin—page 75 and 129 Food Science—Level II

- Preheat oven to 425° F. Spray muffin pan. Make sure oven rack is in the center.
- Measure dry ingredients and sift together into mixing bowl.
- Beat egg slightly; add milk and oil.
- Combine dry and liquid ingredients just until moistened. Stir gently (15-20 strokes). The mixture should be lumpy.
- Spoon batter into muffin pans, filling about 2/3 full.
- Bake at 425° F for about 20 minutes, or until golden brown.

Variations: There are 9 variations of this recipe listed in Lesson 16 "Marvelous Muffins." Fair Exhibit must be a plain muffin.

Source: Oklahoma 4-H Food Science, Level II, No. 186, August 1987

Causes of Failure

Difficulty	Reason Why
Unevenly Browned:	Too hot an oven Oven does not heat uniformly Pans filled too full Wrong proportions Too much beating.
Peaks:	Pans filled too full Heat uneven Too much stirring Insufficient leavening Too stiff a mixture Too hot an oven.
Tough:	Wrong flour—use all-purpose Wrong proportions Too much mixing.
Heavy and irregular in grain. Tunnels	Insufficient Leavening Too much mixing
Smooth Crust	Too much mixing
Hard Crust	Too long baking Too high a temperature
Harsh, dry, crumb	Too stiff a batter Over baked

Quality Standards for Muffins

Size: In proportion to size of muffin baking pan.

Shape: Rounded pebbled top, symmetrical shape. Not peaked or knobby.

Crust: Golden brown, crisp and tender. Not difficult to break apart. Brown bottom not darkened by burning. Thin, uniformly golden-brown crust.

Grain: Cell walls medium-thick. Air space evenly distributed with no elongated cells. No long, narrow tunnels. Richer muffins have finer grain than those with less sugar and shortening. Grain coarse, but uniform.

Smell: Sweet, not rancid or burned.

Texture: Light in hand with moist, tender crumb. Uniform texture; no tunnels.

Flavor: Pleasing and characteristic of muffin type.

Scoring: Excellent—Blue; Good—Red; and Needs to be Improved—White

Source: Muffins Judging Criteria Sheet No. 594, April 1986/2000

Read recipes and directions carefully before starting.

Look up terms and procedures you do not understand.

Recipe Oatmeal Drop Cookies

Lesson 8, "Creative Cookies" in Level II Food Science provides excellent information on baking the "ideal cookie."

Serving size and nutritional information located on page 7.

You be the Judge

Evaluate your cookie—page 59-60 Food Science< Level III

Ingredients Needed:

1 cup Enriched all-purpose flour
1/2 teaspoon Baking Soda
1/2 teaspoon Salt
1/2 cup Butter or margarine
1/4 cup Sugar
1/2cup Brown sugar
1 large Egg, unbeaten
1 teaspoon Vanilla extract
2 Tablespoon Milk
2 cups Rolled oats, quick or old-fashioned
1/2 cup Raisins or nuts (if desired)

- Preheat oven 375° F.
- Sift flour before measuring.
- Sift flour, soda and salt together into mixing bowl.
- Add butter or margarine, sugar, brown sugar, egg, vanilla and milk. Mix until smooth.
- Add rolled oats (also raisins, nuts or dates, if used). Stir until mixed.
- Drop by spoonfuls on ungreased cookie sheet about 2 inches apart. Use one rounded teaspoon to dip out the dough and the other to push the dough onto the cookie sheet.
- Bake for 10 or 12 minutes. The cookies will be a light golden color when they are done. They should be a light golden color when they are done. (They should be soft when you touch them lightly with your finger.)
- Remove cookies from pan with a spatula.
- Place on racks to cool. Yields approximately 3-1/2 dozen cookies.

Source: Oatmeal Drop Cookie Judging Criteria Sheet No. 600, April 1986/2000

Quality Standards for Oatmeal Drop Cookie

Size: Uniform, resulting from one rounded teaspoon or tablespoon of batter per cookie.

Shape: Slightly mounded rather than flattened and fairly circular. Uniform shape.

Texture: Tender, crumb, slightly moist but not doughy. Some recipes make a crisp oatmeal cookie while others make a chewy cookie. Do not mistake chewy for doughy. Easily broken in hand.

Grain: Uniform air cells, evenly distributed. Tender crumb.

