There are 18 Lessons/Activities in the Level III 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. Using the My Plate/ Food Pyramid and a varied Diet
2. Yeast Breads—Rising to the Occasion
3. A Growing Knowledge—Cinnamon Rolls
4. Sizing Up Squash
5. Super Salads
6. Simply Stir-Fry
7. Can It Right! Canning Pickles
8. Freezing: The Cold Facts
9. Scrumptious Strawberries
10. Fun with Fruit Salad
11. Dairy-Making Sense of Our Senses
12. Eggstra Protein
13. Poultry Preparation
14. A Souper Supper
15. Roll Out the Cookies
16. Healthy Eating Habits, Set for Life!
17. Beef Fat Facts
18. Final Project—Breakfast Bread Buffet

Check It Out... Level III Food Science

"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.

An 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.

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

Baked Products Sample Score Card

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<th>Yeast Bread</th>
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<tr>
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4-H’ers may use any recipe that fits the exhibit requirements according to the age group listed in the current State Fair Catalog. Bread machines may be used to mix and bake a yeast bread exhibits, but the dough must be made from scratch - no mixes. Exhibits are being judged on the quality standards listed for the product.

Project work requires practice, just like an athlete must practice.
Recipe Rolled Sugar Cookies

Lesson 15, “Roll Out the Cookies” in Level III Food Science provides excellent information on techniques necessary for the “ideal rolled cookies.”

**Ingredients Needed:**
- 3/4 cup sugar
- 3/4 cup margarine or unsalted butter
- 1 large egg
- 1 teaspoon lemon rind
- 1/4 teaspoon salt
- 2 cups all-purpose flour
- 1/2 teaspoon baking soda
- 1/2 teaspoon cream of tartar
- 1 teaspoon vanilla extract

1. Preheat oven to 400°F. (205°C)
2. Cream thoroughly with electric mixer the sugar, margarine, egg, lemon rind, salt and vanilla.
3. Mix the flour, soda and cream of tartar together. Stir into the sugar — margarine mixture by hand.
4. Shape dough into ball; wrap in plastic and chill.
5. Place small amount of the chilled dough on a lightly floured board or pastry cloth. Use a floured rolling pin, roll gently until dough is ¼ to ⅛ inch thick.
6. Cut into shapes with floured cookie cutters. Save the trimmings at the end. Trimmings can be rolled together to make additional cookies.
7. Place on greased cookie sheet leaving space so that cookies can spread.
8. Bake at 400° F. (250° C.) for 5-9 minutes or until slightly golden. Cool on a wire rack. Yields approximately 18 cookies.

**Source:** Oklahoma 4-H Food Science, Level III, No. 187, August 1987

**Quality Standards for Sugar Cookies**

- **Size:** Uniform
- **Shape:** Slightly mounded and circular
- **Texture:** Tender and crisp
- **Color:** Light golden color with slightly darker edges.
- **Appearance:** Free from excess flour on bottom and edges.
- **Flavor:** Pleasing; ingredients well blended.

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

**Causes of Failure**

<table>
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<tr>
<th>Difficulty</th>
<th>Reason Why</th>
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<td>Flavor bitter</td>
<td>Too much baking powder or soda</td>
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<tr>
<td></td>
<td>Poor recipe/mixing</td>
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<tr>
<td>Irregular shape &amp; thickness</td>
<td>Dough not molded right/chilled enough</td>
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<td>Thin, sharp knife not used for slicing</td>
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<td>Cutter not dipped in flour.</td>
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<tr>
<td>Excessive spreading</td>
<td>Dough too warm</td>
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<td>Dough dropped on hot baking sheet.</td>
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<td>Incorrect oven temperature</td>
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<tr>
<td>Tough/Soft</td>
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<td>Cut too thick</td>
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<td>Too much re-rolling</td>
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<td>Too much or too little flour or mixing</td>
</tr>
<tr>
<td>Streaks</td>
<td>Poor mixing techniques</td>
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</table>

You be the Judge
Evaluate your cookie—page 157 Food Science< Level III

Serving size and nutritional information located on page 6.

