Substitution Science – Cookie Science

Introduction: We can thank the Dutch for introducing American colonists to cookies in 1614 in the new colony now known as New York City. Called ***keokje*** or "little cake" it's thought cookies were small amounts of batter or dough used as an oven test to see if the wood-fired oven was hot enough to bake cake or bread.

Today Americans from many cultures enjoy a wide range of cookies, typically known by their texture—***crisp, chewy, or soft***.

Cookie I.D. Activity: Have students offer favorites that match the cookie types listed below. Search for pictures and recipes in cookbooks, magazines and at reliable internet sites such as:

- www.baking911.com (Sarah Phillips, author)
- www.foodsubs.com (The Cook's Thesaurus)
- www.homebaking.org (The Home Baking Association)
- www.kswheat.com (Kansas Wheat Commission)
- www.wheatfoods.org (Wheat Foods Council)
- www.bettycrocker.com (Betty Crocker Test Kitchens)
- www.verybestbaking.com (Nestle' Test Kitchens)
- www.landolakes.com (Land O'Lakes Test Kitchens)
- www.hersheyskitchens.com (Hershey Foods Test Kitchen)
- www.clabbergirl.com (Clabber Girl Kitchens)

Cookie types:

- **Bar** (chocolate and blonde brownies, date nut bars; lemon squares)
- **Drop** (chocolate chip, oatmeal, apple or pumpkin spice, macaroons)
- **Molded** (snickerdoodles, molasses, peanut butter, crescents)
- **Meringues** (forgotten cookies)
- **Piped or Pressed** (spritz, macaroons)
- **Refrigerator or Ice Box** (pinwheels, ribbons, brown sugar, nut)
- **Rolled** (shortbread, sugar cookies, gingerbread)

Supplies needed:

Ingredients:

-Cake, bread, pastry, all purpose flours
-Butter, unsalted
-Butter-flavored shortening
-Brown and granulated sugars
-Large eggs
-Semi-sweet chocolate chips
-Milk
-Vanilla extract
-Table salt
-Baking soda
-Baking powder

Equipment

-Measuring tools
-Mixers
-Baking sheet pans (shiny aluminum or steel—heavy gauge) or cookie sheet pans
-Parchment pan liners
-Cookie scoops #20, (1.6 oz. dough)
-Scale (ounces/grams)

Cookie Trivia:

Q: How many cookies would you say the average American eats each year—purchased or made at home? (95% of American households eat cookies, averaging 300 per person per year.) (***Baking for Success.*** Home Baking Association)

Q: What were the earliest cookies?(macaroons, fruit tartlets, gingerbread, shortbread)

Q: What did these first cookies have in common? (No leavening except air and beaten egg white—baking soda wasn't used until early 1800s and baking powder, 1860s)

Q: What are cookies called to this day in Britain? (biscuits)

Q: What is America's favorite home baked cookie? (Chocolate Chip Cookie) (Half the cookies baked in American homes are chocolate chip!)

Q: Who, when, where and how was the Toll House Cookie created?

Chocolate wasn't manufactured in the U.S. until 1765 and was then only used as a healthful beverage! Baking with chocolate didn't get popular until the late 19th century. The idea of "chipped chocolate" in cookies came from Mrs. Wakefield at the Toll House Inn in 1930 when she had no nuts and substituted chopped up chocolate. Not until 1939 did Nestle' begin producing "chocolate chips." Today, Nestle' alone produces 250 million morsels per day in three factories. ***Note:*** None of the most popular cookies today (oatmeal, chocolate chip, peanut butter and brownies) existed until the late nineteenth and early twentieth century!

Critical thinking corner—cookies and nutrition:

1. Are cookies a "bad" food? (A: There are no bad foods—only bad diets. A diet is what a person regularly eats over an average of a week or two. There is room for a few cookies in a well-planned diet and active life!)
2. How many calories are in an average, ½ oz. cookie? (A: 110-150)
3. How many cookies are a reasonable number to eat in a day? (A: Depends on the cookie size, but about 1 to 2 oz. or 1 to 4 cookies)
4. What ingredients may add nutritional value to cookies, even though they may still be high in fat and sugar?