Color: Uniform color, golden brown.

Flavor: Pleasing, well-blended ingredients.

Scoring: Excellent—Blue; Good—Red; and Needs to be Improved—White

Source: Oatmeal Drop Cookie Judging Criteria Sheet No. 600, April 1986/2000

Perfecting Cookies

If you have a cookie recipe that you love, but aren't getting the desired results, use these tips to get your perfect cookie:

- **Flat** If you want your cookies on the flat side, do some or all of the following things: Use all butter, use all-purpose flour or bread flour, increase the sugar content slightly, add a bit of liquid to the dough and bring the dough to room temperature before baking.
- **Puffy** For light, puffy cookies, use shortening or margarine and cut back on the amount of fat; add an egg, cut back on the sugar, use cake flour or pastry flour, use baking powder instead of baking soda and refrigerate your dough before baking.
- **Chewy** Try melting the butter before adding it to the sugars when mixing. Remove cookies from the oven a few minutes before they are done, while their centers are still soft but are just cooked through. The edges should be golden. Use brown sugar, honey or molasses as a sweetener. Let cookies cool on the pan for several minutes after baking before transferring to cooling rack.
- **Crispy** For crisp, crunchy cookies, use all butter and a proportion of white sugar.

Source: http://allrecipes.com/ 2012

Recipe Chocolate Chip Cookies

Ingredients Needed:
1 cup Margarine
3/4 cup Sugar
3/4 cup Brown Sugar
2 1/4 cups flour
2 large Eggs
1 teaspoon Baking Soda
1 teaspoon Salt
1 cup Nuts, chopped (if desired)
12 ounce Chocolate chips
1 teaspoon Vanilla extract

Serving size and nutritional information located on page 7.

You be the Judge

Evaluate your cookie—page 59-60 Food Science< Level III

- Preheat oven to (375° F) and grease cookie sheets lightly.
- Cream margarine by beating in the mixer. It is creamed when it looks light and fluffy. Gradually add sugar and cream well. Add egg and beat well.
- Sift flour and measure correct amount. Add soda and salt and sift all three 3 ingredients together. Add to creamed mixture.
- Add a few drops hot water and mix together until well blended.
- Add chopped nuts, chocolate chips and vanilla.
- Drop dough by one-half teaspoons on greased cookie sheets.
- Bake 10 to 12 minutes. Carefully remove pans from oven and move cookies to a wire cooling rack. Yields 3-4 dozen cookies.

Source: Chocolate Chip Cookies Judging Criteria Sheet No. 599, April 1986/2000

Quality Standards for Chocolate Chip Cookies

Size: Uniform, resulting from one rounded teaspoon or 1 tablespoon of batter per cookie.

Shape: Slightly mounded; rounded (the recipe to the listed is the "Tollhouse" recipe, a crisp cookie).

Texture: Tender crumb; slightly crisp.

Color: Delicately golden brown, uniform.

Flavor: Pleasing; ingredients should be well blended

Source: Chocolate Chip Cookies Judging Criteria Sheet No. 599, April 1986/2000

Cookie Ingredients

Using the correct ingredients is key. For best results, follow the recipe closely and measure ingredients carefully.

Fats—Fats play a major role in the spread of a cookie--whether a cookie keeps its shape or flattens in the oven. In general, more fat equals flat, crispy cookies while less fat equals puffier, cake-like cookies.

Cookies are made primarily with butter, margarine or shortening. Whipped spreads are not suitable for baking.

Shortening and margarine are stable and will help cookies keep their original unbaked shapes. Butter melts at body temperature--a much lower temperature than other solid fats--resulting in a "melt-in-your-mouth" burst of flavor.

Cookies made with butter tend to spread out. Butter is essential in certain cookies, such as shortbreads; if they don't hold their shape, consider lowering the amount of butter, sugar or baking soda in the recipe.

Flour—Flour also affects how cookies behave. Most cookie recipes call for all-purpose or pastry flour. Both bread flour, with its high protein content and cake flour, which is high in starch, produce cookies that tend to spread less. (The gluten in the bread flour and the absorbent starch in cake flour are responsible for the similar results.) Higher flour-to-liquid ratios are needed in shortbread and crumbly-textured cookies.

