

Dairy Lab Kits

Materials:

Butter Recipe Print Out	½ Tbsp. Confectioners' Sugar	Measuring cups (½ c, 1 c)
Whipped Cream Recipe Print Out	1.5 tsp. Vanilla Extract	Measuring spoons (½ tsp, 1tsp, ½ Tbsp)
Ice Cream Recipe Print Out	1 can Sweetened Condensed Milk	Rubber Spatula
Farmer Cheese Recipe Print Out	Whisk or electric hand mixer	Loaf pan
Glass Jar (at least ½ pint)	Mixing bowls (lg & md. metal, glass, or ceramic)	Aluminum foil
1.5-2 pts. Heavy Cream		

Butter Lab

Ingredients	Equipment
Heavy Cream	Glass Jar

Whipped Cream Lab

Ingredients	Equipment
½ c. Heavy Cream ½ Tbsp. Confectioners' Sugar ½ tsp. Vanilla Extract	Whisk Mixing Bowl ½ cup Measure ½ tsp Measure ½ Tbsp Measure Airtight Container

Farmer Cheese DEMO

Ingredients	Equipment
3 c. Whole milk 1 c. Heavy Cream ½ tsp. Sea Salt 3 Tbsp. Lemon Juice	3-qt. Saucepan Candy Thermometer Cheesecloth Sieve Lg. Bowl Slotted Spoon 1 cup Measure ½ tsp. Measure 1 Tbsp. Measure Airtight Container

Ice Cream Lab

Ingredients	Equipment
2 c. Heavy Cream 14 oz. Sweetened Condensed milk 1 tsp. Vanilla Extract	1 cup Measure 1 tsp. Measure Lg. Bowl Md. Bowl Rubber Spatula Whisk Ice Cream Containers Loaf Pan Aluminum Foil

Dairy Outline

Problem:

Dreamy Dairy, a small, local dairy is having trouble competing with the larger scale dairies and agricultural systems. Over the last few months, their expenses have exceeded their income and, if the trend continues, the owners of Dreamy Dairy will be forced to sell.

The owners of Dreamy Dairy have asked you to help them find a way to compete and stay in business. They have been encouraged to try incorporating value-added dairy products to sell directly to consumers. The owners are accepting proposals for value-added dairy products you think community members will enjoy and purchase.

You will learn about the challenges faced by Dreamy Dairy and how to prepare and process various value-added dairy products. Then, you will create a flavorful and unique value-added dairy product and present your product and proposal to the owners of Dreamy Dairy. They will select one product to feature in their store.

In unit, students will learn:

- Trends in dairy industry
- Value-added concept
- Dairy product processing

Students will be able to:

- Use appropriate food processing procedures to create at least 3 dairy value-added products.
- Analyze the needs of a client and create a product, written proposal, and pitch to satisfy those needs.
- Explain the role of local dairy producers in the global food system.

Assessment:

Students will create the following deliverables:

1. Unique food product (made) with recipe.
2. 1-page written proposal of how the food product will address the problem 4-8 minute verbal presentation of the food product and how it addresses the problem presented by the client.

Outline:

1. Intro problem
2. Butter Lab (client's attempt at a solution) (sensory evaluation for each lab)
3. Problem deep-dive exploration
 - a. System - [Prezi](#) Another great video can be found [here](#).
 - b. [Value Added](#)
4. Other potential solutions identified by client
 - a. [Whipped cream](#) Lab

- b. [Farmer cheese](#) Demo
 - c. [Ice cream](#) Lab
5. Your turn
- a. Brainstorm product
 - b. Brainstorm flavors
 - c. Create shopping list and budget
 - d. Create product
 - e. Sensory Evaluation
 - f. Write proposal
 - g. Present pitch

The Problem

Dreamy Dairy, a small, local dairy is having trouble competing with the larger scale dairies and agricultural systems. Over the last few months, their expenses have exceeded their income and, if the trend continues, the owners of Dreamy Dairy will be forced to sell.

The owners of Dreamy Dairy have asked you, the Granville Food Science Class, to help them find a way to compete and stay in business. They have been encouraged to try incorporating value-added dairy products to sell directly to consumers. The owners are accepting proposals for value-added dairy products you think community members will enjoy and purchase.

