

## Introduction • Lesson 2

# Helpful Microorganisms

**Class periods required:** Two 30-min. class periods, 10 min. of a 3rd period.

**Supplement section:** Introduction PA PAS for FCS: 9.3.6 F, 9.3.9 B, 9.3.9 G.

**National Education Standards:** FCS 8.2.1, 8.2.2, 8.2.5, 8.2.6, 8.2.7, 9.2.1, 9.2.2, 9.2.5, 9.2.6; LA 2, MA 130, SC 5, 041.

## LESSON SUMMARY

Students will learn about the role of helpful microorganisms in food. Many microorganisms are needed to produce food, drugs, nutrients, and perform many beneficial environmental tasks. Students will then prepare bread, with and without yeast, to learn how yeast helps bread rise.

## Objectives

*The students will:*

- Identify some helpful microorganisms and practical uses for microorganisms in foods.
- Describe the role of yeast in bread making.

## Materials Provided

*Overheads:*

1. Yogurt Manufacture
2. Sausage Manufacture
3. Cheese Manufacture
4. Bread Manufacture
5. How to make Bread (with yeast)
- 6-7. What Happened to my Bread? (3 pages)

*Handouts:*

1. Group 1: How to Make Bread (with yeast)
2. Group 2: How to Make Bread (without yeast)
- 3-6. Bread making recipes (choose one for the activity)

*Teacher Information Sheets:*

1. Yeast Activity Test
2. The Story of Yeast
3. Evaluation of Bread Making Lab
4. Glossary of Bolded Terms

## Suggested Presentation Aids

- Fresh (unspoiled) bread, sausage, and cheese samples
- Bread ingredients (see recipe)

## LESSON PLAN

### Class Period 1

#### Introduction

- Show the students the yogurt, sausage, cheese, and bread samples. Ask them what they think these foods have in common. Explain that microorganisms were used in making each one of the foods, and that while some types of microorganisms are harmful (pathogens), many others can help people.
- Ask the students what they think the role of the microorganisms were in the manufacture of each of the food products.

#### Lesson sequence

- **Yogurt** (Overhead 1): Bacteria used in the manufacture of foods are called starter cultures. To make yogurt using **starter cultures**, the bacteria are added to warm milk with some sugar. The milk is then left in a warm place for a few hours to let the bacteria grow. Bacteria growing in the milk cause the acidity to increase, and the milk solidifies, making yogurt. There are usually about one billion helpful bacteria in a finished yogurt product. Eating these bacteria will not hurt people, and their presence in yogurt increases its digestibility.
- **Sausage** (Overhead 2): Bacteria are also used to make sausages. First salt, sugar, nitrate (as a color stabilizer), and a bacterial starter culture are added to raw pieces of beef. This mixture is allowed to age at refrigerator temperatures for ten days while the bacteria grow. The bacteria perform a process called fermentation (they break down sugars), which gives the sausage its tangy flavor. The sausage is then smoked, packaged, and sold to consumers. A finished sausage product contains about ten million helpful bacteria.
- **Cheese** (Overhead 3): Bacteria have a role in cheese similar to that in yogurt. In cheese

manufacture, first a starter of culture bacteria is added to milk and rennin (an enzyme that breaks apart milk so curds can form). This causes a curd (like cottage cheese) to form. The whey (the milky part of cottage cheese) is then drained off and the curds are salted and pressed together to form a block of cheese. In the case of Swiss cheese, other bacteria are added that produce gasses and form holes in the cheese.

- **Bread** (Overhead 4): When we make bread, we add **yeast** to make the bread rise. First we add the yeast to warm water and **sugar**. Then we add the **flour** and other ingredients. The yeast produces a gas called carbon dioxide (CO<sub>2</sub>), which makes bubbles in the bread, allowing it to rise.
- **Bread making** (Overhead 5): Briefly describe the bread-making process and ingredients.

#### Closure class period 1

- Show the students how active yeast is supposed to look when warm water and sugar are added. Yeast Activity test: Teacher information sheets 1 and 2.

### Class Period 2

- **Bread Making activity:** Divide students into two groups. Have each group assemble ingredients and begin the bread making process. One group will add yeast to their bread, while the other will not. Give each group a copy of a bread recipe (Handouts 3, 4, 5, or 6) and the appropriate bread-making instruction sheet (Overhead 5 and Handouts 1 and 2). Have the students take turns **kneading** the bread, shaping it, and placing it in the pan. The dough should then be covered and placed in a refrigerator until the next class period (it will need to be checked during the day so it does not over rise).

## **Closure class period 2**

- Ask the students to predict what the unleavened bread will taste, look, and feel like. Record these predictions.

## **Class Period 3**

- **Analyzing the Bread:** Before the students come to class, bake the bread and have it cooling for them to analyze. Have the students cut and try each of the bread samples.
- Create a bulletin board with newspaper articles about good food safety practices and food safety problems that need to be addressed in one of the foods made and suggest steps to take to prevent food-borne illness.

## **Closure class period 3**

- Show the students overheads 6-7, "What Happened to my Bread?" to describe how problems can be solved. Discuss the effect of yeast on shape and taste. Did the students' predictions about the bread without the yeast come true? Why or why not?

## **Suggested Learning Activities**

- The manufacture of yogurt, sausage, cheese, and bread using helpful bacteria were discussed in class. Choose another item of food that is made using helpful bacteria and prepare an oral report describing its manufacture to share with the class. Include the following items in your report:
  1. A description of the food product and its use.
  2. A flow chart or diagram detailing the steps in manufacturing the product.
  3. The scientific name of the microorganism and what it does to change the food.
  4. A description of what you think would happen to the food if the microorganism were never added during production.