Baking Powder and Baking Soda—Baking powder and baking soda are the two most common leaveners in cookies. Baking soda is simply bicarbonate of soda, while baking powder is a combination of bicarbonate of soda plus cream of tartar, an acidic ingredient. Baking soda neutralizes the acidity of the dough, allowing the cookies to brown in the oven. Since baking powder already contains its own acid, it will not reduce the acidity in the dough, and the resulting cookies will be puffier and lighter in color.

Sugars—Like fats, sugars liquefy in the oven. The type and amount of sugar used play a big role in cookie performance. White sugar makes a crisper cookie than brown sugar or honey. Cookies made from brown sugar will absorb moisture after baking, helping to ensure that they stay chewy. Most chocolate chip cookie recipes contain both brown and white sugars. If you lower the amount of sugar called for in a cookie recipe, the final baked cookie will be puffier than its high-sugar counterpart.

(Continued on page 6)

(Continued from page 5)

Eggs and Liquids—Eggs are a binding agent. Liquids can either cause cookies to puff up or spread. If egg is the liquid, it will create a puffy, cake-like texture. Just a tablespoon or two of water or other liquid will help your cookies spread into flatter and crisper rounds. Egg yolks bind the dough and add richness but allow a crisp texture after baking, whereas egg whites tend to make cookies dry and cakey. To make up for the drying effect of the egg whites, extra sugar is often added. This is why cookies made with just egg whites tend to be so sweet--think of macaroons.

Mixing

Cookies are not as delicate as cakes, but proper mixing is still important. Some recipes require a creaming step in which the fat and sugars are beaten together until light-colored and fluffy. Other cookies require a sandy texture, so the fat is cut into the flour. Over-mixing can incorporate too much air into the dough, resulting in flat, overly spread-out cookies. Follow the recipe instructions. Once you combine the dry and wet ingredients, mix until just combined.

Temperature

Unless otherwise specified, ingredients should be at room temperature before mixing. Cookie dough that is chilled before baking will hold its shape better. Rolled and cut-out cookies should be refrigerated before baking for sharper, clearer edges. Drop cookies, such as chocolate chip or oatmeal cookies, can be at room temperature before baking; the spoonfuls of dough will spread and flatten out to the desired result.

Equipment and Baking

Different baking sheets and ovens produce different results. Thin baking sheets might allow the bottoms to brown too fast. Special insulated baking sheets allow air movement and help cookies bake evenly, but they can be expensive. Semi-thick rimmed baking sheets--also called jellyroll pans--are available just about everywhere, and are a fine multipurpose baking choice. Rather than greasing each baking sheet, consider investing in a roll of parchment paper or a nonstick pan liner to make cookie removal and clean-up easy.

Follow the recipe's instructions for baking. Invest in an oven thermometer to be sure your oven temperature is calibrated correctly. Generally, cookies are baked in a moderate oven--350 degrees F (175 degrees C)--for 8 to 12 minutes, depending on the size of the cookie. For chewy cookies, allow them to cool on the pan for 3 to 5 minutes before transferring to a cooling rack. For crispier cookies, let cool for one minute on the baking sheet before transferring to a wire rack.

Source: http://allrecipes.com/ 2012

Class of cookie	Description	Examples
Drop	Made from a soft dough and dropped by spoonfuls onto baking sheets	Chocolate chip cookies, oatmeal cookies, macaroons
Rolled	Made from a stiff dough that is rolled out using a rolling pin and cut into shapes with a cookie cutter	Gingerbread men, some sugar cookies, any cookie made with a cookie cutter
Molded, hand shaped	A stiff dough is rolled between the hands to form a ball and/or shaped using a mold or other shape or tool (fork, cookie stamp, bottom of a glass)	Peanut butter cookies, snickerdoodles, almond crescents, some biscotti cookies
Pressed	A stiff dough is forced through a cookie press into decorative shapes.	Spritz, Spritzgebäck
Refrigerator or icebox	Made from stiff dough that is rolled into a log, chilled, sliced and baked.	Pinwheels, shortbread, some sugar cookies, some biscotti cookies
No Bake	Mixture may or may not be cooked on a range but these cookies are not baked in an oven.	Chocolate No Bake Cookies, Rice Krispies Treats
Bar	Dough or batter is baked in a cake or sheet pan and cut into bar shapes after cooling. Many varieties of drop cookie dough can be baked this way.	Brownies, chocolate chip bar cookies

