

Chapter 11

Quick Breads



The term “quick breads” refers to bread products made without yeast. Air, steam, or chemical leaveners, such as baking soda or baking powder, are used as **leavening agents** instead of yeast. Since quick breads do not require kneading or time to rise, they can be prepared in a short amount of time.

The two basic categories of quick breads are batters and dough. Batters contain a higher proportion of liquid and can be divided into two subcategories: pour batters with a 1:1 ratio of liquid to flour and drop batters with a 1:2 ratio of liquid to flour. You use pour batters to make pancakes, waffles, and popovers. You make muffins, cakes, and drop cookies from drop batters. Doughs are used to make biscuits, pastries, cream puffs, pie crusts, and tortillas. The liquid to flour ratio for doughs ranges from 1:3 for soft doughs to 1:6 or 1:8 for stiff doughs. It is important to learn the functions of ingredients (e.g. structure, wetting, leavening or incorporates air, flavor, tenderness) in quick breads so you can make substitutions and adjustments to recipes as needed for consumer preferences, allergies, and intolerances and the overall healthfulness of the product.

 **THINK ABOUT IT**

◆ List some common ingredients for quick breads. Describe the purpose or function you think each ingredient plays in the bread.

◆ List 3 things you would like to learn about quick breads or 3 questions you have relating to quick breads.

1.

2.

3.

LAB ASSIGNMENT:

Muffins, Biscuits & More Quick Breads

The emphasis of this laboratory is to focus on some principals of quick bread food formulations. You will experiment with the effects of using different flours and amount of stirring on the texture and volume of muffins. You will compare baking soda and buttermilk biscuits. You will explore the effects of kneading biscuit dough for various lengths of time. Additionally, each group will prepare a unique quick bread.

Overview:

All students will complete the muffin experiment with their assigned flour, make assigned biscuits, and prepare an additional variety of quick bread. Students will taste and evaluate all of the quick bread products. Due to the number of products you will taste, be sure to keep sample sizes small. Students will also complete a recipe costing activity with this lab.

Kitchen 1: Muffin experiment, All-purpose flour

Baking powder biscuits
Blueberry muffins

Kitchen 2: Muffin experiment, All-purpose flour

Baking powder biscuits
Coffee cake

Kitchen 3: Muffin experiment, Whole wheat flour

Baking powder biscuits, All-purpose flour
Zucchini bread

Kitchen 4: Muffin experiment, Whole wheat flour

Baking powder biscuits
Corn muffins

Kitchen 5: Muffin experiment, All-purpose flour

Buttermilk biscuits
Bran muffins

Kitchen 6: Muffin experiment, Cake flour

Buttermilk biscuits
Maple applesauce bread

Kitchen 7: Muffin experiment, Bread flour
Buttermilk biscuits
Lemon tea bread

Kitchen 8: Muffin Experiment, Bread flour
Buttermilk biscuits
Pumpkin Bread

Evaluation:

- Evaluation of the Muffin Experiment
- Evaluation of Baking Powder and Buttermilk Biscuits
- Evaluation of a Variety of Quick Breads
- Costing Quick Bread

Directions:

1. Always begin by washing hands and thoroughly cleaning/sanitizing work surfaces.
2. Gather ingredients needed for assigned recipes.
3. Complete all assigned recipes/experiments.
4. Read “Quick Bread Science” and “Quick Bread Tips for Consumers”. Complete the “Quick Bread Questions”.
5. When your group is finished, taste a sample of each quick bread. Then complete the evaluation tools and “Quick Bread Feedback.”
6. Clean your work station and check out before leaving.

