Manufacture of Cheese

Class periods: One to three 30-min. class periods

Supplement Section: Processing and Manufacturing PA PAS for FCS: 9.3.3 A, 9.3.3 B, 9.3.6 B, 9.3.9 B, 9.3.12 B.

National Education Standards: FCS 8.2.1, 8.2.3, 8.2.4, 8.2.5, 8.2.6, 9.2.1, 9.2.3, 9.2.4, 9.2.5, 9.2.6; LA 2, 3, 035, 132, 278; SC 5.

LESSON SUMMARY

Cheese is one of the main ingredients of pizza. Students will identify the steps of cheese making and list the safety measures taken at each step of this process.

Objectives

The students will be able to:

- Identify the steps of making cheese.
- Develop a HACCP Plan for making cheese and identify the critical control points at each step.
- Classify types of cheese by texture: soft, semi-soft, semi-hard, and hard.

Materials Provided

Overhead:

• The Basic Stages of Making Cheese

Worksheets:

1. Evaluation for Types of Cheese
2. Evaluation for Cheese Lab

   Worksheet A: HACCP Plan for Making Cheese

   Worksheet B: HACCP Plan for Making Cheese

Handouts:

1. Procedure for Making Soft Cheese
2. Cheese Recipes

Teacher Information sheets:

1. Background Information for Making Cheese
2. Basic Procedure for Making Cheese
3. HACCP Plan Sample for Making Cheese
4. HACCP Plan for Making Cheese Evaluation
5. HACCP Plan for Making Cheese Evaluation Rubric
6. Evaluation for Types of Cheeses/ Answer Key
7. Glossary of Bolded Terms

Suggested Presentation Aids

- Different types of milk: whole, 2 percent, skim, butter.
- Various equipment materials used for cheese making: stainless steel, glass, enamel lined steel.
- Various types of cheese: Brie, cheddar, Parmesan, Swiss, mozzarella, etc.

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by J. Lynne Brown, Melanie Cramer, and Kristine Barlow,College of Agricultural Sciences, The Pennsylvania State University.

LESSON PLAN

Class Period 1

Introduction

Cheese was originally produced as a means to preserve milk.

Lesson Sequence

- (Overhead 1: The Basic Stages of Making Cheese). Discuss each step of cheese making and safety requirements with each step using the following background information on cheese while demonstrating a simple cheese from the recipes provided at the end of this lesson.
- Show different types of cheeses. Classify them into soft (yogurt cheese, mascarpone, farmer's cheese, Brie, cream cheese, ricotta, mozzarella, Munster, feta), semi-soft (American cheese, Baby Swiss, Havarti, Colby), semi-hard (cheddar, gouda, brick, Monterey Jack, provolone), and hard (asiago, blue cheese, Gruyere, Romano, Swiss, parmesan).

Closure class period 1

- Have students taste each kind of cheese and evaluate each for flavor, texture, and color (Worksheet 1).

Class Period 2

- Students will make a soft cheese in class (Teacher information sheet 1 and 2). Refer to cheese making procedure and recipes on attached worksheets (Handout 1 and 2).

Closure class period 2

- Serve the soft cheese. Have each student taste and evaluate the flavor, texture, and color of each cheese. Use the worksheet Evaluation for Cheese Lab (Worksheet 2). Would you make this or another soft cheese again? Why or why not?

Class Period 3

- In groups of three to four students, develop a HACCP plan for making a hard and a soft cheese from milk to consumer. Refer to teacher HACCP plan information sheet as a resource (Teacher information sheet 3, Worksheet A [if teacher gives categories to students] and Worksheet B [student worksheet to develop own chart).

Closure class period 3

- Report to class the similarities and differences for each group.

Suggested Learning Activities

- Show various types of milk: whole, 2 percent, skim, butter. Let students taste each type of milk to differentiate flavors.
- Show an example of a soft and hard cheese in separate containers so students can observe and touch each cheese.

Evaluation

- Students will be evaluated on safety procedure of cheese preparation in foods lab. (Use the Evaluation for Cheese Lab worksheet 2.)
- Evaluate the HACCP plan for making cheese. Use the HACCP Plan for Making Cheese Evaluation and Rubric teacher information sheets (Teacher information sheets 4 & 5).
- Evaluate the types of cheese (Teacher information sheet 6) for flavor, texture, and color.
- Quiz #10.
- Examination #3 at the end of the Processing and Manufacturing unit.