## **Evaluation**

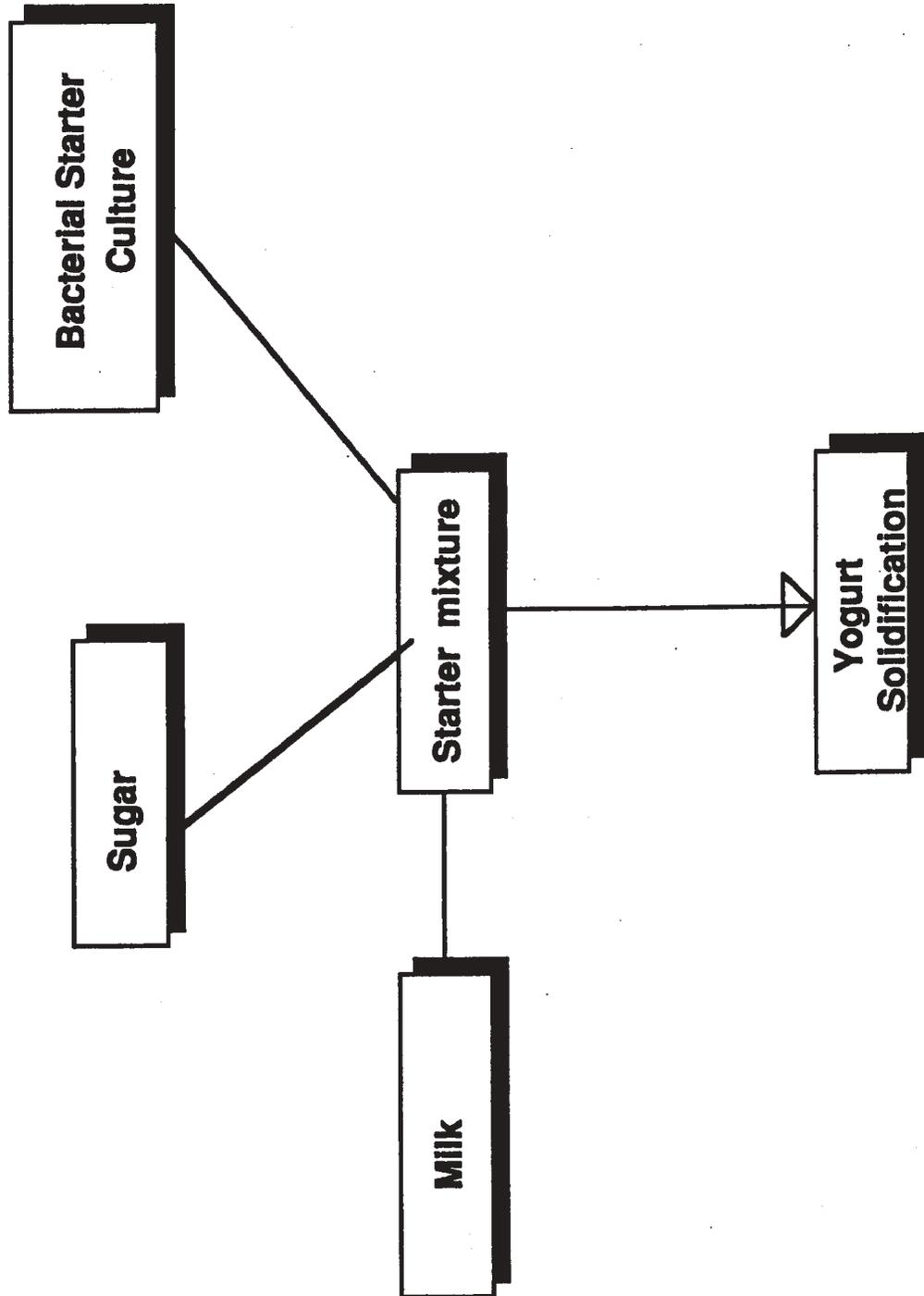
- Class participation and evaluation of participation in the bread-making activity (Teacher information sheet 3, evaluation sheet).
- Bulletin board completed with newspaper articles, title, and slogan statements.
- Quiz #2.
- Examination #1 at the end of the Introduction unit.

## **References**

- More bread recipes and experiments with yeast can be obtained from:  
Red Star Yeast and Products  
433 East Michigan Street, P.O. Box 737  
Milwaukee, WI 53201  
(414) 271-6755