RECIPES:

Muffins, Biscuits & More Quick Breads

Muffin Experiment

Ingredients:

1 cup flour, type as assigned to your group	2 teaspoons baking powder
1/2 teaspoon salt	3 tablespoons sugar
1/2 cup milk, 2%	2 tablespoons egg, beaten
2 tablespoons + as needed vegetable oil	solid shortening to grease muffin tins

Method:

1. Preheat oven to 425° Fahrenheit.
2. Mark the muffin tin to identify the 3 different batters (6 stroke, 16 strokes, 66 strokes)
3. Use oil as needed to lightly grease the bottoms of six muffin tins.
4. Sift together flour, baking powder, salt, and sugar in a medium mixing bowl.
5. Blend together the milk, egg, and 2 tablespoons of oil in a separate small bowl, with a whip (large whisk). Do not beat until foamy.
6. Make a “well” in the dry ingredients. Add the liquid ingredients.
7. Stir 5 or 6 strokes. Some of the dry ingredients will not be wetted at this stage of blending. Fill two muffin cups 2/3 full with under-mixed batter.
8. Stir the remaining batter 5 or 10 additional strokes or just until the dry ingredients are wetted. The batter should appear lumpy at this stage. Fill two muffin cups 2/3 full with standard batter.
9. Stir the remaining batter an additional 50 strokes. At this stage the batter should be extremely smooth. Fill two muffin cups 2/3 full with over-mixed batter.
10. Bake all muffins for 15-20 minutes.

Baking Powder Drop and Cut Biscuits

Ingredients:

1 1/2 cups flour, all-purpose	2 teaspoons baking powder
1/2 teaspoon salt	1/4 cup shortening
1/2 cup + 1 tablespoon milk 2%	shortening to grease baking sheet

Method:

1. Preheat oven to 425° Fahrenheit.
2. Lightly grease a 3-inch strip of the baking sheet for the drop biscuits.
3. Sift together the dry ingredients (flour, baking powder, and salt).
4. Cut shortening into the dry ingredients with a pastry blender. Cut until pieces are well blended.
5. Add all of the milk in one portion. Stir with a fork for approximately 10 strokes.
6. Remove enough dough for two drop biscuits. Place on the greased portion of the baking sheet.
7. Sprinkle approximately 1 tablespoon of flour on a pastry board.
8. Place the remaining dough on the floured pastry board. Dip your fingers in a small amount of flour and pat the dough to a thickness of 1 inch. Fold half of the dough onto the other half. If necessary you may add more flour.
9. Again pat the dough to a thickness of 1 inch and fold in half. Repeat this process 5 or 6 times.
10. Pat the dough to a 3/4-inch thickness.
11. Cut two biscuit using a biscuit cutter. Be sure to dip the cutter into flour before cutting each biscuit. To get evenly shaped biscuits, use even pressure on the cutter.
12. Place each standard biscuit on an ungreased part of the baking sheet.
13. Knead the scraps of dough together until the dough becomes very elastic (50 times). Pat to a 3/4-inch thickness. Cut biscuits out of the overworked dough and place on an ungreased part of the baking sheet.
14. Place the baking sheet in the preheated oven. Bake for about 15 minutes.

Buttermilk Biscuits

Ingredients:

1 1/2 cups flour, all-purpose, + as needed to flour board	2 teaspoons baking powder
1/2 teaspoon baking soda	1/2 teaspoon salt
1/4 cup shortening	2/3 cup buttermilk
shortening to grease baking sheet	

*You can substitute 2/3 cup milk that has had 2/3 Tablespoon of an acid like vinegar and let stand for 5-10 minutes. If you use buttermilk and have left over, you can freeze it for future use.

Method:

