Make & Taste Dairy

Ricotta Cheese (Grades 6-8)

Lesson Activity

LESSON OVERVIEW:

During this lesson, students will be introduced to both the origin and science behind the process of making ricotta cheese. Students will discover the nutrient content and health benefits of eating ricotta cheese. The students will make and taste ricotta in the classroom and discover ways to incorporate ricotta into healthy snacks and dishes such as dips, toppings, spreads and pasta dishes.

LESSON OBJECTIVES:

During this lesson, students will:

- Become familiar with the history and origin of ricotta cheese.
- Explain the basic science of how ricotta was discovered/produced as well as how this differs from that made in a home kitchen or classroom.
- Become familiar with the nutritional composition of ricotta and identify at least two key nutrients present in ricotta.
- Using a simple recipe, students will successfully make ricotta cheese in the classroom.
- Participate in a tasting activity with ricotta spread on small bread toasts/crackers and additional healthful ingredients.
- List at least three ways that ricotta can be used as part of dips, toppings, spreads or incorporated into other dishes.

ACADEMIC INTEGRATION:

- Science
- Health
- Language Arts

LESSON MATERIALS NEEDED:

Ingredients for every 2-4 students:

- 2 cups whole milk*
- 2 tablespoons distilled white vinegar
- ¼ teaspoon salt

*Do not use ultra pasteurized or UHT milk in this recipe. The high heat treatment used in UHT milk processing effects curd formation-sometimes curds do not form.

Equipment:

- Microwave oven
- Large colander
- Large bowl (colander should fit completely over the bowl to promote draining)
- 2 food-safe paper towel sheets
- Measuring cups and spoons
- Slotted spoon
- 1 quart or larger microwave-safe bowl
- Pot holders

For Tasting:

Gather some or all of the items below to create ricotta crostini (the Italian word for toast). If you have a school garden, consider using available herbs or vegetables.

- Small bread points or flat crackers
- Fresh herbs such as basil, parsley, cilantro, or chopped chives
- Sliced black olives
- Diced fresh tomato
- Thinly sliced fresh vegetables (e.g. zucchini, cucumber, radishes, sweet peppers, carrots, mushrooms, etc.)
- Shelled sunflower seeds
- Black pepper

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Leader Background

How Is Ricotta Cheese Made?

While ricotta is a very simple, fresh, curd-based dairy product, the explanation of how it is made can be confusing. Below is a description of the process used in this lesson compared with the traditional, more authentic process used to originally make ricotta.

Simple Method

Ricotta is a fresh cheese that can be made in a home kitchen or classroom by simply curdling and straining milk. Milk curds can be formed by heating and reducing the pH of milk. Common acidic ingredients used to lower the pH include vinegar, lemon juice or buttermilk. When prepared using this method, the ricotta is made primarily from the casein proteins present in milk and the liquid whey is drained off.

Traditional Ricotta

Authentic ricotta was actually produced from the leftover liquid whey that resulted from the production of aged cheese. The word ricotta literally means "re-cooked" in Italian because it undergoes a second process using the byproduct of cheese making. A traditional Italian ricotta therefore contains very little casein and is instead made by coagulating leftover liquid whey proteins. The process involves lowering the pH through fermentation or the addition of acid and then heating at a high temperature until the remaining proteins coagulate (solidify).

Modern Commercial Production of Ricotta

A look at the food labels of today's commercially produced ricotta sometimes reveals a combination of both fluid milk and added whey.

Why Eat It?

Ricotta cheese is a versatile, delicious and nutrient dense food. A small ¼ cup serving of ricotta provides six grams of high quality protein and is also a good source of bone-strengthening calcium. Ricotta also contributes a variety of additional nutrients, including vitamin A, B vitamins, phosphorus, zinc and selenium.

With its mild flavor and soft consistency, ricotta works well in a variety of dishes. Ricotta is used in dips, spreads, pasta dishes, desserts and as a topping for a variety of foods, ranging from eggs to salads to pizza.