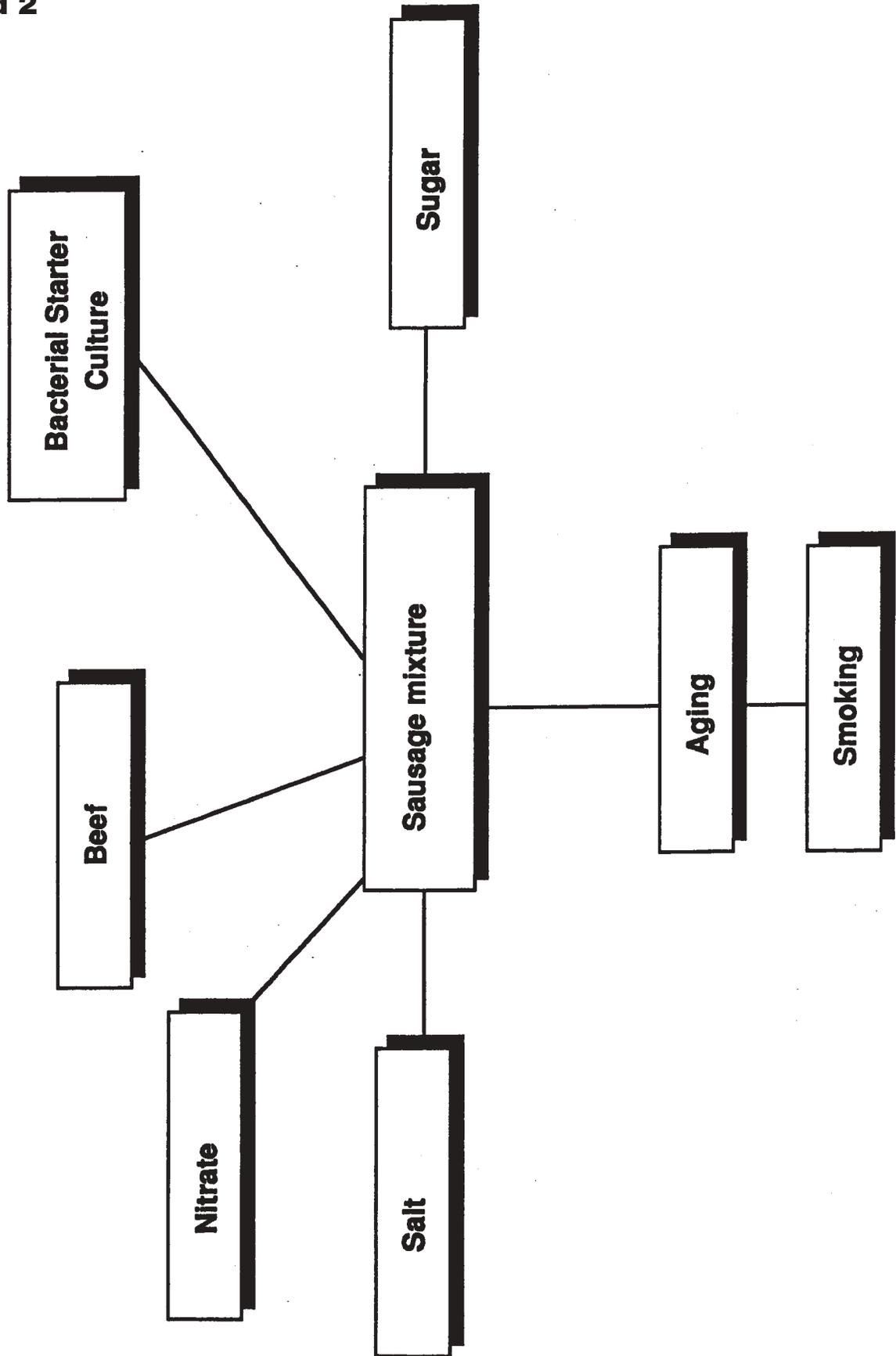
# Overhead 1

## Yogurt Manufacture



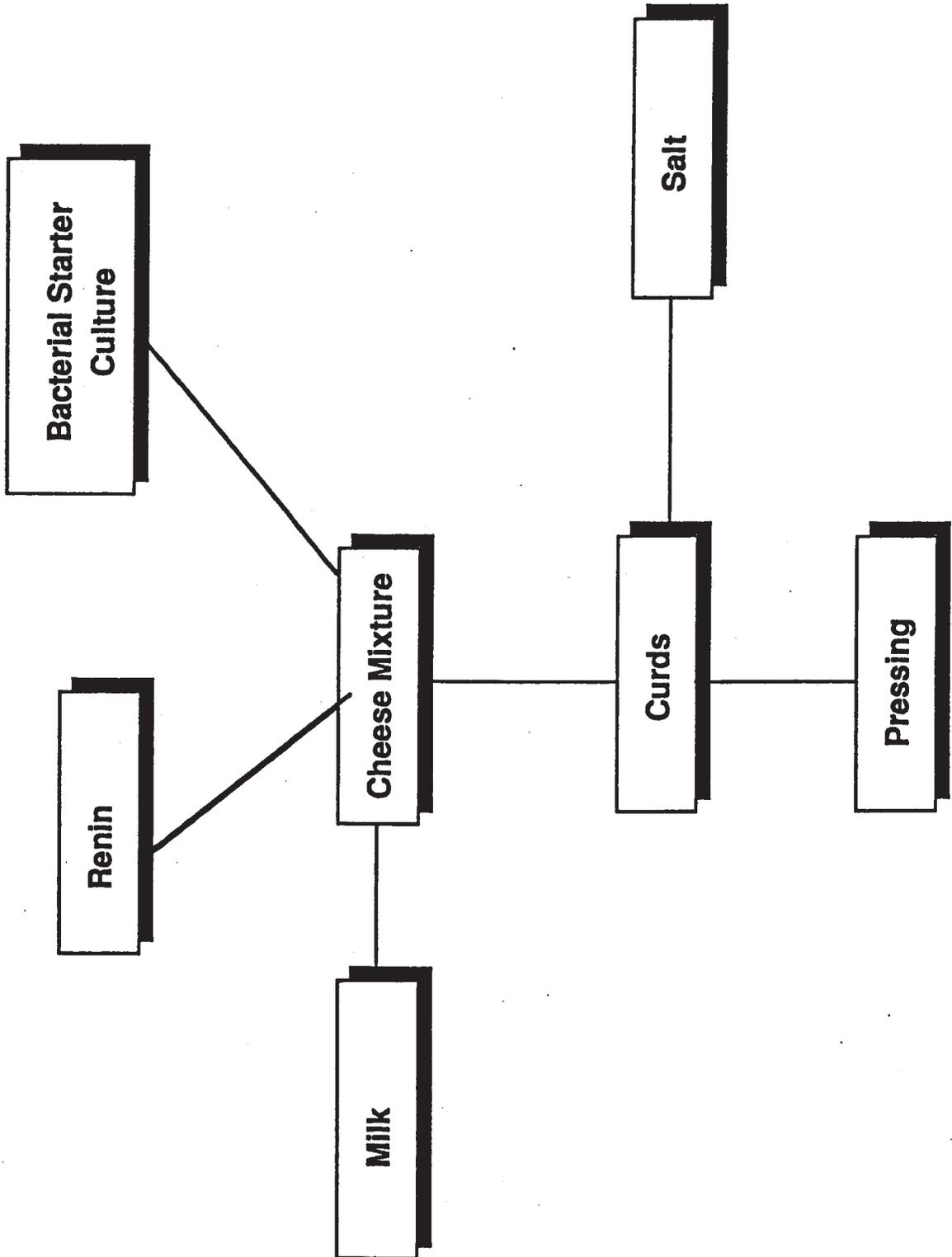
## Overhead 2

# Sausage Manufacture



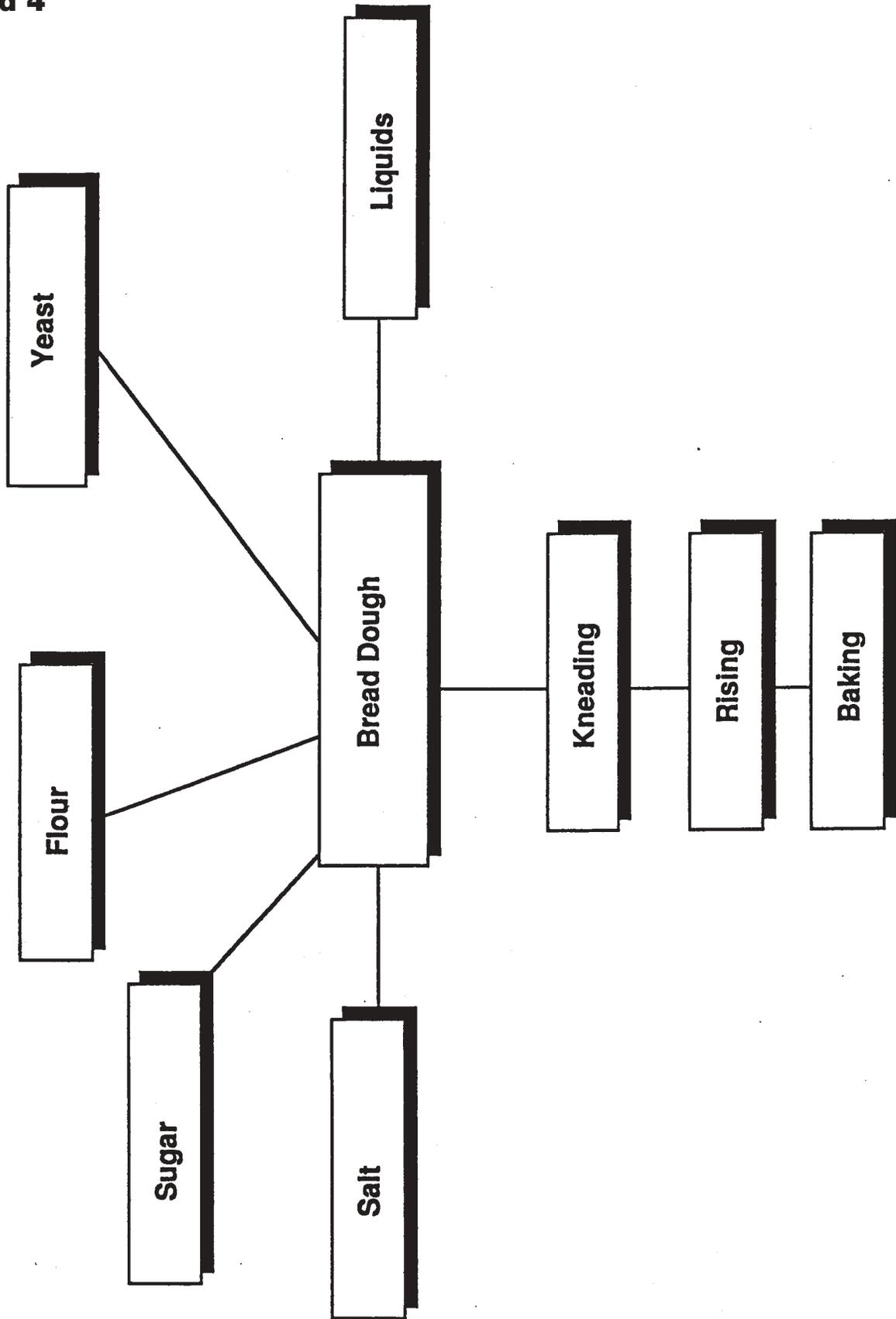
### Overhead 3

## Cheese Manufacture



# Overhead 4

## Bread Manufacture



## Overhead 5

### How to Make Bread (With Yeast)

Adapted from “Red Star Yeast: Breads for the Classroom”

1. Measure all flours into a large mixing bowl.
2. Place yeast, sugar, 1 cup flour, and salt into another large bowl; mix.
3. Measure liquids and heat liquids to 120 to 130°F.
4. Add to dry ingredients; beat with mixer for 2 min.
5. If eggs are called for in the recipe, add, and beat mixture for an additional 1 min.
6. Stir in remaining flour, a little at a time, until the dough pulls away from the side of the bowl and is stiff enough to handle.
7. Turn dough out on floured surface and knead in enough of the remaining flour until the dough is smooth and elastic (about 5-7 min). When the dough has been kneaded enough, a finger placed in the dough will come out clean and the hole will remain.
8. Let dough rise until doubled in bulk.
9. Punch down dough and shape according to recipe directions.
10. Cover and let dough rise in warm place until doubled in bulk.
11. Bake in preheated oven according to the recipe directions until tested done (bread will sound hollow when thumped on bottom with fingers). Remove from pan immediately; cool on wire rack before serving.