(A: whole wheat flour, oatmeal, fruit, eggs, shredded apple, pumpkin or squash, nuts, dry milk, soy flour, peanut butter, cocoa)

5. Do cookies fit in ***your*** diet? www.mypyramid.gov (Click My Pyramid Plan)

Skill Development: Be sure students use ***mise en place*** (pronounced *meez zon plahs*), meaning to have all ingredients and equipment in place before preparing a recipe. Copy the box at the right for each student's reference.

Lab Introduction: Cookies really are little cakes. Their basic ingredients are similar to cake, but cookies have less liquid (egg, milk, water, buttermilk, and other sources).

Cookies are very sensitive to small changes—a little more moisture or flour; a flour that is higher or lower in protein; more or less sugar. All will influence spread, chewiness or crispness, and how quickly the cookies crumble.

Review the five basic cookie ingredients:

(Teacher: Review the function of each ingredient—use the power point, *Baking: From Flour to Table* @ www.kswheat.com)

- **Flours** (cake, pastry, all-purpose, whole grain)

A softer or lower protein flour is most often used for cookies (less than 11% protein). Measuring accurately is critical—one or two extra tablespoons (1/4 to ½ ounce) will make a lot of difference in how much the cookie spreads or puffs. Higher protein flours absorb more moisture and lessen spread.

- **Sugar** (granulated, brown, powdered, honey, molasses, corn syrup) Fat and sugar ***creamed*** together trap air to make the cookie tender. (Creaming is demonstrated on the ***Bakers Dozen*** DVD, www.homebaking.org)
- Brown sugar adds moisture and chewiness.
- Granulated sugar makes a thinner, crisper cookie
- Substituting honey adds moisture, increases browning, spread, and softness. Honey is not going to hold the air sugar does when creamed with the fat—it is 17% water. Honey is 20% sweeter than sugar so less may be used. Oven heat or baking time may need to be reduced.

Top Ten Cookie Tips

(Clip and Save)

+**Avoid over-softening butter; no need to pre-soften margarine**—both should be bendable, but not melting. (Room temperature—70 degrees F.) Do not substitute spreads for butter or margarine. Half butter/half shortening offers flavor and controls spread.

+ **Stir flour, spoon into dry measuring cups—level off**, or weigh! One or two extra or less tablespoons of flour will make a big difference! All-purpose flour is generally good for cookies. Soft wheat (pastry or cake) flour is best for tender cookies.

+**Use large eggs**. Eggs at room temperature for 30 minutes and beaten will make a lighter cookie.

+**Use fresh, soft brown sugar** to get the required moisture for the dough. Packed brown sugar should hold the form of the measuring cup.

+**Cream fat and sugar (beat) well**
a) cream fat and sugar on medium high speed until light & fluffy
b) reduce mixer speed, add egg & liquid; mix in completely

+**Blend flour(s) and dry leavening ingredients with a wire whisk or sifter** to thoroughly mix them together before adding, one third at a time, to the creamed mixture. Scrape bowl as you mix.

+**Preheat the oven**, placing racks as directed, usually in the middle position. Check oven's temperature to avoid a too cold or hot oven.

+ **Evenly portion and space** (about 1 ½ inches apart) **cookie dough** on shiny, sturdy aluminum or steel sheet pans. Grease pans (or not) as directed--or use parchment liners.

+**After very brief cooling on pan, remove the cookies to a cooling rack**. Store when cooled completely.

+ **Let pan cool completely** before portioning more cookie dough.

+**Freeze baked cookies of like kinds together**—crisp with crisp/chewy with chewy. Consider freezing tightly wrapped cookie dough shaped in a log for easy slicing for baking later.

Five Basic cookie ingredient review, continued

- **Fats** Butter, margarine vegetable shortening are all used in cookies. Butter gives the best flavor; shortening will not spread as much. This is because butter and margarine are 80% fat, 20% liquid and melt quickly; shortening is 100% fat. Try using half butter/half shortening for best flavor and controlled spread. Never use *reduced fat spreads* unless using a recipe designed for a specific spread.

(NOTE: Warming fat in the microwave is very risky. If fat is melted or too warm it will not cream (hold air) as well—cookies will spread more. See "chewy" cookie lab recipe.)