1. Preheat oven to 425° Fahrenheit.
2. Lightly grease a 3-inch strip of the baking sheet for the drop biscuits.
3. Sift together the dry ingredients (flour, baking powder, baking soda, and salt).
4. Cut shortening into dry ingredients with a pastry blender. Cut until pieces are well blended.
5. Add all the buttermilk in one portion. Stir with a fork for approximately 10 strokes.
6. Remove enough dough for two drop biscuits. Place on the greased portion of baking sheet.
7. Sprinkle approximately 1 tablespoon of flour on a breadboard.
8. Place the remaining dough on the floured work space. Dip your fingers in a small amount of flour and pat the dough to a thickness of 1 inch. Fold half of the dough onto the other half. If necessary you may add more flour.
9. Again pat the dough to a thickness of 1 inch and fold in half. Repeat this process 5 or 6 times.
10. Pat the dough to a 3/4-inch thickness.
11. Cut two biscuit using a biscuit cutter. Be sure to dip the cutter into flour before cutting each biscuit. To get evenly shaped biscuits, use even pressure on the cutter.
12. Place each standard biscuit on an ungreased part of the baking sheet.
13. Knead the scraps of dough together until the dough becomes very elastic (50 times). Pat to a 3/4-inch thickness. Cut biscuits out of the overworked dough and place on an ungreased part of the baking sheet.
14. Place the baking sheet in the preheated oven. Bake for about 15 minutes.

Blueberry Muffins

Ingredients:

1 3/4 cups flour, all-purpose	1/2 cup sugar
2 1/2 teaspoons baking powder	3/4 teaspoon salt
3/4 cup milk, 2%	1/3 cup vegetable oil
1 egg, beaten	2 tablespoons sugar
1 cup blueberries (90-250 berries depending on size)	2 teaspoons lemon zest
shortening to grease tins	

Method:

1. Preheat oven to 400° Fahrenheit. Grease muffin tin.
2. In a large bowl, combine flour, sugar, baking powder, and salt. Make a well in the center of the dry ingredients.
3. Combine the milk, oil, and egg in a 2 cup measuring cup. Add to the dry ingredients, stirring until just moistened.
4. Toss the blueberries with the 2 tablespoons of sugar and the lemon zest. Fold into the batter.
5. Fill the greased muffin tins 2/3 full. Bake for about 20 minutes or until inserted toothpick comes out clean.

Coffee Cake

Ingredients:

1 cup sugar	1/2 cup margarine or butter
2 eggs	2 cups flour, all-purpose
1 teaspoon baking powder	1 teaspoon baking soda
1/2 teaspoon salt	1 cup sour cream, reduced fat
1 teaspoon vanilla	1/2 cup pecans, chopped
3 tablespoons brown sugar	2 tablespoons sugar
1/2 teaspoon cinnamon	solid shortening to grease baking pan

Method:

1. Preheat oven to 350° Fahrenheit.
2. In a medium mixing bowl, cream the sugar and butter together until light and fluffy. Use an electric mixer.
3. Add the eggs, one at a time. Mix well after each addition.
4. Sift together the flour, baking powder, baking soda, and salt. Mix well.
5. Add 1/3 of the dry ingredients to the creamed mixture. Add half of the sour cream. Mix well. Add another 1/3 of the dry ingredients and the remaining sour cream. Mix well. Finish adding the dry ingredients. Stir in the vanilla.
6. Pour batter in to a well-greased 9-inch square pan.
7. Combine the pecans, brown sugar, sugar, and the cinnamon. Sprinkle on the batter.
8. Bake in preheated oven for 45-50 minutes or until inserted toothpick comes out clean.

Zucchini Bread

Ingredients:

2 eggs, beaten	1 teaspoon vanilla
2 Tablespoons vegetable oil	1 cup sugar
1/2 teaspoon cinnamon	1/2 teaspoon salt
1/2 teaspoon baking soda	1/4 teaspoon baking powder
2 cups flour, all-purpose	1 medium 6 1/2 ounces zucchini, coarsely grated
2 ounces pecans, chopped	solid shortening to grease pan

Method:

1. Preheat oven to 350° Fahrenheit. Grease a 5x9-inch loaf pan.
2. Combine the eggs, vanilla, and oil in a medium mixing bowl.
3. Sift together the sugar, cinnamon, salt, baking soda, baking powder, and flour in a separate mixing bowl.
4. Add the liquid ingredients to the dry ingredients. Stir just until combined.
5. Add the zucchini and pecans.
6. Place batter into prepared pan. Bake for about 1 hour or until inserted toothpick comes out clean.