History of Ricotta Cheese

There are references to ricotta in art, literature and medicine dating back to the early thirteenth century. Food historians believe that ricotta cheese is an ancient food that originated in the Italian island province of Sicily and was likely first produced from sheep's milk rather than cow's milk. Herds of sheep were more common and accessible to the peasants.

It is thought that ricotta began with the peasant class who was concerned about wasting the considerable liquid that drained off when aged cheese was produced. To avoid wasting the liquid whey resulting from cheese making, the technique of fermentation and heating was used to make a second or "re-cooked" cheese.

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Glossary:
Casein: The primary protein in milk, which accounts for 82% of the total protein while whey accounts for the remaining 18%. Casein is known to coagulate or thicken when exposed to certain conditions and forms the lumps or curds necessary for cheese making.
Calcium: The most abundant mineral in the body, calcium is needed for the development and maintenance of healthy bones and teeth. The biggest source of dietary calcium comes from dairy products such as milk, yogurt and cheese.
Curdle: In cooking, refers to when a protein ingredient separates into lumps. It is generally caused by heat and/or acidic ingredients. Curdling milk and capturing those curds is the process used in making ricotta cheese.
Protein: A nutrient needed by the body for growth, maintenance and repair.
Ricotta: A type of fresh cheese made from liquid whey or milk (or sometimes, a combination of the two). In Italian, the word means "re-cooked," which refers to the process of using the leftover liquid whey from producing aged cheeses to make the fresh cheese known as ricotta.
Whey: The liquid portion left when the casein portion of milk is thickened or coagulated. Liquid whey is a byproduct of producing aged cheeses, straining yogurt, or making ricotta cheese from milk.

Teaching the Lesson

Class Discussion

1. Begin the lesson by asking students whether they are familiar with ricotta cheese and whether they have tasted it or observed family members using it in recipes. You may want to point out that it is commonly used in lasagna recipes.

Describe how ricotta is the Italian word for re-cooked. It likely originated hundreds or even thousands of years ago in Sicily. Peasants who did not want to waste the liquid produced from cheese making learned to ferment and "re-cook" the liquid to produce the curds that form ricotta.

Ask students if they can locate Sicily on a world map (it is an island that is part of Italy).

2. Ask students if they are familiar with the the process of how ricotta is produced. Explain the basic process of producing curds from whole milk by using acid and heat. (See above for full explanation).

3. Ask students if they can name nutrients found in ricotta cheese. Point out that ricotta is a good source of protein and calcium and provides a number of other nutrients, including vitamin A, B vitamins, phosphorus, zinc and selenium.

Later in the lesson, students will complete an activity sheet using the Nutrition Facts labels for whole milk ricotta.

4. Describe how the class will break into small groups and take turns creating their own ricotta cheese. They will then use their ricotta at a tasting station to create delicious, unique ricotta crostini.

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Making and Tasting

Make Your Own Ricotta Cheese

Number of participants in a group: 2-4

Ingredients

- 2 cups whole milk*
- 2 tablespoons distilled white vinegar
- ¼ teaspoon salt

*Do not use ultra pasteurized or UHT milk in this recipe. The high heat treatment used in UHT milk processing effects curd formation- sometimes curds do not form.

Equipment

- Microwave oven
- Large colander
- Large bowl (colander should fit completely over the bowl to promote draining)
- 2 food-safe paper towel sheets
- Measuring cups and spoons
- Slotted spoon with small slots
- 1 quart or larger clear microwave-safe bowl
- Pot holders

Directions

Food Safety:

- Thoroughly clean table or preparation area with soap and warm water before starting this project.
- Students should thoroughly wash their hands with soap and warm water immediately prior to beginning the food preparation.
- All ingredients should be kept chilled up until the time of preparation and again chilled after the project is complete.

1. Place the colander over the mixing bowl and make sure there is room for liquid to drain into the bowl.
2. Place 2 paper towel sheets inside the colander.
3. Combine milk, salt, vinegar in microwave-safe bowl.
4. Microwave on high power until milk is lightly bubbling around the edges. This generally takes around 3 minutes. DO NOT LEAVE UNATTENDED.
5. Using pot holders, remove bowl from microwave and stir gently for a few seconds. Milk should quickly separate into solid white curds and transparent liquid whey.
6. Using slotted spoon, transfer the curds to the colander and drain for at least 5 minutes.
7. The curd left on top of the paper towels is your ricotta cheese! Carefully spoon the ricotta into a container and proceed to the tasting table. Ricotta keeps in the refrigerator for up to 5 days.