- **Leavening** (baking soda, baking powder, cream of tartar, eggs, air)

Leavenings are not interchangeable. In a cookie dough, baking soda relaxes the gluten and promotes spread; soda needs an acid ingredient present too. Baking powder contains both an acid and soda; it has "double action" leavening both while mixing and in the oven heat.

(Note: Learn more about leavening in Bakers Bake Waffles—Leavening Science lab. Also more leavening science available at www.clabbergirl.com)

- **Eggs** (whole, yolks, whites) Unless otherwise stated, large eggs should be used.

Decreasing the eggs and adding liquid in a dough will increase the spread. ***Liquids*** in cookie dough may include water, milk, juice and vanilla.

Remember, eggs help cookies puff (add steam leavening) and help hold air when beaten with the creamed fat and sugar. The egg white also dries baked goods.

More about eggs at www.aeb.org and on *Bakers Dozen* lessons on DVD www.homebaking.org

(Note: For those with an egg allergy, ¼ cup silken tofu may be substituted per large egg, adding tofu during mixing as you would an egg.)

Additional cookie baking details:

- **Baking Temperature**:

Oven must be preheated. If oven temperature is too low, dough will spread too much before setting; if temperature too high, not enough spread will occur before cookie sets.

- **Baking pans and pan treatments**:
- *Shiny heavy aluminum or steel sheet pans* with one or two sides allowing for air flow are ideal for baking cookies.
- Professional bakers may *double pan* cookies to provide for even browning on top and bottom.
- Grease, spray or use parchment or silicone pan liners *as recipe directs*.
- *Rotate* (turn pans 180 degrees) halfway through baking if baking is uneven in the oven (true especially of convection ovens).
- Pans should be cooled before more cookie dough is portioned onto them.
- Remove cookies from pan as soon as possible to wire cooling rack.

Cookie video and worksheet: If possible, view or read the script of *Three Chips for Sister Marsha* www.FoodNetwork.com with Alton Brown. *Good Eats—Episode EA1C05. Video 1: Super Sweets)* Answer the questions below while watching the video ***OR*** use as a pre- and post-test. (Answers follow)

The Thin Cookie

1. Would you increase or decrease the baking soda when making thin cookies?

2. Would you increase or decrease the eggs in a thin cookie? _____

3. **True or False** Butter changes from a solid to a liquid in a few degrees of heat.

4. What two ingredients should you cream until light and fluffy? _____ _____

5. **True or False** Add the dry ingredients all at once at highest speed.

6. Why is using a scoop so important in putting the dough on the cookie sheet?

7. **True or False** Parchment and wax paper are the same product. Which should you use in baking cookies?

8. When should cookies come out of the oven?

The Puffy Cookie

9. What type of fat did Alton Brown use in the puffy cookie (lab)? Why?

10. **True or False** Cake flour will produce more steam than all-purpose flour because of the lower protein content.

11. Why would baking powder be used instead of baking soda?

12. What is the benefit of adding the flour in installments?

13. Why does the puffy dough need to be chilled?

The Chewy Cookie

14. What needs to be done to the butter in the chewy cookie recipes?

15. What type of flour is used in the chewy cookie? Why?

16. **True or False.** The darker the sugar the chewier the cookie.

17. How much egg is used in the chewy cookie? How does this compare to the crisp cookie?

Source: Alton Brown, (www.altonbrown.com and www.foodtv.com)

Answers to Cookie Quiz:

1. Increasing the soda by ½ again as much raises the temperature at which the batter sets (batter becomes less acidic). This allows the cookie to spread more before setting, so it's thinner.
2. Use 1 less egg (recipe normally uses 2) and substitute 2 oz. whole milk instead. Eggs tend to puff, not spread, so using only one egg will promote the spread. Also, eggs are protein and aid in setting the dough.)
3. True. Butter melts very quickly (it has a "sharp" melting point)
4. Butter and sugar
5. False. Add dry ingredients, blended, in thirds, mixing on low speed to thoroughly blend.
6. So the cookies will be an even size and bake evenly.
7. False. Parchment paper is silicone treated for easy release and waxed paper has wax coating and will melt onto the product, giving it a waxy taste. Use parchment paper to line baking pans!
8. When they are nearly set in the middle, but not "completely done" looking. "If they look done, they're over done." *Three Chips for Sister Marsha.* Alton Brown.
9. Shortening. Melts at a higher temperature than butter, so batter won't spread as quickly, allowing the batter more time to rise (puff).
10. True. Lower protein in flour frees the liquid to turn to steam and to "lift" or puff the batter
11. Acidic batter sets quicker, spreads less.(See Question/Answer #1.)
12. Allows the dry ingredients to blend in thoroughly and without flying up and out of the bowl.
13. Cold batter will spread more slowly, allowing it to puff before setting.
14. It is melted, freeing up the water in the butter to mix with the flour's gluten, creating more "chewiness."
15. Bread flour. It has more gluten forming proteins to mix with the melted butter's water and develop chewiness.
16. True. Dark brown sugar has more molasses and draws moisture from the air.
17. One whole egg and one egg yolk plus the 2 oz. milk
    Thin crisp cookie has one egg and the 2 oz. of milk)

Sources:

Three Chips for Sister Marsha. Alton Brown, www.foodnetwork.com Good Eats Episode EA1C105.
Baking 9-1-1. Sarah Phillips. www.baking911.com
Home Baking Association. Sharon Davis, www.homebaking.org

NOTE: If cookies are browning too rapidly on the bottom and edges, ***double panning*** may be recommended—place one pan on top of another. This is frequently done in bakeries. Heavy weight, shiny aluminum or steel sheet pans lined with parchment paper is recommended.

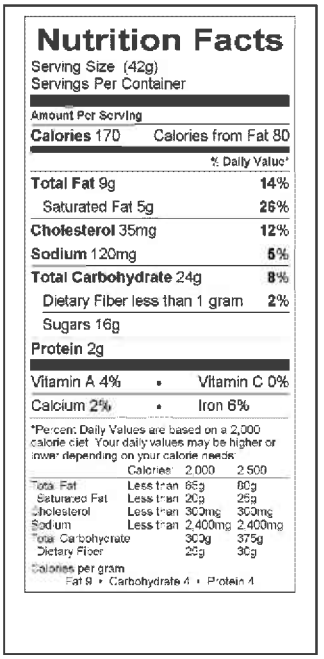
Teacher note: If using two days for this lab, you will want to chill all three doughs, BUT take the Thin and Crispy Cookie dough out of refrigeration 1 hour before scooping.

Lab #1- Ingredient Lab: In this experiment, students will observe the difference varying the flour and sugar types, liquid and amount of egg will make in producing a chewy, crisp or puffy chocolate chip cookie.

Schedule: Two, 50-minute labs, for mixing, (20 minutes prep) baking, (15 minutes to bake), (10 minutes to cool; evaluate results) and report observations.

Chewy Chocolate Chip Cookies

Makes eight (1.4 oz/40g) cookies



Nutrition Facts

Serving Size (42g)
Servings Per Container

Amount Per Serving	
Calories 170	Calories from Fat 80
	% Daily Value*
Total Fat 9g	14%
Saturated Fat 5g	26%
Cholesterol 35mg	12%
Sodium 120mg	5%
Total Carbohydrate 24g	8%
Dietary Fiber less than 1 gram	2%
Sugars 16g	
Protein 2g	
Vitamin A 4% •	Vitamin C 0%
Calcium 2% •	Iron 6%

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

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Ingredients

¼ cup butter (1/2 stick)
½ cup + 2 Tablespoons bread flour
¼ teaspoon salt
¼ teaspoon baking soda
1 Tablespoon granulated sugar
¼ cup + 1 Tablespoon brown sugar
1 Tablespoon beaten egg
1 Tablespoon beaten egg yolk
1 ½ teaspoons milk
½ teaspoon vanilla extract
½ cup semisweet chocolate chips

Method:

1. Preheat oven to 375 ° F.
2. Cover the butter and melt it in the microwave.
3. Sift or whisk together the flour, salt and baking soda and set aside.
4. Pour the melted butter in the mixer's work bowl. Add the sugar and brown sugar. Cream the butter and sugars on medium speed. Add the beaten egg, beaten egg yolk, milk and vanilla extract and mix until well combined. Slowly incorporate the flour mixture until thoroughly combined.
5. Stir in the chocolate chips.
6. Chill the dough 1 hour or overnight. Scoop (#20 disher) onto parchment-lined baking sheets, 8 cookies per sheet, evenly spaced.
7. Bake for 14 minutes or until golden brown, checking the cookies after 5 minutes. Rotate the baking sheet for even browning.
8. Remove cookies to a wire cooling rack as soon as set enough. Cool completely before stacking or storing in an airtight container.

Credit: *Three Chips for Sister Marsha* www.FoodNetwork.com with Alton Brown. *Good Eats—Episode EA1C05. Video 1: Super Sweets*

Thin and Crispy Chocolate Chip Cookies
Makes 8, 1.4oz/40g cookies

Nutrition Facts

Serving Size (40g)
Servings Per Container

Amount Per Serving

Calories 180	Calories from Fat 80
	% Daily Value*
Total Fat 9g	14%
Saturated Fat 8g	28%
Cholesterol 20mg	7%
Sodium 120mg	5%
Total Carbohydrate 23g	8%
Dietary Fiber less than 1 gram	3%
Sugars 16g	
Protein 2g	
Vitamin A 4% •	Vitamin C 0%
Calcium 2% •	Iron 4%

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

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

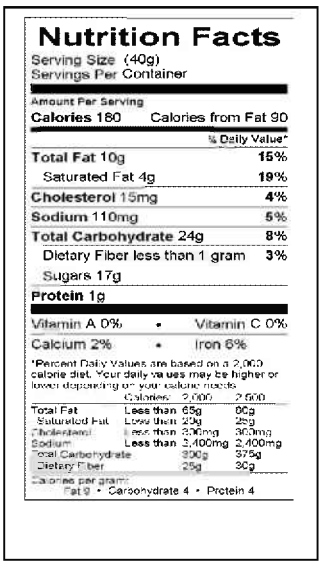
Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Ingredients
½ cup + 1 Tablespoon all-purpose flour
¼ teaspoon salt
¼ teaspoon baking soda
1 Tablespoon beaten egg
1 Tablespoon milk
½ teaspoon vanilla extract
¼ cup butter (1/2 stick)
¼ cup granulated sugar
2 Tablespoons brown sugar
½ cup semisweet chocolate chips

Method:
1. Preheat oven to 375 ° F. Sift or whisk together the flour, salt, and baking soda in a mixing bowl. Combine the egg, milk, and vanilla in another bowl.
2. Cream the butter in the mixer bowl, starting on low speed to soften the butter. Add the sugars. Increase the speed to medium and cream the mixture until light and fluffy. Reduce to low speed and add the egg mixture slowly. Increase to a medium speed and mix until well combined.
3. Add the flour mixture slowly, 1/3 at a time, scraping the sides of the bowl until thoroughly combined.
4. Stir in the chocolate chips. Scoop with a #20 disher onto the parchment-lined baking sheets, 8 cookies per sheet.
5. Bake for 13 to 15 minutes, checking the cookies after 5 minutes. Rotate the baking sheet for more even browning if needed. Remove the cookies from the pan immediately onto wire cooling rack.
6. Once cooled completely, store in an airtight container.

Credit: *Three Chips for Sister Marsha* *www.FoodNetwork.com* with Alton Brown. *Good Eats—Episode EA1C05. Video 1: Super Sweets*

Soft and Puffy Chocolate Chip
Makes 8, 1.4 oz/40g cookies



Ingredients
¼ cup butter-flavored shortening
3 Tablespoons granulated sugar
¼ cup brown sugar
½ cup + 1 Tablespoon cake flour
¼ teaspoon salt
½ teaspoon baking powder
2 Tablespoons beaten egg
½ teaspoon vanilla extract
½ cup semisweet chocolate chips