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References

- http://www.leeners.com/cheesemaking1.html
- IFST: Current Hot Topics: Food Safety and Cheese (Institute Of Food Science & Technology) http://www.ces.ncsu.edu/depts/foodsci/agentinfo/dairy/conspub.html
- The Basics of Cheese Making: http://www.efr.hw.ac.uk/SDA/cheese2.html
- Basic Cheese Making Protocol. David B. Fankhauser, Ph.D. Professor of Biology and Chemistry, University of Cincinnati Clermont College, Batavia, OH 45103. http://Biology.clc.uc.edu/Fankhauser/cheese/cheese.html
- I Love Cheese! Web site: www.cheese.com

  CHEESE FAQs, Cheese by Textures, Making Cheese.

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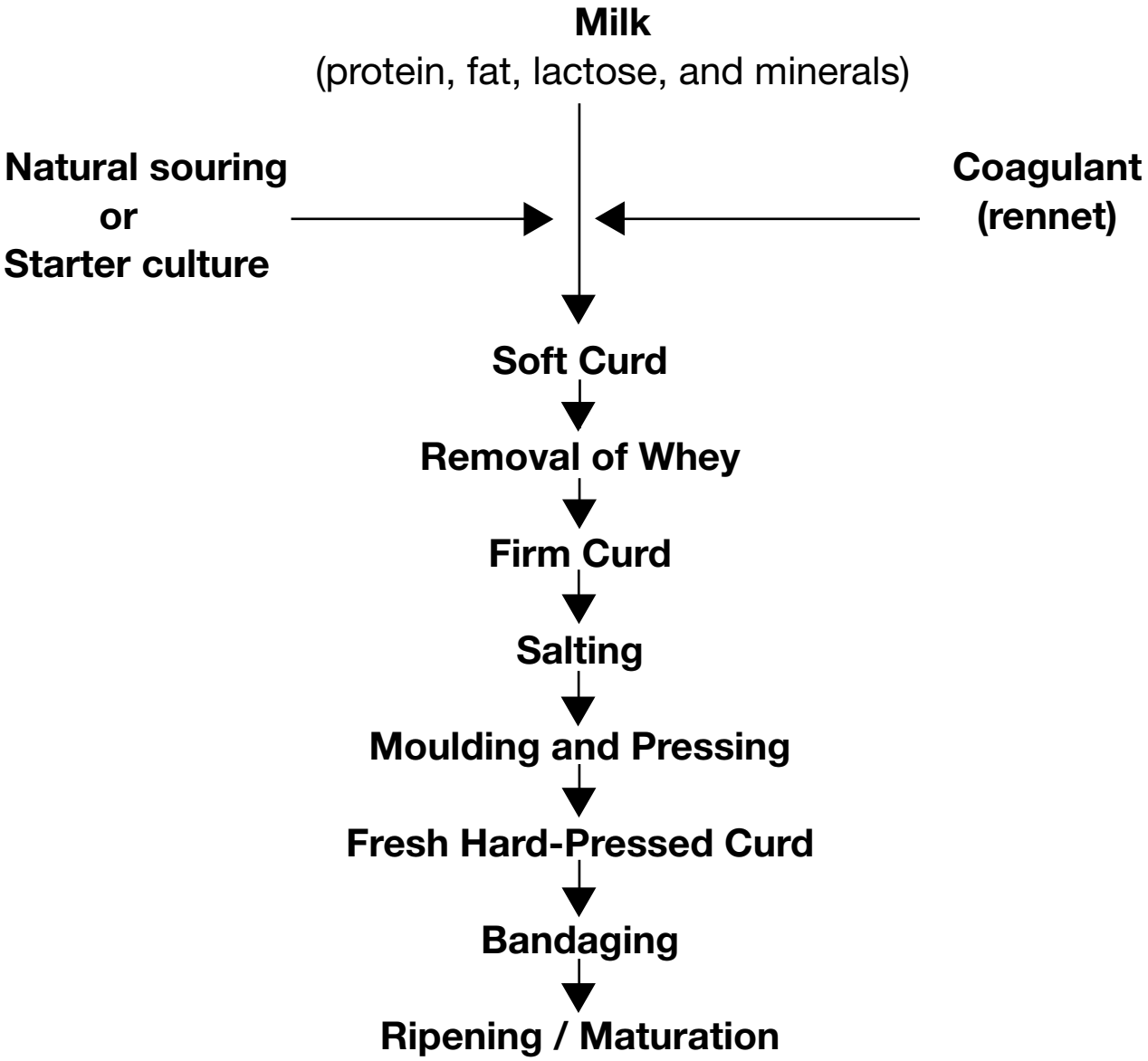
Overhead 1