Corn Muffins

Ingredients:

¾ cups yellow cornmeal	1 cup flour, all-purpose
¼ cup sugar	1 teaspoon baking powder
1/4 teaspoon baking soda	6 ounces buttermilk
2 eggs, beaten	2 Tablespoons butter, melted
solid shortening to grease muffin tin	

Method:

1. Preheat oven to 375° Fahrenheit.
2. Grease a muffin tin.
3. Combine the cornmeal, flour, sugar, baking powder, and baking soda in a medium mixing bowl.
4. Combine the buttermilk, eggs, and butter. Add to the dry ingredients. Stir until the dry ingredients are just moistened.
5. Portion into the greased muffin tins, 2/3 full. Bake for 20-25 minutes or until toothpick inserted comes out clean.

Bran Muffins

Ingredients:

¾ cup flour, all-purpose	4 teaspoons baking powder
1 teaspoon salt	1/2 cup sugar
¾ cup milk	2 cups bran cereal
1/4 cup egg, blended	1/4 cup vegetable oil
solid shortening to grease pan	

Method:

1. Preheat oven to 425° Fahrenheit.
2. Grease a muffin tin.
3. Sift together the flour, baking powder, salt, and sugar in a mixing bowl.
4. Blend together the milk and bran cereal in a bowl. Let stand for 5 minutes.
5. Add the egg and oil to the bran mixture. Mix well.
6. Add the bran mixture to the dry ingredients. Stir until just moistened.
7. Fill muffin cups 2/3 full. Bake for 15-18 minutes or until inserted toothpick comes out clean.

Maple Applesauce Quick Bread

Ingredients:

2 eggs	1/3 cup maple syrup
1/3 cup butter or margarine, melted	1 1/2 cups applesauce
3/4 cup pecans, chopped	2 cups flour, all-purpose
2 teaspoons baking powder	1/2 teaspoon baking soda
1/2 teaspoon salt	1 1/2 teaspoons cinnamon
1/4 teaspoon nutmeg	1/4 cup wheat germ
solid shortening to grease pan	

Method:

1. Preheat oven to 350° Fahrenheit.
2. Grease a large loaf pan.
3. In a large bowl, beat eggs until slightly thickened.
4. Add the maple syrup, melted butter, and applesauce, mix well.
5. Add the nuts.
6. In a separate bowl, sift together the flour, baking powder, baking soda, salt, cinnamon, and nutmeg. Stir in the wheat germ.
7. Fold the dry ingredients into the liquid ingredients.
8. Pour the batter into the greased 8 x 4 inch loaf pan.
9. Bake for 50 to 55 minutes or until inserted toothpick comes out clean.

Lemon Tea Bread

Ingredients:

3 Tablespoons butter or margarine, softened	1 ¼ cup sugar
2 eggs	1/2 cup milk
1 ½ cup flour, all-purpose	1 teaspoon baking powder
1/2 teaspoon salt	1 tablespoon lemon zest
4 ounces lemon juice	solid shortening to grease pan

Method:

1. Preheat the oven to 350° Fahrenheit.
2. Grease a loaf pan.
3. Using an electric mixer, cream the butter with ¾ cup of the sugar.
4. Add the eggs, one at a time, mixing well after each addition.
5. Add the milk, mix well.
6. Sift the flour, baking powder, and salt together and add to the wet ingredients. Mix well. Stir in the lemon zest.
7. Place in the prepared pan. Bake for 35-40 minutes or until toothpick inserted comes out clean. Remove the bread from the pan and place on a cooling rack.
8. Combine ½ cup of sugar with the lemon juice. Heat in a small saucepan until the sugar is dissolved and the mixture is hot.
9. Slowly pour the glaze over the hot bread.