## Overhead 6

# WHAT HAPPENED TO MY BREAD?

### MY CRUST IS TOO THICK

- Too much flour
- Insufficient rising
- Oven temperature too low

### MY 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

### MY BREAD HAS A SOUR TASTE

- Rising place too warm
- Dough rose too fast
- Dough rose too long before being baked

### MY DOUGH DID NOT RISE

- Water too cool for dissolving yeast
- Too stiff a dough
- Too cool a rising place

### MY BREAD HAS DARK STREAKS

- Uneven mixing or kneading
- Bowl greased too heavily
- Dough not covered during rising

## Overhead 7

### **MY BREAD HAS HOLES IN IT**

- Air not completely pressed out of dough during shaping
- Dough rose too long before baking

### **MY BREAD IS DOUGHY ON THE BOTTOM**

- Bread not removed from pans and allowed to cool on racks

### **MY BREAD HAS EXCESSIVE BREAK ON SIDE**

- Oven too hot
- Insufficient rising
- Improper shaping

### **THE TOPS OF MY BREAD LOAVES CRACK**

- Bread cooled too rapidly, probably in a draft
- Dough too stiff
- Dough not well mixed

### **MY BREAD DOESN'T RISE IN THE OVEN**

- Rising place too warm, weakening yeast
- Dough allowed to rise too long

### **MY BREAD IS HEAVY AND COMPACT**

- Too much flour added
- Dough not allowed to rise long enough
- Certain flours (whole wheat, rye) create heavier products

### **MY BREAD IS WET INSIDE AND COARSE GRAINED**

- Loaf is underbaked
- Insufficient rising

## Handout 1

### How to Make Bread (With Yeast)

Adapted from “Red Star Yeast: Breads for the Classroom”

1. Measure all flours into a large mixing bowl.
2. Place yeast, sugar, 1 cup flour, and salt into another large bowl; mix.
3. Measure liquids and heat liquids to 120 to 130°F.
4. Add to dry ingredients; beat with mixer for 2 min.
5. If eggs are called for in the recipe, add, and beat mixture for an additional 1 min.
6. Stir in remaining flour, a little at a time, until the dough pulls away from the side of the bowl and is stiff enough to handle.
7. Turn dough out on floured surface and knead in enough of the remaining flour until the dough is smooth and elastic (about 5-7 min). When the dough has been kneaded enough, a finger placed in the dough will come out clean and the hole will remain.
8. Let dough rise until doubled in bulk.
9. Punch down dough and shape according to recipe directions.
10. Cover and let dough rise in warm place until doubled in bulk.
11. Bake in preheated oven according to the recipe directions until tested done (bread will sound hollow when thumped on bottom with fingers). Remove from pan immediately; cool on wire rack before serving.

## Handout 2

### How to Make Bread (Without Yeast)

Adapted from “Red Star Yeast: Breads for the Classroom”

1. Measure all flours into a large mixing bowl.
2. Place sugar, 1 cup flour, and salt into another large bowl; mix.
3. Measure liquids and heat liquids to 120 to 130°F.
4. Add to dry ingredients; beat with mixer for 2 min.
5. If eggs are called for in the recipe, add, and beat mixture for an additional 1 min.
6. Stir in remaining flour, a little at a time, until the dough pulls away from the side of the bowl and is stiff enough to handle.
7. Turn dough out on floured surface and knead in enough of the remaining flour until the dough is smooth and elastic (about 5-7 min). When the dough has been kneaded enough, a finger placed in the dough will come out clean and the hole will remain.
8. Let dough rise until doubled in bulk.
9. Punch down dough and shape according to recipe directions.
10. Cover and let dough rise in warm place until doubled in bulk.
11. Bake in preheated oven according to the recipe directions until tested done (bread will sound hollow when thumped on bottom with fingers).
12. Remove from pan immediately; cool on wire rack before serving.

## Handout 3

### BURLAP BREAD



**5 to 5 1/2 cups all-purpose flour**  
**2 packages RED STAR® Active Dry Yeast or QUICK•RISE™ Yeast**  
**1 cup rolled oats**  
**1/3 cup wheat germ**  
**1/2 cup whole bran cereal**  
**1 tablespoon salt**  
**2 cups water**  
**1/2 cup molasses**  
**2 tablespoons oil**

**Oven 375°**

**2 Loaves**

**In large mixer bowl, combine 2 cups flour, yeast, oats, wheat germ, cereal and salt; mix well. Add very warm water (120-130°), molasses and oil to flour mixture. Blend at low speed until moistened; beat 3 minutes at medium speed. By hand, gradually stir in enough remaining flour to make a firm dough. Knead on floured surface, 5 to 8 minutes. Place in greased bowl, turning to grease top. Cover; let rise in warm place until double, about 1 hour (30 minutes for QUICK•RISE™ Yeast).**