Read recipes and directions carefully before starting.

Look up terms and procedures you do not understand.

Source: Sugar Cookies Judging Criteria Sheet No. 598, April 1986/2000
Recipe: Rapid-mix Method Yeast Bread

Lesson 2, “Yeast Bread—Rising to the Occasion” in Level III Food Science provides excellent information on techniques necessary for working with yeast breads.

Ingredients Needed:
5-5 1/2 cups flour (up to 1/2 can be whole wheat)
1 package dry yeast (2 1/2 teaspoon.)
2/3 cup nonfat dry milk
2 teaspoon salt
1 tablespoon sugar
2 cups water (120-130° F)
2 tablespoon oil
Oil or non-stick cooking spray to grease pans

Serving size and nutritional information located on page 6.

Preheat oven to 400°F.
In large bowl mix together 2 cups flour, yeast, dry milk, salt and sugar.
Add water and stir well.
Add oil and beat with mixer 3 minutes or with wooden spoon about 5 minutes.
Gradually stir in enough remaining flour to make a soft dough.
Gently knead on lightly-floured surface about 5-7 minutes.
Cover dough with damp towel. Let rest 20 minutes.
Shape into 2 loaves (see instructions in lesson 2). Place in well-greased loaf pans.
Let rise until doubled in bulk. Cover dough with damp towel so skin doesn’t form.
Bake at 400° F for 35-40 minutes. The bread is done when it makes a hollow sound when tapped on the bottom and sides are firm and golden brown. Makes 2 loaves.

Source: Oklahoma 4-H Food Science, Level III, No. 187, August 1987

Causes of Failure

Difficulty Reason Why
Crust Thick Too much flour; insufficient rising, oven temperature too low
Baked loaf crumbles easily Dough not well-mixed; too much flour added; rising place too warm; dough allowed to rise too long; oven temperature too low; weak flour
Bread has sour taste Rising place too warm and dough rose too fast; dough rose too long before being baked
Dough does not rise Too cool or hot water temperature used for dissolving yeast; dough too stiff; rising place too cool; expired yeast.
Bread has dark streaks Uneven mixing or kneading; bowl greased too heavily; dough not covered during rising; flour on work surface
Bread has holes Air not completely worked out of dough during shaping of loaves; dough rose too long before baking
Bread is doughy on bottom Bread not removed from pans and allowed to cool on racks after baking; under baked
Top of loaves cracked Cooled too rapidly, probably in a draft; dough too stiff; dough not well-mixed

Additional Trouble Shooting Tips in Lesson 2 Level III.
Recipe Cinnamon Rolls

Lesson 3, “A Growing Knowledge of Yeast—Cinnamon Rolls” in Level III Food Science provides excellent information on making cinnamon rolls.

Sweet Dough Ingredients Needed:
3 1/2 - 4 cups bread flour
1 package active dry yeast
1 cup fat free milk
1/4 cup sugar
1/4 cup reduced-calorie margarine (in a tub)
1/2 teaspoon salt
2 large eggs
Vegetable cooking spray

Cinnamon Roll Filling:
3 tablespoons margarine
2/3 cup brown sugar
2 teaspoon cinnamon
1/2 cup raisins, if desired
1/2 cup nuts, if desired