Pumpkin Bread

Ingredients:

3 ½ cups sifted flour	3 cups sugar
1 ½ teaspoons salt	2/3 cups water
1 teaspoon nutmeg	1 cup vegetable oil
2 teaspoons baking soda	4 eggs
1 teaspoon cinnamon	2 cups (1 can) pumpkin

Method:

1. Preheat oven to 350° Fahrenheit. Grease and flour 3 medium-sized loaf pans. In a mixing bowl, sift together the flour, salt, nutmeg, baking soda, cinnamon, and sugar.
2. Add the water, oil, eggs, and pumpkin to the mixing bowl and stir until a smooth batter forms.
3. Pour the batter into 3 medium-sized loaf pans and bake in the oven for 1 hour.

EVALUATION OF MUFFIN EXPERIMENT (ALL-PURPOSE AND WHOLE WHEAT FLOUR)

1. Taste each variation and place the numerical score for each characteristic in the upper left hand corner of each box. (Score System: 1=very poor; 2=poor; 3=fair; 4=medium; 5=good; 6=very good; 7=excellent)
2. Provide comments/description to justify the numerical score.

QUALITY CHARACTERISTICS	APPEARANCE	CONSISTENCY/ TEXTURE	TENDERNESS	OVERALL QUALITY	FLAVOR
MUFFIN, ALL-PURPOSE UNDERMIXED					
MUFFIN ALL-PURPOSE STANDARD					
MUFFIN, ALL-PURPOSE OVERMIXED					
MUFFIN, WHOLE WHEAT UNDERMIXED					
MUFFIN, WHOLE WHEAT STANDARD					
MUFFIN, WHOLE WHEAT OVERMIXED					

EVALUATION OF MUFFIN EXPERIMENT (BREAD FLOUR AND GLUTEN FREE MIX)

1. Taste each variation and place the numerical score for each characteristic in the upper left hand corner of each box. (Score System: 1=very poor; 2=poor; 3=fair; 4=medium; 5=good; 6=very good; 7=excellent)
2. Provide comments/description to justify the numerical score.

QUALITY CHARACTERISTICS	APPEARANCE	CONSISTENCY/ TEXTURE	TENDERNESS	OVERALL QUALITY	FLAVOR
MUFFIN, CAKE UNDERMIXED					
MUFFIN, CAKE STANDARD					
MUFFIN, CAKE OVERMIXED					
MUFFIN, BREAD UNDERMIXED					
MUFFIN, BREAD STANDARD					
MUFFIN, BREAD OVERMIXED					

EVALUATION OF BAKING POWDER AND BUTTERMILK BISCUITS

1. Taste each variation and place the numerical score for each characteristic in the upper left hand corner of each box. (Score System: 1=very poor; 2=poor; 3=fair; 4=medium; 5=good; 6=very good; 7=excellent)
2. Provide comments/description to justify the numerical score.

QUALITY CHARACTERISTICS	APPEARANCE	CONSISTENCY/ TEXTURE	TENDERNESS	FLAVOR	OVERALL QUALITY
BISCUIT, BAKING POWDER DROPPED					
BISCUIT, BAKING POWDER STANDARD					
BISCUIT, BAKING POWDER OVERWORKED					
BISCUIT, BUTTERMILK DROPPED					
BISCUIT, BUTTERMILK STANDARD					
BISCUIT, BUTTERMILK OVERWORKED					
BISCUIT, GLUTEN FREE MIX DROPPED					
BISCUIT, GLUTEN FREE MIX STANDARD					
BISCUIT, GLUTEN FREE MIX OVERWORKED					

EVALUATION OF VARIETY OF QUICK BREADS

1. Taste each variation and place the numerical score for each characteristic in the upper left hand corner of each box. (Score System: 1=very poor; 2=poor; 3=fair; 4=medium; 5=good; 6=very good; 7=excellent)
2. Provide comments/description to justify the numerical score.