Serving Size and Nutritional Information for all Recipes

Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Baking Powder Biscuits—page 2

12 Servings—Amount Per Serving
Calories 129.1
Total Fat 4.9 g
- Saturated Fat 2.0 g
- Polyunsaturated Fat 0.6 g
- Monounsaturated Fat 2.0 g

Cholesterol 3.6 mg
Sodium 225.5 mg
Potassium 48.1 mg
Total Carbohydrate 17.6 g
- Dietary Fiber 0.6 g
- Sugars 0.7 g

Protein 3.2 g
Vitamin A 0.6 %
Vitamin B-12 0.0 %
Vitamin B-6 0.4 %
Vitamin C 0.1 %
Vitamin D 1.6 %
Vitamin E 0.3 %
Calcium 8.9 %
Copper 2.1 %
Folate 8.8 %
Iron 6.3 %
Magnesium 1.5 %
Manganese 9.1 %
Niacin 8.6 %
Pantothenic Acid 1%
Phosphorus 4.7 %
Riboflavin 6.9 %
Selenium 13.0 %
Thiamin 12.4 %
Zinc 1.3 %

Plain Muffins—page 3

16 Servings - Amount Per Serving
Calories 111.5
Total Fat 4.2 g
- Saturated Fat 0.6 g
- Polyunsaturated Fat 1.1 g
- Monounsaturated Fat 2.2 g

Cholesterol 12.8 mg
Sodium 175.0 mg
Potassium 46.3 mg
Total Carbohydrate 16.0 g
- Dietary Fiber 0.4 g
- Sugars 3.9 g

Protein 2.5 g
Vitamin A 1.0 %
Vitamin B-12 0.5 %
Vitamin B-6 0.6 %
Vitamin C 0.1 %
Vitamin D 2.2 %
Vitamin E 3.6 %
Calcium 7.2 %
Copper 1.1 %
Folate 7.5 %
Iron 4.8 %
Magnesium 0.9 %
Manganese 5.3 %
Niacin 4.6 %
Pantothenic Acid .7 %
Phosphorus 4.2 %
Riboflavin 5.2 %
Selenium 7.6 %
Thiamin 8.2 %
Zinc 1.0 %

Oatmeal Drop Cookies—page 4

42 Servings - Amount Per Serving
Calories 79.6
Total Fat 2.8 g
- Saturated Fat 1.5 g
- Polyunsaturated Fat 0.1 g
- Monounsaturated Fat 0.6 g

Cholesterol 10.3 mg
Sodium 61.5 mg
Potassium 30.7 mg
Total Carbohydrate 13.7 g
- Dietary Fiber 0.9 g
- Sugars 5.9 g

Protein 1.7 g
Vitamin A 1.5 %
Vitamin B-12 0.3 %
Vitamin B-6 0.4 %
Vitamin C 0.1 %
Vitamin D 0.7 %
Vitamin E 0.3 %
Calcium 1.0 %
Copper 0.9 %
Folate 1.5 %
Iron 3.3 %
Magnesium 0.5 %
Manganese 1.8 %
Niacin 1.0 %
Pantothenic Acid .2 %
Phosphorus 0.9 %
Riboflavin 1.3 %
Selenium 1.6 %
Thiamin 1.8 %
Zinc 0.3 %

Chocolate Chip Cookies—page 5

42 Servings—Amount Per Serving
Calories 145.7
Total Fat 8.5 g
- Saturated Fat 1.9 g
- Polyunsaturated Fat 3.2 g
- Monounsaturated Fat 3.1 g

Cholesterol 10.1 mg
Sodium 98.3 mg
Potassium 61.1 mg
Total Carbohydrate 17.9 g
- Dietary Fiber 0.7 g
- Sugars 8.9 g

Protein 1.7 g
Vitamin A 4.4 %
Vitamin B-12 0.8 %
Vitamin B-6 0.8 %
Vitamin C 0.1 %
Vitamin D 0.5 %
Vitamin E 1.0 %
Calcium 2.1 %
Copper 3.9 %
Folate 3.6 %
Iron 3.2 %
Magnesium 2.4 %
Manganese 10.2 %
Niacin 2.2 %
Pantothenic Acid .8 %
Phosphorus 3.5 %
Riboflavin 3.8 %
Selenium 3.9 %
Thiamin 5.1 %
Zinc 1.9 %