**Punch down dough. Divide into 2 parts. On lightly floured surface, roll or pat each half to a 14x7-inch rectangle. Starting with shorter side, roll up tightly, pressing dough into roll with each turn. Pinch edges and ends to seal. Place in greased 9x5-inch bread pans. Cover; let rise in warm place until double, about 1 hour (30 minutes for QUICK•RISE™ Yeast). Bake at 375° for 35 to 40 minutes until loaves sound hollow when tapped. Remove from pans; cool.**

## Handout 4



### HERB WHOLE WHEAT BREAD

**3 1/2 to 4 cups all-purpose flour**  
**3 cups whole wheat flour**  
**2 packages RED STAR® Active Dry Yeast or QUICK•RISE™ Yeast**  
**2 1/2 teaspoons salt**  
**1 teaspoon dill seed**  
**1 teaspoon basil leaves**  
**1 teaspoon thyme leaves**  
**2 cups water**  
**1/3 cup honey**  
**1/3 cup oil**  
**1 egg**

**Oven 400°**

**2 Loaves**

**In large mixer bowl, combine 1 1/2 cups all-purpose flour, 1 cup whole wheat flour, yeast, salt, dill seed, basil and thyme; mix well. Add very warm water (120-130°), honey and oil to flour mixture. Beat with mixer 2 minutes. Add egg; beat an additional 1 minute. By hand, gradually stir in remaining whole wheat flour and enough remaining all-purpose flour to make a firm dough. Knead on floured surface until smooth and elastic, 5 to 8 minutes. Place in greased bowl, turning to grease top. Cover; let rise in warm place until double, about 1 hour (30 minutes for QUICK•RISE™ Yeast).**

**Punch down dough. Divide into 2 parts. On lightly floured surface, roll or pat each half to a 14x7-inch rectangle. Starting with the shorter side, roll up tightly, pressing dough into roll with each turn. Pinch edges and ends to seal. Place in greased 8x4-inch bread pans. Cover; let rise in warm place until double, about 45 minutes (25 minutes for QUICK•RISE™ Yeast). Bake at 400° for 15 minutes; reduce heat to 375° and bake 20 to 25 minutes longer until loaves sound hollow when tapped. Remove from pans; cool.**

## Handout 5



### MANY GRAINS BREAD

- 2 3/4 to 3 1/4 cups all-purpose flour**
- 3 cups graham flour**
- 2 packages RED STAR® Active Dry Yeast or QUICK•RISE™ Yeast**
- 4 teaspoons salt**
- 3 cups water**
- 1/2 cup dark molasses**
- 1/4 cup oil**
- 1/2 cup buckwheat flour**
- 1/2 cup rye flour**
- 1/2 cup soy flour**
- 1/2 cup yellow cornmeal**
- 1/2 cup quick rolled oats**

**Oven 375°**

**2 Round Loaves**

**In large mixer bowl, combine 1 1/2 cups all-purpose flour and 2 cups graham flour, yeast and salt; mix well. Add very warm water (120-130°), molasses and oil to flour mixture. Blend at low speed until moistened; beat 3 minutes at medium speed. By hand, gradually stir in buckwheat, rye and soy flours, cornmeal, rolled oats, remaining graham flour and enough remaining all-purpose flour to make a firm dough. Knead on floured surface, 5 to 8 minutes. Place in greased bowl, turning to grease top. Cover; let rise in warm place until double, about 1 hour (30 minutes for QUICK•RISE™ Yeast).**

**Punch down dough. Divide into 2 parts. On lightly floured surface, shape each half into a round loaf. Place on greased cookie sheet. Cover; let rise in warm place until double, about 30 minutes (15 minutes for QUICK•RISE™ Yeast). With very sharp knife, make cross slash across top of each loaf. Bake at 375° for 35 to 40 minutes until bread sounds hollow when tapped. If too dark, cover loosely with foil last 5 to 10 minutes of baking. Remove from cookie sheets; cool.**

**Handout 6****REFRIGERATOR ROLLS**

**6 1/2 to 7 cups all-purpose flour**  
**2 packages RED STAR® Active Dry Yeast**  
**1/2 cup sugar**  
**2 teaspoons salt**  
**2 cups water**  
**1/3 cup butter or margarine**  
**2 eggs, room temperature**

**Oven 400°**

**32 Rolls**

**In large mixing bowl, combine 2 1/2 cups flour, yeast, sugar and salt; mix well. Add 2 cups very warm (120-130°) water and butter to flour mixture, Blend at low speed until moistened; beat 2 minutes at medium speed. Add eggs; beat additional 1 minute. By hand, gradually add enough remaining flour to make a soft dough. Knead on floured surface until smooth and elastic, about 5 minutes. Place in greased bowl, turning to grease top. Cover with plastic wrap and foil. Refrigerate.**

**While dough is chilling, punch down several times if necessary. Divide dough into 4 parts. Each part can now be shaped into 8 rolls. Place rolls 2 to 3 inches apart on greased cookie sheets. Cover; let rise at room temperature until almost doubled, 10 to 15 minutes. Top with desired crust treatment and topping. Bake at 400° for 8 to 10 minutes or until golden brown. Remove from cookie sheets to cool. Serve warm or cold.**

## Teacher Information Sheet 1

# YEAST ACTIVITY TEST

### SUPPLIES:

1. 1-cup glass measuring cups
2. Water
3. Thermometers
4. Yeast - 1 package per person or group
5. Sugar

### METHOD:

Dissolve 1 teaspoon sugar in 1/2 cup water (110°-115°F) in the 1-cup glass measuring cup. Add the package of yeast; stir. Set timer for 10 minutes. At the end of 10 minutes, students are to record their results.

### RESULTS:

Active Dry Yeast doubles in volume in 10 minutes. The yeast may be used at this point because it has come from a dormant to an active state and is fermenting or growing.