QUALITY CHARACTERISTICS	APPEARANCE	CONSISTENCY/TEXTURE	TENDERNESS	OVERALL QUALITY	FLAVOR
BLUEBERRY MUFFINS					
CORN MUFFINS					
BRAN MUFFINS					
PUMPKIN MUFFINS					
COFFEE CAKE					
MAPLE APPLESAUCE BREAD					
LEMON TEA BREAD					
ZUCCHINI BREAD					

COSTING QUICK BREAD (THE VARIETY YOU MADE)

My Variety _____

1. List each ingredient, cost for amount purchased and unit purchased, and amount used in recipe in the table below. You will need to get copy of the receipt from your instructor.
2. For each ingredient, calculate and record the cost for the amount used.
3. Calculate the total cost to prepare your grain recipe.

INGREDIENT	COST FOR AMOUNT PURCHASED AND UNIT PURCHASED	AMOUNT USED IN RECIPE	COST FOR AMOUNT USED
Total cost to prepare your quick bread variety:			

LEARN MORE:

Quick Bread Science

- ◆ Each ingredient in quick bread serves one or more functions. These functions include **leavening**, **tenderizing**, **flavoring**, **adding textures**, and affecting the **appearance** of the final product.
- ◆ When dough is **kneaded** or manipulated, **gliadin** and **glutenin** proteins combine to form the protein **gluten**. Gluten allows bread to expand, while providing support and structure to the bread. Since quick breads are not kneaded, the gluten is less developed than gluten in yeast breads. Flours with a medium to strong protein content are necessary to create a quick bread that rises and holds its shape.
- ◆ Gluten free baking mixes have become available in recent years. The main ingredient found in many is rice flour. Products made with gluten free flours are likely to have a more compact or dense texture. Some describe the texture of rice flour as “sandy”.
- ◆ Liquid ingredients moisten or hydrate the proteins in flour allowing gluten to form. They function in **gelatinizing starch**, dissolving dry ingredients (leavening agents, salt, and sugar) and providing a medium for baking soda, baking powder, and acids to react. In addition, they turn to steam as they are heated and the steam acts as a leavening agent. Milk and buttermilk are often used in quick breads as the moistening agent because they add nutrients and aid in browning. Water or juice may also be used.
- ◆ Leavening agents help bread rise, creating a spongy light final product. Chemical agents, air, and steam are used to leaven quick breads. Air and steam are usually used in combination with a chemical agent. Acids such as buttermilk, molasses, and orange juice may react with baking soda or baking powder (chemical agents) to release carbon dioxide gas. Gases can then move into and expand existing air pockets. Air pockets are formed when air is incorporated by beating, creaming, stirring or folding-in egg foams. Products leavened by steam often have a high ratio of liquid to flour. For example, popovers and cream puffs have a 1:1 ratio of liquid to flour. As liquids heat and turn to steam the gluten is expanded and the bread rises.
- ◆ Fats such as butter, margarine, vegetable oil, shortening, and lard are used to tenderize quick breads. The fats separate particles of flour; thereby, preventing gluten from forming stiff bands. When creamed, solid fats can aid in leavening the product because air is incorporated during creaming. Fat can add to the flavor of the bread product too.

- ◆ Eggs have many functions including leavening, providing structure, emulsifying, tenderizing, coloring, adding flavor, and increasing nutritive value. Beating eggs incorporates air into the mixture. Egg proteins found in the white and yolk provide structure. The egg yolk acts as an **emulsifier**, aids in tenderizing the product, and adds color. Eggs are a good source of nutrients such as vitamin A, vitamin D, folic acid, riboflavin, and proteins.
- ◆ Sugar functions to sweeten and flavor quick breads. In addition, sugar plays a role in the **Maillard browning reaction** which further develops flavors and appearance. Honey, molasses, maple syrup, brown sugar, and other sweeteners may be used as the sweetening agent.