The Basic Stages of Making Cheese



David B. Fankhauser, Ph.D.
http://www.clc.uc.edu/~fankhadb/cheese/cheese.html

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Worksheet 1

Name_____
Class/Period _____
Date _____

Evaluation For Types of Cheese

Choose two types of cheese from each category. Circle their names. Evaluate each cheese on flavor, texture, and color.

Cheese	Flavor	Texture	Color
Soft cheese Yogurt cheese Mascarpone Brie Cream cheese Mozzarella Muenster			
Semi-soft cheese American cheese Baby Swiss Havarti Colby			
Semi hard cheese Cheddar Gouda Brick Monterey Jack Provolone			
Hard cheese Asiago Blue cheese Gruyere Romano Parmesan Swiss			

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Worksheet 2

Name_____
Class/Period _____
Date _____

Evaluation for Cheese Lab

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

Procedure	Score
Clean and sanitize work area	1 2 3 4 5 6 7 8 9 10
Sanitize equipment	1 2 3 4 5 6 7 8 9 10
Follow directions from simple cheese recipe	1 2 3 4 5 6 7 8 9 10
Measure ingredients correctly	1 2 3 4 5 6 7 8 9 10
Use pasteurized, fresh milk or yogurt	1 2 3 4 5 6 7 8 9 10
Heat milk to correct temperature as stated in recipe	1 2 3 4 5 6 7 8 9 10
Yogurt is allowed to drain in cheesecloth for one hour	1 2 3 4 5 6 7 8 9 10
Curds and whey are allowed to drain in cheesecloth for one hour or until they stop dripping	1 2 3 4 5 6 7 8 9 10
Add acid at correct time in recipe	1 2 3 4 5 6 7 8 9 10
Place cheese in bowl and refrigerate	1 2 3 4 5 6 7 8 9 10
Clean up: Rinse equipment with cold water, soak if necessary	1 2 3 4 5 6 7 8 9 10
Wash all equipment with hot, soapy water	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

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Worksheet A

Name_____
Class/Period _____
Date _____

HACCP Plan For Making Cheese

Students will describe critical control points for the outlined cheese-making steps.

Cheese Making Steps	Describe the Critical Control Points
Milk	
Pasteurize milk	
Milk is pumped into large stainless steel vats to cook for 30 min. at 104°F	
Rennet: Enzyme used as a starter culture. Can be bought commercially or extracted from the fourth stomach of a milk-fed calf, called a 'veil'.	
Food colorings: natural or man-made	
Curd formation	
Whey is drained from the curd	
Curd is mixed with salt	
Moulding of cheese	

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Drying of Cheese	
Waxing (some cheese)	
Cheese is placed in a ventilated room to be aged	
Cheese is cut, weighed; bag is sealed, boxed and shipped.	
Shipping to retail}	
Retail: Cutting and wrapping	
Storage at retail site	
Display case in grocery store	
Home	

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Worksheet B

Name_____
Class/Period _____
Date _____

HACCP Plan For Making Cheese

Students will develop their own HACCP plan for cheese-making and describe the critical control points for each step.

Cheese Making Steps	Describe the Critical Control Points

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Handout 1

Procedure for Making Soft Cheese

You will be making a simple, soft cheese. Cheese making usually takes a lot of milk, as well as time to prepare. The following recipes use already ripened dairy products (yogurt) or an acid added directly to the milk in order to separate the curds and whey. These cheeses are ready to eat in as little as a day. Making them will demonstrate the separation of water and milk solids as well as introduce the basics of heating milk and draining cheese, using cheesecloth.