## Teacher information Sheet 2

# THE STORY OF YEAST

## HISTORY

The earliest uses of yeast for leavening bread may never be learned, since it was used before man knew how to write. The chemical action of yeast that causes dough to rise, known as fermentation, was probably looked upon as a mysterious and unreal phenomenon. It is believed that since early times, mixtures of leavening for bread making were formed by natural contaminants of the flour such as: wild yeast and lactobacilli (organisms also present in milk). Leaven, mentioned in the Bible, was a soft dough-type medium kept from one baking of bread to another. A small portion of this dough was used to start or leaven each new bread dough. Later scientific research found that yeast is microorganisms (visible only with a microscope). The chemical action and growth of yeast that caused dough to rise then became understandable.

## WHAT IS YEAST

Yeast is tiny forms of plant life scientists call microorganisms. They are egg-shaped cells that can only be seen with a microscope. It takes 20,000,000,000 (twenty billion) to weigh one gram or 1/28 of an ounce.

Yeast cells digest food to obtain energy for growth. Their favorite food is sugar: sucrose (beet or cane sugar), fructose and glucose (found in honey, molasses, maple syrup and fruit) and maltose (derived from starch in flour). The process, alcoholic fermentation, produces useful end products, carbon dioxide and ethyl alcohol, which are released by the yeast cells into the surrounding liquid. This is how alcoholic drinks are produced from sugar-containing flours, i.e. barley sugar/beer, grape juice/wine, and wheat, corn or other grain starches/whiskey.

Fermentation occurs naturally in nature. For instance, many berries break open in late fall when they are over-ripe and full of sugar. Natural yeast from the air, so tiny they cannot be seen, lodge on the surface of these berries, which then become alcoholic.

In the commercial fermentation of grape juice for the production of wine, the carbon dioxide gas escapes from the solution. Evidence of gas can be seen in the heavy foam caps in fermenting wine tanks. In bread baking, when yeast ferments the sugars available from the flour and from added sugar, the carbon dioxide gas cannot escape because the dough is elastic and stretchable. Therefore, the dough rises. Thus, the term yeast-raised or yeast-leavened breads came into the vocabulary of the world of baking.

## PRODUCING YEAST

The method of producing yeast in modern factories is to grow it on cane or beet molasses. Yeast is added to the sugar solution and minerals in large fermentation vats. As the yeast digests the sugar, it grows by budding. The buds separate from the "mother" cell and continue to do their own budding. When they have completed this process, they are separated, washed, filtered and pressed. The results of these processes are compressed or moist yeast. Moist yeast can be dried under carefully controlled conditions to become what we know as dry yeast. After drying, it is finely ground and packaged in oxygen-free packages that will keep the yeast active for 13 months without refrigeration.

## YEAST IN BREAD MAKING

Compressed yeast is very perishable and must be kept under refrigeration. It can be dissolved in warm water (80°-90°F) before using in a recipe. Dry yeast can be dissolved directly in water that is 110°-115°F, or it can be mixed with flour first and then activated with water that is 120°-130°F. The flour protects the yeast and acts as a blanket to keep the yeast safe from the hot water.

Once in the dough, the yeast immediately begins to ferment the sugar; the dough rises with the formation of the small carbon dioxide gas bubbles. The dough is very elastic and stretchable and does not allow the bubbles to escape. As the gases collect, the bread expands. During the first part of baking, there is a final increase in the volume of the bread known as oven-spring. As the interior of the bread heats, the carbon dioxide produced by the yeast rapidly expands the gluten pockets and the loaf increases in size. The action continues until the internal temperature of the loaf gets so hot that the yeast cells die and the crust is formed. The small amount of alcohol generated during fermentation evaporates during the baking process. While oven-spring is happening, during the first 10 to 12 minutes of baking, the heat bakes the dough into the firm texture of bread by setting the starch, and the holes which were occupied by the carbon dioxide gas are left to make the bread porous.

## WHY EAT BREAD

In order to bake bread, we need to make a dough of flour, water, yeast, sugar, oil and salt. All of these ingredients help to produce a favorite food that is not only delicious to eat but also very high in nutritional value. Bread is a complex carbohydrate containing 8.5% to 10% protein. This is so important in the development of healthy human tissue and also a good source of vitamins like thiamin, riboflavin and niacin and minerals like calcium, iron and phosphorus. Including several servings of complex carbohydrates into your meal planning is important, but it is also necessary to balance them with the remaining steps of the food pyramid. Having healthy portions of bread along with fruit, vegetables, meat and dairy products plus using fat sparingly will lead to well-balanced and healthy eating.

## Teacher information Sheet 3

Name \_\_\_\_\_

Class/Period \_\_\_\_\_

Date \_\_\_\_\_

## Evaluation for Bread-Making Lab

Evaluate each step of the bread-making lab using the following rating scale. One is low and ten is the highest score. If an evaluation step is not used in your recipe, leave it blank.