Yield: 2 cups of whole milk will result in approximately a ½ cup of ricotta cheese

Note: The liquid drained from the ricotta contains protein and other nutrients and can be used in soups, mashed potatoes, baked goods or other recipes.

Tasting

Once a group of students completes their ricotta cheese, they can move to a separate table, set with small plates, crostini or crackers and toppings.

1. Spread small toasts (crostini) or crackers with ricotta.
2. Add some or all of the following toppings. If you have a school garden, consider using available herbs or vegetables.
   - Fresh herbs such as basil, parsley, cilantro, or chopped chives
   - Sliced black olives
   - Diced fresh tomato
   - Thinly sliced fresh vegetables (e.g. zucchini, cucumber, radishes, sweet peppers, carrots, mushrooms, etc.)
   - Shelled sunflower seeds
   - Black pepper

References

1. Ricotta Cheese, Science and Food, UCLA Division of Life Sciences and Department of Integrative Biology & Physiology
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4. López-Alt, J. Kenji. The Food Lab: Fresh Ricotta in Five Minutes or Less. Serious Eats
http://www.seriouseats.com/2010/02/how-to-make-fresh-ricotta-fast-easy-homemade-cheese-the-food-lab.html
5. Ricotta Cheese, Canadian Dairy Commission
www.milkingredients.ca/index-eng.php?id=190
6. Nutrition Facts label from Organic Valley whole milk ricotta,
https://www.organicvalley.coop/products/cheese/ricotta-cheese/whole-milk-ricotta-cheese-15-oz/
(data used to generate Nutrition Facts label for this lesson, since ingredients are similar to those used in the lesson recipe)

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Lesson Activity

Answer the following questions after completion of the lesson.

1. History of ricotta cheese:
   a. In which country did ricotta cheese originate?

   b. What is the English translation of the word ricotta?

   c. What is the likely reason that peasants began making ricotta from the liquid left from cheese making?

   BONUS: Which animal do food historians suspect produced the milk for the first ricotta cheese?

2. The process of creating fresh ricotta from milk requires:
   a. An acid ingredient to lower the pH of the milk
   b. Fresh herbs to provide flavor
   c. Heat
   d. Both A and C

3. Ricotta is considered an aged cheese and will keep in the refrigerator for several weeks.
   a. True
   b. False

4. Use the Nutrition Facts label at right to answer the following questions.
   a. How much protein is included in a ¼ cup serving?

   b. If you combine ½ cup of ricotta with strawberries and eat the entire portion for a snack, how many milligrams of calcium would you consume?

   c. How much added sugar is present in ricotta cheese?

   d. Part-skim ricotta cheese is also available in the grocery store. Name the nutrient in the part-skim variety that would be lower than the whole milk variety shown here.

Nutrition Facts

8 servings per container

Serving size 1/4 cup (55g)

Amount Per Serving

Calories 100

	% Daily Value*
Total Fat 7g	**9%**
Saturated Fat 4g	**20%**
Trans Fat 0g	
Cholesterol 20mg	**7%**
Sodium 100mg	**4%**
Total Carbohydrate 3g	**1%**
Dietary Fiber 0g	**0%**
Total Sugars 3g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 150mg	10%
Iron 0mg	0%
Potassium 60mg	2%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

5. List at least three ways that ricotta cheese can be combined with other foods or in recipes.

BONUS: The liquid whey that drains off of the ricotta cheese contains important nutrients. Can you think of ways to use this liquid in food preparation?

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Answer Key

Answer the following questions after completion of the lesson.