Gather all ingredients and equipment needed to complete the cheese recipe.

Prepare your cheese making work area.

- Dedicate your kitchen to making cheese. Do not make any other food during that time.
- Since you are working with warm milk, be aware that milk is susceptible to bacterial contamination.
- Put all other foods away, remove soiled dish cloths and towels, wash counters, sink, and stove top with soap and water.
- Use a cleanser to wipe down all surfaces.
- Sanitize all equipment you will be using for cheese making. Organize your equipment for easy use. Do not use chlorine bleach on stainless steel, as it will deteriorate.
- Caring for your equipment: When hot milk is allowed to cool on a surface, it will stick. Utensils should be rinsed in cold water before washing in hot, soapy water.
- Prepare the cheese according to recipe directions.
- Cleanup is essential to a bacteria-free cheese-making environment. Rinse equipment used for cheese making with cold water. Soak if necessary. Wash all equipment and preparation surfaces with hot, soapy water. Use a commercial cleaner on preparation surfaces to further sanitize.
- Serve the soft cheese with crackers, fruit, or raw vegetables.

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Handout 2

Cheese Recipes

Overnight Yogurt Cheese

1 quart plain yogurt

Line a colander with a double layer of cheesecloth. Pour the yogurt into the cheesecloth. Allow to drain for one hour. Tie the corners of the cheesecloth and hang the yogurt to drain overnight. This cheese will keep up to a week in the refrigerator. This is a simple overnight cheese with a surprising flavor. Use it like cream cheese.

Yogurt Dessert Cheese

1 batch yogurt cheese

2 tsp. honey

1/4 tsp. cinnamon

1/4 tsp. vanilla extract

1/4 tsp. nutmeg

1/4 tsp. allspice

Combine the ingredients and serve with fresh cut apples.

Lemon Cheese Spread

1/2 gallon whole milk

2 large lemons

1/4 tsp. cheese salt

Warm the milk to 165°F. Stir often to avoid scorching the milk. Add the juice of the two lemons to the milk. Stir for five seconds and then allow the milk to set off the stove for fifteen minutes. The warm milk will separate into a stringy white curd and a greenish liquid whey.

Line a colander with cheesecloth and pour the curd and whey into the colander. Tie the four corners of the cheesecloth into a lose knot and hang the bag of curds to drain for an hour or until it stops dripping. Remove the cheese from the cloth and place it in a bowl. Add cheese salt to taste. This cheese will keep up to one week in the refrigerator.

This is a quick and easy cheese to make and can be used as a cheese spread.

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Lemon Garlic Cheese Dip

1 batch of lemon cheese

1 small garlic clove

1 Tbsp. Half and Half

1/4 tsp. dill weed

Finely crush garlic and then combine all ingredients. Mix until smooth. A small food processor works very well to blend the ingredients. Serve with rye crackers. To use as a dip, add more Half and Half until the desired consistency is reached.

Mascarpone

1 quart light cream (no substitutes)

1/4 tsp. tartaric acid

In a double boiler, heat cream to 180°F. Add tartaric acid and stir for few minutes. The cream will slowly thicken into a custard-like consistency with noticeable tiny flecks of curd.

If the cream does not coagulate, add a speck more tartaric acid and continue stirring. Avoid using too much acid or the cheese will become grainy. Line a stainless steel colander with a double layer of fine cheesecloth. Pour the cream into the colander and let drain for one to two hours. Place the colander into a shallow bowl and refrigerate overnight. Place the finished cheese in an airtight container and keep refrigerated. It will keep up to two weeks.

This cheese is good as a spread for sweet breads. Please note that this cheese can be made only from light cream.

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Teacher information sheet 1

Background Information for Making Cheese

Equipment

- Clean milk cans and utensils with hot, soapy water, sterilize in boiling water, and dry completely to prevent and/or retard bacterial contamination.
- All utensils that come in contact with milk must be made of glass, stainless steel, or enamel lined steel. Cheese making involves an acidification of milk, which may deteriorate utensils such as aluminum or cast iron. Show different types of equipment and utensils and specify what material they are made from.