Combine 2 cups of flour with yeast.
Combine milk, sugar, margarine and salt in saucepan and heat over low heat until very warm (120-130°F). Add to flour mixture; add eggs. Beat at low speed for 30 seconds; scrape sides of bowl constantly.
Beat 3 minutes at high speed, scraping sides constantly. Use a wooden spoon to mix in remaining flour until a soft dough forms (dough will pull away from sides of bowl).
Turn onto “lightly” floured surface. Gently knead until smooth and elastic (about 5 minutes). Shape into a ball.
Spray mixing bowl with vegetable cooking spray. Place dough in bowl and turn to coat with oil. Cover with clean damp towel and let rise in a warm place until doubled in bulk (45-60 minutes).
Punch dough down. Cover; let rest 10 minutes.
Spray two 9 x 1 1/2” inch round baking pans with vegetable cooking spray.
Divide sweet dough in half. Roll each half into a 12 x 8 inch rectangle.
In a small saucepan, melt 3 tablespoons margarine. Brush half of the margarine over each rectangle of dough.
Combine the brown sugar and cinnamon (raisins and nuts, if desired). Sprinkle half of mixture on each rectangle. Remember that no nuts equals a lower fat content in the finished product.
Roll up, starting from longest end. Pinch dough together to seal. Moistening the edge of the dough makes it easier to seal firmly.
Cut into 1-inch slices. To cut into nice even pieces without smashing the roll, use a piece of string/dental floss. Slide the string under the roll, bring the ends up to the top, cross and pull.
Cross ends, pull string tight to cut through roll. Place in greased pans. Cover; let rise till doubled (about 30 minutes).
Bake in 375°F oven for 18-20 minutes. Cool slightly. If desired frost cinnamon rolls while warm.

County and State Fair Exhibits can not be iced.

Yields 24 Cinnamon Rolls

Source: Oklahoma 4-H Food Science, Level III, No. 187, August 1987

Quality Standards for Cinnamon Rolls

Size: Uniform
Shape: Uniform, round, even thickness of bread spiral.
Crust: Thin, smooth, uniform golden brown, slightly darker on top than sides and bottom, tender.
Texture: Tender, springy crumb, moist.
Color: Even, free of dark streaks, characteristic of ingredients.
Flavor: Sweet, not overpowered by spices, uniform, not yeasty, rancid or sour.
Grain: Fine cells, evenly distributed, thin cell walls.

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

Read recipes and directions carefully before starting.
Look up terms and procedures you do not understand.
When using fresh cake yeast (also known as compressed fresh yeast) for a bread recipe, the yeast should first be crumbled into a bowl or it can be broken up using a wooden spoon. Use the quantity of yeast specified in the recipe. Add the quantity of warm water specified in the bread recipe and stir until the yeast dissolves into a uniform paste. The bowl should be placed in a warm location for several minutes before the yeast mixture is added to the flour.

Active Dry Yeast

Active dry yeast comes in a granular form and is usually available in small packages. To prepare the yeast for bread making, pour some warm water (the quantity specified in the bread recipe) into a bowl. Add the specified quantity of active dry yeast to the water. The yeast granules will slowly sink. Place the bowl in a warm location for about 5 to 10 minutes. The liquid should begin to bubble and foam. Do not allow the yeast to sit too long before adding it to the flour or it will become a less effective leavening agent. Stir the liquid with a wooden spoon and add it to the flour.

Quick-Rising Active Dry Yeast

Like active dry yeast, quick-rising active dry yeast is also a granular product available in small packages. It can be added directly to the flour and other ingredients without having to be activated in warm water first. Simply blend the specified quantity of yeast with the other dry ingredients in a large bowl.

The yeast will activate as soon as the liquid ingredients are added. When water is the only liquid used in the bread recipe, the temperature of the water can be warmer (usually 115º to 125ºF) than the temperature of the water used to activate other types of yeast.

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**Class of cookie**  | **Description** | **Examples**
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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

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**Yeast—What’s the difference?**

**Fresh Cake Yeast**

When using fresh cake yeast (also known as compressed fresh yeast) for a bread recipe, the yeast should first be crumbled into a bowl or it can be broken up using a wooden spoon. Use the quantity of yeast specified in the recipe. Add the quantity of warm water specified in the bread recipe and stir until the yeast dissolves into a uniform paste. The bowl should be placed in a warm location for several minutes before the yeast mixture is added to the flour.
# 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

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<th>36 Servings - Amount Per Serving</th>
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