Procedure	Score									
Proper storage temperature for perishable ingredients	1	2	3	4	5	6	7	8	9	10
Clean storage area for ingredients	1	2	3	4	5	6	7	8	9	10
Wash hands and personal hygiene	1	2	3	4	5	6	7	8	9	10
Clean and sanitize work area, ovens, and equipment	1	2	3	4	5	6	7	8	9	10
Wash packages before opening	1	2	3	4	5	6	7	8	9	10
Organize work area	1	2	3	4	5	6	7	8	9	10
Follow bread recipe directions completely	1	2	3	4	5	6	7	8	9	10
Measure ingredients accurately	1	2	3	4	5	6	7	8	9	10
Correct temperature of water, 120 -130 ° F for yeast growth	1	2	3	4	5	6	7	8	9	10
Liquid ingredients added to dry ingredients with accuracy	1	2	3	4	5	6	7	8	9	10
Knead bread for 5-7 min. on floured surface	1	2	3	4	5	6	7	8	9	10
Cover, let dough rise in a warm place until doubled in bulk	1	2	3	4	5	6	7	8	9	10
Punch dough down and rise until double in bulk	1	2	3	4	5	6	7	8	9	10
Bake in <b>preheated</b> oven according to directions	1	2	3	4	5	6	7	8	9	10
Remove from pan immediately, cool on wire rack	1	2	3	4	5	6	7	8	9	10
Clean up: wash all equipment with hot, soapy water	1	2	3	4	5	6	7	8	9	10
Clean up any spills on the floor	1	2	3	4	5	6	7	8	9	10
Use a commercial cleaner on preparation surfaces to sanitize	1	2	3	4	5	6	7	8	9	10

## Teacher information sheet 4

### Glossary of Bolded Terms

**Starter Culture:** Bacteria that are added to foods to change their composition, flavor, and/or appearance.

**Yeast:** Single-celled living organism that releases gasses to make bread rise when given moisture, food, and oxygen.

**Flour:** Added to bread to trap the gas bubbles produced by the yeast. This allows the bread to rise.

**Kneading:** A folding motion that gives the bread dough enough elasticity to rise.

**Liquid:** Makes the dough workable when combined with the dry ingredients and provides a moist environment for the yeast to grow.

**Sugar:** Aids in the browning of the crust and adds flavor to the bread. Provides food for the yeast to grow.

**Salt:** Preserves and enhances taste of baked bread. Keeps the yeast fermentation at a steady pace.

**Fat:** Makes bread tender and gives dough richness and moisture. Coats the flour particles to slow down elastic formation during kneading and gives the final product a finer grain.

**Quiz 2****Unit: Introduction****Lesson: Helpful Microorganisms**

Name \_\_\_\_\_

Class/Period \_\_\_\_\_

Date \_\_\_\_\_

**Matching: Match the vocabulary terms in column A with the definitions in column B. Write the letter of the definition in column B in the space next to the terms in column A.**

**A****B**

_____ 1. Starter Culture	A. Structure or base of the bread dough. Added to bread to trap the gas bubbles produced by the yeast.
_____ 2. Yeast	B. Makes bread tender, gives dough richness and moisture, and coats the flour particles to slow down elastic formation during kneading.
_____ 3. Flour	C. Bacteria that are added to foods to change their composition, flavor, and/or appearance.
_____ 4. Kneading	D. Aids in the browning of the crust and adds flavor to the bread.
_____ 5. Liquid	E. Single-celled living organism that release gasses to make bread rise when given moisture, food, and oxygen.
_____ 6. Sugar	F. Preserves and enhances taste of the bread. Keeps the yeast fermentation at a steady pace.
_____ 7. Salt	G. Makes the dough workable when combined with the dry ingredients and provides an environment for the yeast to grow.
_____ 8. Fat	H. A folding motion that gives the bread dough elasticity to rise.

**Short answer and fill in the blank: Write short answers or fill in the blank to the following questions and statements. Use complete sentences when answering questions.**

1. Draw a diagram representing the manufacture of cheese. How do helpful microorganisms work to improve cheese?



## Quiz 2 Key

**Unit: Introduction**

**Lesson: Helpful Microorganisms**

**Matching: Match the vocabulary terms in column A with the definitions in column B. Write the letter of the definition in column B in the space next to the terms in column A.**

A	B
___C___ 1. Starter Culture	A. Structure or base of the bread dough. Added to bread to trap the gas bubbles produced by the yeast.
___E___ 2. Yeast	B. Makes bread tender, gives dough richness and moisture, and coats the flour particles to slow down elastic formation during kneading.
___A___ 3. Flour	C. Bacteria that are added to foods to change their composition, flavor, and/or appearance.
___H___ 4. Kneading	D. Aids in the browning of the crust and adds flavor to the bread.
___G___ 5. Liquid	E. Single-celled living organism that release gasses to make bread rise when given moisture, food, and oxygen.
___D___ 6. Sugar	F. Preserves and enhances taste of the bread. Keeps the yeast fermentation at a steady pace.
___F___ 7. Salt	G. Makes the dough workable when combined with the dry ingredients and provides an environment for the yeast to grow.
___B___ 8. Fat	H. A folding motion that gives the bread dough elasticity to rise.

**Short answer and fill in the blank: Write short answers or fill in the blank to the following questions and statements. Use complete sentences when answering questions.**

1. Draw a diagram representing the manufacture of cheese. How do helpful microorganisms work to improve cheese?

*See diagram on overhead #3 of Helpful Microorganisms Lesson plan.*

*Helpful microorganisms work to improve cheese by causing a curd to form and making the holes in Swiss cheese.*

2. A long time ago cheese was made by adding a sample of raw milk, left out overnight, to fresh milk. Why do you think this process worked to make the cheese, and why don't we use that method today?

*Bacteria are commonly found in raw milk, and leaving the milk out overnight allowed starter culture bacteria to grow. We don't use that process today because pathogens may also grow in milk left out overnight and contaminate the finished cheese product.*

3. What do yogurt, sausage, cheese, and bread have in common?

*Microorganisms were used in making these foods.*

4. Bacteria perform a process of *fermentation* (break down sugars), which gives the sausage its tangy flavor.
5. Yogurt is made by adding the *bacteria* from the starter culture to warm milk with some sugar.

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