Milk

- Cheese is a fresh or ripened product made from coagulated milk.
- Variations in the quality of cheese depends on the type of milk used.
- Never use spoiled or expired milk.
- Keep the milk chilled at 36° F to retard spoilage until ready for use.
- Milk is carefully selected to make sure there are no antibiotics or harmful agents that could affect the cheese making process.
- The milk is heated and held at a given temperature (161-165°F) for a short period of time to destroy any harmful bacteria. This is a process known as **pasteurization**. Pasteurization is a Critical Control Point that provides the means of ensuring the destruction of pathogens in milk.

Forming the Curd

- The first step in making cheese is to coagulate the milk solids into a curd.
- This can be done by acid coagulation or **rennet** coagulation (enzyme extracted from the fourth stomach of the milk-fed calf, or vegetable rennet derived from certain strains of fungi or bacteria).
- Lemon juice and vinegar are acids that are added to a bacterial culture that turn lactose into lactic acid. The acid coagulates the milk solid into curds and the remaining liquid is whey.
- The **casein** or milk protein will precipitate and coagulate, and the curd formed is cut to separate the whey (the clear liquid that contains some of the water-soluble substances in milk).
- Coagulation is activated at temperatures between 20 and 40°C. The coagulation period depends on the type of cheese and varies from 30 minutes to 36 hours.

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Salting

- After the curd is cut and stirred to remove the whey, it is mixed with salt and packed into cheesecloth-lined hoops. The cheese is called "green cheese."
- Salt serves many purposes in cheese making. It speeds up the drying process, increases the cheese's flavor, helps the rind to form, and slows down contamination by microorganisms.

Moulding

- **Moulding** is the term used for containing and pressing salted curd into a certain shape.
- The pressed green cheese is dried for several days and is coated with hot paraffin to prevent moisture loss during curing and retard growth of bacteria.
- .• The cheese is placed in a ventilated room at a controlled temperature, about 10°C (50°F). Temperatures, which range from 32 to 77°F, vary depending on the type of cheese.

Ripening

- The **ripening** or curing causes desirable changes in the texture and flavor of cheese.
- The changes in texture will vary with the different types of cheese.
- During ripening, some cheeses become very soft, others become harder and even crumbly, and others become porous or develop holes.
- A distinctive flavor is developed in each kind of cheese.

Critical Control Points

- The following measures should be taken in the cheese making process:
- The pasteurized milk should be collected and maintained in good hygienic conditions.
- If the pasteurized milk is not to be used immediately, it should be refrigerated to minimize multiplication of bacteria.
- Good conditions of hygiene should be maintained throughout cheese manufacture, ripening, distribution, sale, and storage until consumption to prevent contamination.
- Pasteurization is one of the major critical control points in the cheese making process. Pasteurization prevents potential pathogenic organisms from contaminating milk.
- If milk has not been fully and correctly pasteurized, the elimination of all pathogens from raw milk cannot be guaranteed in all types of cheese, no matter how good the hygiene during milking and cheese production.
- Most cases of cheese-associated outbreaks of foodborne illness involved unpasteurized milk, improperly pasteurized milk, or milk contaminated with pathogenic microorganisms.
- However, contamination can occur even if pasteurized milk was used during processing.

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- Microbiological tests performed on finished cheese are useful for monitoring the successful application of controls, but these tests cannot ensure the microbiological safety of the cheese.

- Organisms, such as *Listeria monocytogenes*, *Brucella melitensis*, *Salmonella*, and *Escherichia coli* 0157 have all been associated with outbreaks traced to cheese.

- *Listeria monocytogenes* is a potentially dangerous foodborne pathogen that can multiply at refrigeration temperatures.

- The incidence of this bacteria in cheese can be reduced by proper control of hygiene and by controlled pasteurization of milk.

- Not all types of microorganisms will die during cheese making, due to acidity and high temperatures during pasteurization. Soft cheeses are prepared differently than hard cheeses and are more susceptible to bacterial contamination.

- Soft cheeses are neither fermented nor matured. Their high moisture content and high humidity encourages bacterial growth.

- For example, Brie has a lower pH and more moisture content, which promotes the growth of many pathogens. Parmesan is more acidic and has a lower water content, which inhibits microbial growth.