Quick Bread Tips for Consumers

- ◆ Quick breads are more versatile than other baked goods giving you more flexibility to add and/or substitute ingredients.
- ◆ To decrease the fat in quick bread recipes, try replacing some or all of the butter or oil with an equal amount of applesauce. Start by replacing 1/2 the fat with applesauce. For example, if your recipe calls for 1 cup of butter try using 1/2 cup of butter and 1/2 cup of applesauce. You'll cut 800 fat kcalories from the butter and will only add about 50 carbohydrate kcalories with the applesauce.
- ◆ Applesauce works well as fat replacer in muffins, quick breads, cakes, and brownies. Other fruit purees such as prune puree, pear puree, mashed bananas, and pumpkin puree work, too. To make prune puree combine 1 1/3 cups of pitted prunes with 6 tablespoons of water and mix in a blender until the prunes are finely chopped.
- ◆ To increase the fiber and nutrient content of a quick bread, try adding dried fruit or nuts. Be sure to soak the dried fruit overnight. Soaking overnight will make the fruit tender and moist, which will keep your bread moist too. The fruit and nuts will add extra flavors and textures too.

Quick Bread Questions

1. The ingredients for batters and dough can be combined by stirring, beating, creaming, cutting in, folding in, or kneading. Match the mixing method with the description.

___ **Stirring**

___ **Beating**

___ **Creaming**

___ **Cutting in**

___ **Folding in**

___ **Kneading**

- A. Incorporating egg whites gently into a mixture using a spatula or spoon
- B. Beating fat and sugar until creamy, incorporates air
- C. Folding and pressing dough to develop the gluten
- D. Distributing ingredients evenly using a spoon
- E. Incorporating a solid fat into flour using a pastry blender, two knives, or a fork
- F. Incorporating air and distributing flour into mixture using a mixer, wire whisk, or spoon

2. Describe how muffins should be mixed.

3. Explain what happens when muffins are over-mixed or under-mixed.

4. What happens if you over-knead a biscuit?

5. Explain how buttermilk and baking powdered biscuits differ in appearance and taste.

Quick Breads Teacher Tips

Overview

Quick breads are baked immediately after the ingredients are mixed. They are leavened during baking with air, steam, and/or carbon dioxide. The different types of quick breads vary in their proportion of flour, liquid, salt, and leavening agent. Biscuits are considered a dough and muffins are considered a drop batter.

- ◆ This lab experience will take a full class period of 2 ¼ hours to complete.
- ◆ The students will study flour as a structural ingredient. The proteins in flour are important in ingredients in baked, fried, and steamed flour mixtures.
- ◆ The students will study how the hydration of flour (or how much liquid is added), the manipulation of the mixture (over and under mixing), and the addition of other ingredients affect the product.

Lab Management

Demonstrations

- ◆ Keep grocery store receipts to share prices with students for quick bread ingredients.
- ◆ Display a variety of flours and discuss their properties and uses.
- ◆ Discuss the use of applesauce or other fruit purees as a substitute for oil in quick breads.

Time Management

- ◆ All kitchens need to bake their main quick bread recipe first in order to provide enough time for them to cook and cool.
- ◆ Kitchens will need to share ovens. For example, Kitchens 1 & 2 will need to share by setting one oven at 350° Fahrenheit and another oven at 425° Fahrenheit. The same goes for Kitchens 5 & 6 and Kitchens 7 & 8. One oven is for muffins and biscuits, while the other is for the main quick bread recipes.

- ◆ Announce to the class that at least one muffin from each type of flour used needs to remain uneaten (1 under-mixed, 1 standard, and 1 over-mixed). The rest can be cut into small sample size pieces for students to taste. Students will need to observe the height and tunneling of each type of mixed muffin from each type of flour used. Keep each type of mixed muffin separate and labeled. Groups using the same type of flour can combine their sample muffins in order to keep things condensed. Do not use mini muffin pans. The same goes for the biscuits.
- ◆ The **zucchini bread** and **maple applesauce bread** may need to be set at a higher temperature or cook longer if it is not done in the center after the allotted time.