You will learn about the challenges faced by Dreamy Dairy and how to prepare and process various value-added dairy products. Then, you will create a flavorful and unique value-added dairy product and present your product and proposal to the owners of Dreamy Dairy. They will select one product to feature in their store.

Lab Procedure

Butter

Directions: Read the pre-lab questions, recipe, and conclusion questions carefully before beginning the lab. Answer the pre-lab questions, then make sure you have all of your ingredients and equipment out and ready to go (think [mise en place](#) here) before you start making the food product.

Recipe:

[Homemade Butter in a Jar](#)

Hard copy included in Lab Kit.

Pre-Lab Question:

1. Number 4 in the recipe instructions says “the mixture separates into buttermilk and butter” What is fresh buttermilk?

Sensory Evaluation Results:

See	Smell	Hear	Feel	Taste

Conclusion Questions:

1. How does the butter you made compare to commercial butter? Be sure to include similarities and differences.

2. Should the client consider adding butter as a product available for sale on the farm?
Why or why not?

3. What would you do to make this butter a more marketable product?

Homemade Butter in a Jar

Prep Time: 1 min **Shake Time:** ~7 min

Ingredients:

¼-⅓ c. Heavy Cream (to fill jar about ½ way)

Equipment:

Jar with lid

Instructions:

1. Fill your jar half-way with cream.
2. Pop the lid on, and start shaking.
3. When the sloshing sounds stop, remove the lid, and check for whipped cream!
4. Pop the lid back on, and continue to shake until the mixture separates into buttermilk and butter.
5. Remove the lump of butter (save the buttermilk for baking).
6. Rinse butter under cold water, kneading any buttermilk out of the butter.
7. Stir in a dash of salt if you wish.
8. Your butter won't keep for long because there are no preservatives. If you're not eating all of it the first day, store in the fridge for another day or two.
9. Store in the fridge if kept for more than one day.

Homemade Butter in a Jar

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Ingredients:

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9. Store in the fridge if kept for more than one day.

Challenges to Dairy Farms

Discussion Questions:

1. What are some of the environmental challenges dairy farms face today?
2. How are they addressing these environmental challenges?
3. What technologies are farms adopting to help address the environmental challenges?
4. What are some of the economic challenges dairy farms face today?
5. How are they addressing these economic challenges?
6. How do you think the way the farms address the economic challenges affects their long-term sustainability?
7. What are some of the social challenges dairy farms face today?
8. How are they addressing these social challenges?
9. What factors do you think are causing or inflating some of these social challenges?
10. How do the challenges dairy farms face compare to the challenges other farms face?
11. What other challenges do dairy farms face that were not addressed?
12. Do individual dairy farms have enough power to change the system?

Lab Procedure
Whipped Cream

Directions: Read the pre-lab questions, recipe, and conclusion questions carefully before beginning the lab. Answer the pre-lab questions, then make sure you have all of your ingredients and equipment out and ready to go (think [mise en place](#) here) before you start making the food product.

Recipe:

[Sweetened Whipped Cream](#)

Hard copy included in Lab Kit.

Pre-Lab Question:

1. The recipe instructs to whip the cream to “stiff peaks” Describe how you know you have **stiff peaks**.

Sensory Evaluation Results:

See	Smell	Hear	Feel	Taste

Conclusion Questions:

1. What causes the volume of the cream to increase as you whip it?

2. Should the client consider adding whipped cream as a product available for sale on the farm? **Why or why not?**

3. What would you do to make this whipped cream a more marketable product?

Sweetened Whipped Cream

Prep Time: 5 min

Ingredients:

½ c. Heavy Cream

½ tsp. Vanilla extract

½ Tbsp. Confectioners Sugar

Equipment:

Whisk or electric hand mixer

Large Mixing Bowl

½ cup Measure

½ tsp. Measure

Airtight Container for storage

Instructions:

1. In a large bowl, whip cream until stiff peaks are just about to form*.
2. Beat in vanilla and sugar until peaks form.
 - a. Make sure not to over-beat, cream will then become lumpy and butter-like.
3. Serve chilled.

*The cream will whip up faster if the bowl, whisk, and cream are COLD.

Demonstration Guide

Farmer Cheese

Directions: Read the recipe and questions carefully before beginning. Then, answer the questions as you follow along with the demonstration.