Storage tips for cheese:

- All cheese should be stored at a temperature between 35 and 40°F in tightly wrapped foil or plastic to protect it from drying out. Strong-smelling cheese should be stored in separate containers to prevent odors from transferring to other foods.

- Freezing cheese will help it last longer. Use moisture-proof and airtight wrapping, freeze quickly, and store at 32°F for two or more months. Thaw in the refrigerator and use as soon as possible after thawing.

- Mold may develop on the surface of cheese. Although most molds are harmless, it's best to remove before serving. Cut away 1/2 inch of cheese on all sides of the visible mold. Use remaining cheese as soon as possible.

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Teacher Information Sheet 2

Basic Procedure for Making Cheese

Ingredients to turn one gallon of milk into one pound of cheese:

1 gallon of fresh milk

1 Tablespoon buttermilk

1/4 tablet rennet ("Junket" rennet tablets come in a package of 8 tablets).
Redco Foods, Inc. P.O. Box 879 Windsor, CT 06095.

Equipment:

Thermometer

Wooden mixing spoon or whisk

Stainless steel or enameled pot, 4-6 qt, with lid, sterilized

8" strainer or a colander (Whey does not flow through as fast as a strainer.)

Large handkerchief, sterilized by boiling

Pressing frame, 4"x 5"

Can about 20 oz., with ends removed (save one end)

Procedure

1. The evening before you plan to make cheese, warm one gallon of the freshest milk to 68°F in the sterilized pot. Blend in one Tablespoon buttermilk as starter. Cover with the sterilized lid.

2. Let sit at room temperature overnight.

3. The next morning, warm milk up to 86°F. Dissolve 1/4 tablet of rennet in 1/4 cup of cold water.

4. Add dissolved rennet to warmed milk, stir to mix. Cover and let stand undisturbed for at least 35 min.

5. Test for completed action of rennet ("clean break"): Probe a clean finger into gelled milk and lift. If the gel is firm enough to break cleanly as the finger is lifted, go back to the next step. If not firm enough, let sit until clean break is obtained. (Do not stir.) This may take 1-2 hours: Be patient, do not disturb the milk.

6. Once a clean break is achieved, cut the curd with a long knife: Begin at edge of pot, cut straight down the bottom. Cut repeatedly parallel to first cut, but increasing the angle of the knife until reaching other side of pot. Rotate the pot 90 degrees, cut as before. Rotate and cut two more times.

7. Place pot over low heat, stir curd with clean bare hand by reaching down to bottom, gently

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lifting, and stirring. Cut larger curds as they appear. Do not mash or squeeze. If you want some soft cottage cheese, remove a portion of the curd at this step before you raise the temperature. Continue stirring for 15 minutes (curds will clump if not stirred). Heat curds to 95°F for soft curd, or as high as 102°F for very firm cheese. The temperature makes a great deal of difference in the consistency of the cheese.

8. Stir and maintain desired temperature until curd has contracted to consistency of firm scrambled eggs. Remove from the stove. The curds should sink in whey. Decant off whey through a strainer. Place curds in a large bowl. If the curds float, you have a gas producing contaminate in your starter. You may have more difficulty separating the curds from the whey.

9. Sprinkle two tsp. salt over curds, working with hands to mix. Pour off accumulated whey. The salt is necessary so that the cheese will not spoil as it cures.

10. Use sterile large white handkerchief to line a smooth-sided 4”x5” tin can from which both ends have been removed. Place still warm curds in the cloth, cover curd with the corners of the cloth, lay the cutout end of the can on top, and place heavy weight to press down. Let sit for 12 hours or so.

11. The next morning, remove from press, remove cloth, rub outside of cheese with salt and re-wrap with fresh handkerchief (do not replace in press). Place wrapped cheese on a rack in the refrigerator. Replace bandage daily (as long as it continues to become wet). When a dry yellowish rind forms (about one to two weeks), dip in melted wax, store in refrigerator for about one month or longer for sharper cheese.