Sensory Evaluation

- ◆ Instruct the students on how to display and when to evaluate the products. As time allows, a student from each kitchen should comment about the preparation of the dish and the final product.
- ◆ Students may not be familiar with the characteristics of high quality quick breads. Take time to review the criteria for appearance and consistency/texture.
- ◆ Evaluate at the same time, side by side the biscuits; the muffins; and the breads.
- ◆ Experts would give high ratings to an appearance that has these characteristics: even size; smooth, golden top; tender top crust; flaky, slightly moist texture; and to eating quality that is creamy light, tender crumb; fine grain; and has a mild flavor (not bitter).
- ◆ Ask the students how the layers were formed in a biscuit. Is the biscuit better with more or fewer layers?

Nutrition Points for Discussion:

- ◆ The Dietary Guidelines for Americans recommend we increase the use of whole grains, use oils rather than solid fats, and reduce sodium and added sugars. What roles do quick breads play in a health promoting diet?
- ◆ Discuss the function of fat in each of the recipes where it is used. Not all fats are interchangeable in quick breads.
 - What role does oil play in the preparation of a muffin? The recipe calls for vegetable oil. How would the products compare or contrast if olive, canola, safflower, corn, or vegetable oil were used?

- The baking powder drops and cut biscuits use shortening. Could oil be used? How would the product be different?
 - How would the buttermilk biscuits be different if skim milk with an acid were used?
 - What is the role of sour cream in the coffee cake? How would the product be different if full fat sour cream was used? How would it be different if you used a “mock sour cream” (low fat cottage cheese, skim milk, and lemon juice)? Could you substitute non-fat yogurt?
 - What is the role of oil in zucchini bread? The recipe calls for vegetable oil. What types of oil could be used?
 - What is the role of margarine or butter in the maple applesauce quick bread? Could healthy oil be used instead?
- ◆ Select nutrition tips for each of these products. For example:
- Although one biscuit is 73 calories, 40% of those come from fat. Is this appropriate bread for a patient with heart disease? Why or why not?
 - One serving of coffee cake has 226 calories with 42% of the calories coming from fat. How can this product be incorporated into a health promoting diet?
 - Many people make zucchini bread as a way to use up zucchini when it is plentiful in the garden. How can you incorporate this bread into the diet of a person with type 2 diabetes?
 - Compare and contrast the nutritional value of the corn, pumpkin, and bran muffins. What is the role of sugar in the muffins and can it be reduced?
 - What is the role of applesauce in the maple applesauce quick bread?

SHOPPING LIST: (8 SECTIONS)

Item	Utilized Unit/Lab Section	Purchased Unit
Blueberries	1 cup	1 package
Zucchini	6.5 oz	2 small
Lemon Zest	5 tsp.	3 lemons
Lemon juice	4 oz	1 bottle
Applesauce	1 ½ cups	1 jar
Bran cereal	2 cups	1 box
Yellow cornmeal	4 oz	1 cont.
Whole wheat flour	2 cups	1 sml. bag
Bread flour	2 cups	1 sml. bag
All-purpose flour	6 ¾ lbs	10 lb bag
Cake flour	2 cups	1 box
Baking powder	7 oz	1 box
Baking soda	1 ¾ TBSP	1 box
Salt	4 TBSP	1 cont.
Sugar	3 lbs	1 bag
Brown sugar	3 TBSP	1 bag
Pumpkin	1 cup	1 can
Wheat germ	¼ cup	1 jar
Pecans chopped	1 ¾ cups	1 bag
Vanilla	2 tsp.	1 cont.
Cinnamon	3 ½ tsp.	1 cont.
Nutmeg	¾ tsp.	1 cont.
Ginger	½ tsp.	1 cont.
Cloves	¼ tsp.	1 cont.
Maple syrup	1/3 cup	1 bottle
Vegetable oil	2 ½ cups	1 cont.
Shortening	2 cups	1 cont.
Milk	8 ¼ cups	1 gallon
Buttermilk	3 ½ cups	1 quart
Sour cream	1 cup	1 cont.
Eggs	22	2 dozen
Butter	10 oz	1 block