Method

1. Heat oven to 375 ˚F. Combine the shortening and sugars in the mixer bowl; cream until light and fluffy. In the meantime, sift or whisk together the cake flour, salt, and baking powder. Set aside.
2. Add the eggs to the creamed mixture and beat on medium to combine. Then add vanilla. Increase the speed until thoroughly incorporated and fluffy.
3. With the mixer set to low, slowly add the dry ingredients, 1/3 at a time, to the shortening and combine well. Stir in the chocolate chips. Chill the dough one hour or overnight.
4. Scoop (#20 scoop) onto parchment-lined baking sheets, 8 per sheet. Bake for 13 minutes or until golden brown and puffy, checking the cookies after 5 minutes. Rotate the baking sheet for even browning.
5. Remove cookies to cool on wire rack; when completely cool, store in an airtight container.

Credit: *Three Chips for Sister Marsha* www.FoodNetwork.com with Alton Brown. *Good Eats—Episode EA1C05. Video 1: Super Sweets*

Cookie Lab Evaluation Form: Put one of each type of cookie on a plate. Evaluate for the following characteristics using this scale:

5=Outstanding 4=Good 3=OK 2=Bummer 1=Yikes!

Cookie Type	Desired Texture	Desired Appearance	Desired Taste	Total
Thin Cookie				
Puffy Cookie				
Chewy Cookie				
Cantucci (biscotti)				

1. Which cookie did you personally like the best? _____

2, Name one reason the puffy cookie was more puffy. _____

Name one reason the thin cookie was more thin. _____

Name one reason the chewy cookie was more chewy. _____

Why gives the biscotti its characteristic crunch? _____

3. What cooking and cleaning tasks were you involved with in this lab? (List 3 or 4)

4. If you do this lab again, or prepare these at home, what would you change or try to improve on? (List at least one thing).

Lab #2--Cookie Mixing Methods

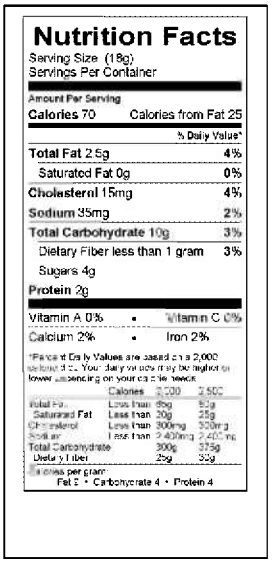
Teacher introduction: Basically only two mixing methods are used with cookies: the ***one-stage method*** and the ***creaming method.*** In the first lab we used the creaming method. Introduce students to the coffeehouse favorite, Italian biscotti along with th one-stage method used for mixing biscotti dough.

Biscotti: All Italian cookies are called *biscotti*. ***Cantuccini*** are the classic twice-baked, "dunking" kind. With little or no fat other than eggs and nuts, they offer a wide variety of choices for add-ins (fruits, nuts, chocolate, or other flavors). They are mixed in a one-bowl method (no creaming), baked in a "log" shape, cooled, sliced and then baked again for their characteristic crunch. They are then sometimes partially dipped in chocolate.

Be sure and carefully read the two baking stages necessary for these cookies.

Lab #2-Cookie Mixing Method, One-Stage Mixing

Schedule: Two, 50-minute labs
Day 1: Steps 1-5: Mixing, (20 minutes prep); dividing dough into 2 logs, baking 30 minutes. Cool logs and wrap.
Day 2: Begin with Step 6-Slice and bake second time (30 minutes); evaluate/compare methods, cookies and report observations.



Cantuccini

Makes about 48, 0.6 oz/18g biscotti

Ingredients	Measures	Weights
All-purpose flour	2 ¼ cups	9.25 oz.
Granulated sugar	1 cup	7 oz.
Baking powder	2 teaspoons	.33 oz.
Ground cinnamon	¾ teaspoons	¾ teaspoon
Salt	¼ teaspoon	¼ teaspoon
Whole, unblanched almonds	1 ½ cups	6.5 oz.
Large eggs	3	5.0 oz. (2/3 c.)
Vanilla extract	2 teaspoons	2 teaspoons

Method:

1. Thoroughly mix the flour, sugar, baking powder, cinnamon and salt in a large mixing bowl. Stir in the almonds.
2. Use a wire whisk to beat the eggs and vanilla together in a small bowl. Stir them into the flour mixture. The dough may appear dry, but it will come together as you knead.
3. On a lightly floured work surface, knead the dough by folding it over onto itself until it is smooth, about 1 to 2 minutes. Avoid adding too much flour. Divide the dough into two, 12-inch logs about 2-inches wide and 1-inch high.
4. Preheat the oven to 350 degrees F. with rack placed in center. Use parchment paper or a vegetable cooking spray to line or treat a large baking sheet.
5. Place on greased or parchment lined pan and bake for 30 minutes, (until risen and firm to the touch). Slide the logs (leave on the parchment paper) onto a cooling rack and cool until cool, about 30 minutes and proceed to step 6 OR after cooling, wrap the logs in plastic wrap and continue when convenient the next day.
6. (Day 2) Preheat the oven to 350 degrees F. Slice into ¼-inch thick slices using a very sharp, serrated knife. Place cut side down on baking sheets. Bake 10 to 15 minutes, turn the cookies over, and bake another 10 to 15 minutes until golden.
7. Cool and store up to a month in an airtight tin or plastic container.

Cantuccini variations:

Almond orange: Use only 2 large whole eggs. Add and beat with the eggs ¼ cup fresh orange juice and 2 ½ tablespoons grated orange peel. Part whole wheat flour may be used.
Almond cocoa: Stir ½ cup baking cocoa in with the dry ingredients.
Sesame: Omit the almonds. Stir about ½ cup toasted sesame seeds with the dry ingredients. Decrease the vanilla extract to 1 teaspoon.
Chocolate-Dipped: Combine ½ cup semi-sweet chocolate chips with 2 teaspoons vegetable shortening. Melt over low heat. Remove from heat. Dip one half of the cantuccini or biscotti in chocolate. Sprinkle with chopped almonds if desired. Let cool on wire rack.

- More biscotti recipes at: www.kswheat.com and www.homebaking.org links

Critical Cookie Thinking: Compare biscotti (one-stage mixing) and chocolate chip cookies (creaming method). Identify three characteristics that are different between the finished products. Ex: Moisture level, crispness, fat content, keeping qualities. (Chocolate chip are fresh for two to three days, stored in an airtight container. Biscotti keep well for several weeks in a sealed container.)

Community Service Learning:

Following are successful ways to extend learning to support or improve the community around you. January through December, baking has a place in today's culture as a delicious hand made craft.

- Get involved in the ***Great American Bake Sale*** to help end childhood hunger in America. www.greatamericanbakesale.org or 1-800-761-4227. Use Home Baking Association's ***High Yield Bake Sale*** tips @ www.homebaking.org.

- Have students chose a time to bake with another family member OR help a young person learn some baking skills. ***Bake for Family Fun*** is celebrated in February and many ideas are to be found at www.bakeforfamilyfun.org.

- ***Bake and Take Day*** is held nationally every fourth Saturday of March. Have your students adopt an older neighbor, an emergency shelter, a soup kitchen or care center. Create and deliver simple handmade cookies or crackers. Experiment with baking with the new sugar replacements in cookies. Include fruit, a fresh flower, a note, a puzzle, a game—all to brighten their day! Log onto www.bakeandtakeday.org for more information and to register what you've done!

- Bring students, faculty and parents together after a long summer. Stage a ***Coffee House*** featuring talents from parents, school staff, and students. Sell a wide selection of cookies, coffee, tea and milk to support a favorite local charity. (Borrow from the Java Den lesson plan at www.homebaking.org)

- Plan a ***Holiday Heritage Cookie Sale***. Have students do a little history search at home or in the community. What was a favorite cookie their grandma or great-grandparent prepared? Are there cookies some of the clubs or churches used to bake and were known for? Prepare several types of these Heritage cookies for a Valentines, Mother's Day, Thanksgiving or December holiday cookie sale. Feature the family or individual's name and heritage of each special cookie. Consider designing and printing a small booklet (in house, desk-top project) of these recipes and make available for sale. Sell the cookies by the pound or plate, allowing customers to "mix it up" as they wish!

- Have your own great idea? Enter the Home Baking Association Educator Award contest offered every year. Entry information is @ www.homebaking.org