Source: http://biology.clc.uc.edu/fankhauser/Cheese/Cheese98.htm

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Teacher information sheet 3

HACCP Plan Sample For Making Cheese

Cheese-Making Steps	Describe the Critical Control Points
Milk	Cows are cared for properly under clean methods, free of antibiotics or harmful agents. The fresher the milk the better. All milking and storage equipment is clean and sterilized.
Pasteurize milk	161-165°F for 18 seconds. Kills bacteria in milk.
Milk is pumped into large stainless steel vats to cook for 30 min. at 104°F	Clean and sanitary. Stainless steel does not react with the acid coagulator.
Rennet: Enzyme used as a starter culture. Can be bought commercially or extracted from the fourth stomach of a milk-fed calf, called a "veil."	Processed under sanitary conditions.
Food colorings: natural or man-made	Sources and processing of colorings are inspected.
Curd formation	Finishing tables are sanitary. Time and temperature are monitored and pH is at the proper level.
Whey is drained from the curd	Processed under clean and sanitary conditions or returned to the dairy and mixed with the cow's food.
Curd is mixed with salt	Salt allows the cheese to be aged over long periods of time without spoiling.
Moulding of cheese	Containing and pressing salted cheese curd requires monitoring of equipment.
Drying of cheese	Air-drying allows the protective rind to develop. Correct temperature is maintained with clean facilities.
Waxing (some cheese)	Cheese is coated with hot paraffin to prevent moisture loss and protect the cheese during aging.
Cheese is placed in a ventilated room to be aged	Controlled temperature. Strict monitoring of temperature to prevent spoilage. Resting period during which the character and flavor of the cheese develop.
Cheese is cut, weighed;	Manufacturing processes are regularly monitored for employee and

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bag is sealed, boxed, and shipped	equipment sanitation and sterility.
Shipping to retail	Clean trucks and appropriate temperatures are maintained to prevent spoilage.
Retail: Cutting and wrapping	Knives and cutting areas are clean and sanitized. Wrapping in airtight packages.
Storage at retail site	Store at a safe temperature until sold. Hard, semi-hard, and semi soft cheeses are stored in temperatures from 46-55°F.
Display case in grocery store	Clean equipment and display case. Personal hygiene of employees is maintained
Home	Store in refrigerator (keep refrigerator at proper temperature, 35 - 40°F), in unopened original package, in airtight re-sealable plastic bag, or tightly wrapped foil or plastic wrap to protect it from drying out. Do not store cheese with other strong-smelling foods as they will absorb aromas and may spoil.

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Teacher information sheet 4

Name_____
Class/Period _____
Date _____

HACCP Plan for Making Cheese Evaluation

Grade the HACCP plan activity on the following criteria using the 0-4 rating scale. Four is the highest rate and zero is the lowest rate. Write comments in the boxes under the rating for each criterion.

Criteria	4	3	2	1	0
Content: information is correct, and complete.					
Neatness: clean, organized, and not sloppy.					
Spelling: All words spelled correctly.					

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Teacher information sheet 5

HACCP Plan for Making Cheese Evaluation Rubric

Grade the HACCP plan activity on the following criteria using the 0-4 rating scale. Four is the highest rate and zero is the lowest rate. The rubric uses the following rating information for evaluating the HACCP plan for cheese making.

Criteria	4	3	2	1	0
Content: information is correct, and complete.	14-18 steps are given with CCP for each	13-9 steps are given with CCP for each	8-4 steps are given with CCP for each	3-1 steps are given with CCP for each	No steps are given with no CCP for each
Neatness: clean, organized, and not sloppy.	100% clean and organized	90%clean and organized	80%clean and organized	70%clean and organized	60% or less clean and organized
Spelling: All words spelled correctly.	100% correct spelling	90% correct spelling	80% correct spelling	70% correct spelling	60% or less correct spelling
Handed in on time: Handed in on duedate. A point is deducted for each day late.	Handed in on due date	One day late	Two days late	Three days late	More than three days late
Time Management: Time used wisely and to work on project at allotted time.	100 % time used to work on the HACCP plan	90 % time used to work on the HAACP plan	80 % time used to work on the HACCP plan	70 % time used to work on the HACCP plan	60 % or less time used to work on the HAACP plan

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Teacher information sheet 6/Answer Key

Evaluation For Types of Cheese

Choose two types of cheese from each category. Evaluate each cheese on flavor, texture, and color.