1. History of ricotta cheese:
   a. In which country did ricotta cheese originate?
   SICILY or ITALY (either answer is acceptale)
   b. What is the English translation of the word ricotta?
   RE-COOKED
   c. What is the likely reason that peasants began making ricotta from the liquid left from cheese making?
   TO AVOID WASTING FOOD
   BONUS: Which animal do food historians suspect produced the milk for the first ricotta cheese?
   SHEEP
2. The process of creating fresh ricotta from milk requires:
   a. An acid ingredient to lower the pH of the milk
   b. Fresh herbs to provide flavor
   c. Heat
   d. Both A and C
3. Ricotta is considered an aged cheese and will keep in the refrigerator for several weeks.
   a. True
   b. False - **RICOTTA IS A FRESH CHEESE AND KEEPS JUST A FEW DAYS, BEST USED WITHIN 5 DAYS.**
4. Use the Nutrition Facts label at right to answer the following questions.
   a. How much protein is included in a ¼ cup serving?
   6 GRAMS
   b. If you combine ½ cup of ricotta with strawberries and eat the entire portion for a snack, how many milligrams of calcium would you consume?
   300 MILLIGRAMS
   c. How much added sugar is present in ricotta cheese?
   0 GRAMS
   d. Part-skim ricotta cheese is also available in the grocery store. Name the nutrient in the part-skim variety that would be lower than the whole milk variety shown here.
   FAT AND ALSO SATURATED FAT
5. List at least three ways that ricotta cheese can be combined with other foods or in recipes.
   Answers will vary – possibilities include topping for bread, toast or crackers, base for dips, an ingredient in lasagna and other pasta dishes, healthy dessert mixed with fruit and granola/ nuts, a dollop added to salads, eggs, waffles etc.

BONUS: The liquid whey that drains off of the ricotta cheese contains important nutrients. Can you think of ways to use this liquid in food preparation?
The liquid drained from the ricotta contains protein and other nutrients and can be used in soups, mashed potatoes, baked goods or other recipes.

Nutrition Facts

8 servings per container

Serving size	1/4 cup (55g)
Amount Per Serving	
Calories	**100**
	% Daily Value*
Total Fat 7g	**9%**
Saturated Fat 4g	**20%**
Trans Fat 0g	
Cholesterol 20mg	**7%**
Sodium 100mg	**4%**
Total Carbohydrate 3g	**1%**
Dietary Fiber 0g	**0%**
Total Sugars 3g	
Includes 0g Added Sugars	**0%**
Protein 6g	**12%**
Vitamin D 0mcg	0%
Calcium 150mg	10%
Iron 0mg	0%
Potassium 60mg	2%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

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Take Home Activity

TRY THIS AT HOME!

Now that you have created your own ricotta cheese at school, you can make it at home for your family and use as part of many recipes!

Make Your Own Ricotta Cheese

Ingredients:

2 cups whole milk*
2 tablespoons distilled white vinegar
¼ teaspoon salt

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Equipment

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Directions:

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7. The curd left on top of the paper towels is your ricotta cheese! Carefully spoon the ricotta into a container. Ricotta keeps in the refrigerator for up to 5 days.

Yield: 2 cups of whole milk will result in approximately ½ cup of ricotta cheese

Using Your Ricotta Cheese...

WITH EGGS: Scramble two eggs and top with a dollop of ricotta cheese and sprinkle with chopped chives. Serve with buttered whole wheat bread.

AS A SNACK: Spread ricotta cheese on a slice of toasted 100% whole wheat bread and top with cucumber and tomato slices.

AS A DIP: Mix 1 cup of ricotta with a cooked 10-ounce package of frozen spinach (with excess water squeezed out), 1 cup of Parmesan cheese, ¼ cup of reduced fat mayonnaise. Top with extra-virgin olive oil and black pepper.

WITH PASTA: Combine tomato sauce with pasta. Add a dollop of ricotta and top with fresh sliced basil, a drizzle of extra-virgin olive oil and ground black pepper.

AT BREAKFAST: Top toaster waffles, pancakes, French toast, granola, etc. with a dollop of ricotta and fruit and add a bit of honey or maple syrup.

FOR DESSERT: Place ¼ cup of ricotta in a small dish and top with fresh berries and a drizzle of chocolate syrup.

Note: The liquid drained from the ricotta contains protein and other nutrients and can be used in soups, mashed potatoes, baked goods or other recipes.