Recipe:

[Farmer Cheese](#)

Demo Questions:

1. What is the purpose of the lemon juice in the recipe?

2. After the lemon juice is added to the mixture, the mixture begins to separate into two different components. What is the name of each and what type of nutrient are they?

3. What is the liquid by-product of farmer cheese called and what can be done with it?

Conclusion Questions:

1. Should the client consider adding farmer cheese as a product available for sale on the farm? **Why or why not?**

2. What would you do to make this farmer cheese a more marketable product?

Farmer Cheese

Prep Time: 25 min **Strain Time:** 1 hr. **Yields:** 1 cup

Recipe From: [Leite's Culinaria](#)

Ingredients:

3 c. Whole milk
1 c. Heavy Cream
½ tsp. Sea Salt
3 Tbsp. Lemon Juice

Equipment:

3-qt. Saucepan
Candy Thermometer
Cheesecloth
Sieve
Lg. Bowl
Slotted Spoon
1 cup Measure
½ tsp. Measure
1 Tbsp. Measure
Airtight Container

Instructions:

1. Pour the milk, cream, and salt into a 3-quart (2.8-liter) stainless steel saucepan, place it over medium-low heat, and warm the milk to 190°F (88°C), stirring occasionally to keep it from scorching on the bottom. This could take up to 15 minutes or so. Watch the temperature carefully because you'll be waiting, waiting, waiting and then all of a sudden towards the very end it will increase dramatically.
2. Remove the pan from the heat and add the lemon juice, slowly stirring once or twice. Let the pot sit for 5 minutes. Do not stir the mixture during this time. It will separate into very small curds and some watery whey.
3. Line a sieve with cheesecloth and place it over a large bowl. Pour the curds and whey into the sieve and let it strain at room temperature for at least 1 hour.
4. Discard the drained liquid or reserve it for another use. Remove the farmer cheese from the strainer and, if desired, gently press it into a decorative mold or simply mound it on a plate or in a bowl. Cover and refrigerate for at least 1 hour to help the cheese firm slightly. Eat the farmer cheese right away or transfer it to an airtight container and stash it in the fridge for up to 1 week.

Lab Procedure
Ice Cream

Directions: Read the pre-lab questions, recipe, and conclusion questions carefully before beginning the lab. Answer the pre-lab questions, then make sure you have all of your ingredients and equipment out and ready to go (think [mise en place](#) here) before you start making the food product.

Recipe:

[Homemade No-Churn Ice Cream](#) Adapted from: [Foodiecrush.com](#)

Pre-Lab Questions:

1. Number 2 in the recipe instructions says to “Gently fold in the whipped cream with a spatula...” What does the word **fold** mean?

Sensory Evaluation Results:

See	Smell	Hear	Feel	Taste

Conclusion Questions:

1. In step 1 in the recipe instructions, what dairy product did you make?

2. Should the client consider adding ice cream as a product available for sale on the farm?
Why or why not?

3. What would you do to make this ice cream a more marketable product?

No-Churn Ice Cream

Prep Time: 10 min **Chill Time:** 4 hours

Recipe from: Foodiecrush.com

Ingredients:

2 c. Heavy Cream
14 fl. oz. Sweetened Condensed Milk
1 tsp. Vanilla Extract

Equipment:

1 cup Measure
1 tsp. Measure
Can Opener
Lg. Bowl
Md. Bowl
Rubber Spatula
Whisk
Loaf Pan
Aluminum Foil

Instructions:

1. In a large bowl, use a whisk to whip the cream until stiff peaks occur, be careful not to over whip.
2. In a medium bowl, whisk the vanilla into the sweetened condensed milk.
3. Gently fold in the whipped cream with a spatula, slowly incorporating the two mixtures together so it stays light and aerated.
4. Transfer the mixture to a loaf pan, cover with aluminum foil, and freeze for 4-6 hours.
5. To serve, remove from the freezer and let sit a few minutes before scooping.

Proposal for New Product
For
Dreamy Dairy

(Insert Product Name)

Overview of the Problem

(BRIEF summary of the Dreamy Dairy's need.)

(Insert Product Name) Overview

Overview of your product (include what it is, special flavors, etc.)

Any other special features of your product (packaging, options, etc.)

Conclusion

How your product meets the needs of Dreamy Dairy.

Why Dreamy Dairy should choose your potential solution.