Cheese	Flavor	Texture	Color
Soft cheese: Yogurt cheese Mascarpone Brie ***Cream cheese**** Mozzarella Muenster	Bland	Smooth soft, packaged in grocery store in a rectangular block.	White
Semi -soft cheese: American cheese ***Baby Swiss **** Havarti Colby	Mild bite	Smooth, pliable, rubbery, small holes throughout	Creamy yellow, white
Semi hard cheese: ***Cheddar **** Gouda Brick Monterey Jack Provolone	Various flavors from mild bite to sharp bite	Hard, various shapes	Orange or yellow, white
Hard cheese: Asiago ***Blue cheese **** Gruyere Romano Parmesan Swiss	Strong, sour to bitter flavor	Crumbly	White with blue flecks

** Cheeses identified by bold italic letters are source of evaluation.*

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Teacher information sheet 7

Glossary of Bolded Terms

HACCP: Hazard Analysis and Critical Control Points. Identifies hazards, develops a plan to prevent or control such hazards at critical control points, records what is done at each of these points, and verifies that the system is working on an ongoing basis.

Pasteurization: Milk is heated and held at a temperature of 160-165^{O} F for a short period of time to destroy any harmful bacteria.

Rennet: Enzyme extracted from the fourth stomach of the milk-fed calf, or vegetable rennet derived from certain strains of fungi or bacteria.

Casein: Milk protein.

Moulding: Containing and pressing salted curd into a certain shape.

Ripening: Curing cheese.

***Listeria monocytogenes*:** A potentially dangerous foodborne pathogen that can multiply at refrigeration temperatures.

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Quiz 10

Unit: Processing and Manufacturing
Lesson: Food Safety and Cheese

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. HACCP	A. Curing cheese
_____ 2. Pasteurization	B. Milk protein
_____ 3. Rennet	C. Milk heated and held at a temperature of 160-165°F for a short period of time to destroy any harmful bacteria.
_____ 4. Casein	D. A potentially dangerous foodborne pathogen that has an ability to multiply at refrigeration temperatures.
_____ 5. Moulding	E. Hazard Analysis and Critical Control Points. A plan to identify, prevent, or control hazards at critical control points. Records and verifies that the system is working.
_____ 6. Ripening	F. Containing and pressing salted curd into a certain shape.
_____ 7. *Listeria*	G. Enzyme extracted from the fourth stomach of the milk-fed calf.

Short Answer: Write short answers to the following questions and statements. Use complete sentences when answering questions.

1. When making cheese, what is the most important critical control point to prevent potential pathogenic organisms from contaminating milk?

2. What can be done if mold forms on the surface of cheese?

3. Cheese is a fresh or ripened product made from _____ _____.

4. *Listeria monocytogenes* can be reduced in cheese by control of _____ and pasteurization of milk.

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Quiz 10 Key

Unit: Processing and Manufacturing
Lesson: Food Safety and Cheese

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
E 1. HACCP	A. Curing cheese
C 2. Pasteurization	B. Milk protein
G 3. Rennet	C. Milk heated and held at a temperature of 160-165°F for a short period of time to destroy any harmful bacteria.
B 4. Casein	D. A potentially dangerous foodborne pathogen that has an ability to multiply at refrigeration temperatures.
F 5. Moulding	E. Hazard Analysis and Critical Control Points. A plan to identify, prevent, or control hazards at critical control points. Records and verifies that the system is working.
A 6. Ripening	F. Containing and pressing salted curd into a certain shape.
D 7. *Listeria*	G. Enzyme extracted from the fourth stomach of the milk-fed calf.

Short Answer: Write short answers to the following questions and statements. Use complete sentences when answering questions.

1. When making cheese, what is the most important critical control point to prevent potential pathogenic organisms from contaminating milk?

   Pasteurization

2. What can be done if mold forms on the surface of cheese?

   Although most molds are harmless, it's best to remove before serving. Cut away 1/2 inch of the cheese on all sides of the visible mold. Use remaining cheese as soon as possible.

3. Cheese is a fresh or ripened product made from *coagulated milk.*

4. *Listeria monocytogenes* can be reduced in cheese by control of *hygiene* and pasteurization of milk.

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