Make & Taste Dairy
Greek Yogurt (Grades 6-8)

Lesson Activity

LESSON OVERVIEW:
During this lesson, students will be introduced to both the origin and science behind the process of traditional yogurt production in general and Greek yogurt in particular. Students will discover that traditional yogurt and Greek yogurt are healthful foods because they offer nutrients in every bite. The students will make Greek yogurt, measure the solid and liquid whey created by the yogurt-making process and discover ways to incorporate Greek yogurt into healthy recipes.

LESSON OBJECTIVES:
During this lesson, students will:
- Become familiar with the history and origin of traditional yogurt and Greek yogurt.
- Explain the basic science of how traditional yogurt is produced and the additional steps required to make Greek yogurt.
- Become familiar with the nutritional composition of Greek yogurt and contrast it with the nutritional composition of traditional yogurt.
- Learn the health benefits that yogurt provides to the body.
- Using a simple method, students will successfully make Greek yogurt.
- Participate in creating a yogurt parfait, which combine Greek yogurt with additional healthful ingredients.
- List at least five ways that Greek yogurt can be used as part of a healthy meal.

ACADEMIC INTEGRATION:
- Science
- History
- Language Arts

LESSON MATERIALS NEEDED:
Ingredients for every 2-4 students:
2 cups plain, traditional yogurt (non-fat, low-fat or whole)

Equipment
- Large colander
- Large bowl (colander should fit completely over the bowl to promote draining)
- 2 coffee filters (12 cup size or larger)
- Large Spoon
- Small clear cups to make parfaits and spoons for tasting
- Measuring cups and spoons

For Tasting
Some or all the items below to create a Greek yogurt parfait:
- granola (can purchase nut-free as needed)
- assorted Berries (fresh or frozen)
- shredded coconut
- honey or maple syrup

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Leader Background

How is Yogurt Made?
Yogurt is a fermented dairy product made by adding bacteria starters or "cultures" to fresh milk. Lactobacillus bulgaricus and Streptococcus thermophilus are two common bacterial strains used in yogurt production as well as other beneficial bacteria. The bacteria are added to heated, pasteurized, homogenized milk, afterward, the milk is incubated for several hours at a specific temperature (110-115ºF) to maximize the activity of the bacteria. If the temperature is too low, the bacteria will not grow sufficiently and if the temperature rises too high, the bacteria will die.

The bacteria convert the lactose (natural sugar in milk) to lactic acid, which thickens the milk and gives it the tangy taste characteristic of yogurt. Because lactose is converted in the fermentation process, individuals who are sensitive to this natural sugar in milk can often eat yogurt without experiencing symptoms. This sensitivity to lactose is called lactose intolerance.

What is Greek Yogurt?
When traditional yogurt is strained, much of the liquid (whey) is removed which results in a thicker product known as Greek yogurt. The primary protein left after straining is casein, which remains after the process known as "coagulation." Casein is the also the primary protein in cheese and accounts for the curds in cottage cheese. Compared to traditional yogurt, Greek yogurt is higher in total protein, but lower in sugar, sodium, calcium, and phosphorus than traditional yogurt.

The "Greek" label is misnomer little misleading, since most are not from Greece and strained yogurt is enjoyed by people throughout the world (see history below).

Why Eat It?
Both traditional and Greek yogurts are nutrient-rich foods and are beneficial for health. Yogurt provides a high-quality source of protein, which helps build and repair muscles and calcium which helps strengthen bones and teeth.

Most yogurt also contains live and active bacterial cultures known as probiotics. Probiotics benefit human health by improving digestive function and the immune system.

Physically active students looking for a good recovery snack after a long workout, or intense competition can use Greek yogurt as a snack or in smoothies. The protein in Greek yogurt is equal to a scoop of protein powder, plus the yogurt offers many nutrients and probiotics from the bacteria cultures.

History of Yogurt
Yogurt is a very old food which dates to around 5000 BC (over 7,000 years ago)! Herdsmen in the Middle East kept milk in goatskin bags hung across their camels' backs. After traveling in the hot sun, the milk was transformed into tangy custard. Intestinal juices in the goatskin bag contained bacteria, and the warmth and agitation caused by the camel's movements were ideal for making the first yogurt.

In the 11th century, the curative properties of yogurt were evaluated for the first time in Turkish literature. Genghis Khan introduced yogurt in the Mongolian diet of his army, believing it instilled bravery.

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Glossary:

Calcium: An important mineral found in dairy foods that gives bones and teeth structure and strength.
Casein: The primary protein in milk, it 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. When Greek yogurt is strained, much of the whey is removed, resulting in a thicker casein-rich product.
Fermentation: In food, fermentation is a process where beneficial bacteria convert sugar into lactic acid, resulting in a tangy flavor. Besides yogurt, other examples of fermented food include sauerkraut, kefir, sour cream and some cheeses.
Greek Yogurt: Yogurt that has been strained to create a thicker and higher protein product. The primary protein in Greek yogurt is casein.
Protein: A nutrient needed by the body for growth, maintenance, and repair muscle tissue.
Whey: The liquid portion of yogurt that is left when yogurt is strained. Known as "acid whey," this tangy liquid contains protein, calcium and other nutrients and can be used in smoothies, baked goods and puddings.
Yogurt: A fermented dairy product made by adding specific live bacterial cultures to milk and promoting bacterial growth by holding the mixture at a temperature of 110-115° F for several hours.

In the early 1900s, Dr. Stamen Grigorov, a Bulgarian medical student, discovered the specific bacteria responsible for yogurt fermentation and described the health benefits of lactic acid and bacteria found in yogurt.

As an ancient food, yogurt has gone by many names over the millennia: Katyk (Armenia), dahi (India), zabadi (Egypt), mast (Iran), leben raib (Saudi Arabia), laban (Iraq and Lebanon), roba (Sudan), iogurte (Brazil), cuajada (Spain), coalhada (Portugal), dovga (Azerbaijan), and matsoni (Georgia, Russia and Japan).

Only recently, Greek yogurt become popular throughout the world. In the U.S., the popularity of Greek yogurt began to surge around 2009. In Iceland, thick, strained yogurt is known as "skyr" and has also become a popular commercial yogurt in America.

Teaching the Lesson

Class Discussion

1. Begin the lesson by finding out what students know about the history of both traditional and Greek yogurts.
Describe how yogurt is an ancient food dating back at least 7,000 years. Students may be interested to know that yogurt was an accidental discovery in the Middle East when bacteria from goatskin bags caused milk to ferment into yogurt when carried by camels through the hot desert (see above for more information on the history).
2. Ask students if they can describe the process of how milk becomes yogurt. Explain the basic process of fermentation using beneficial bacteria. (See above).
3. Ask students if they can name the nutrients found in traditional and Greek yogurts. Compare and contrast the differences between the two types of yogurt. (Greek yogurt is thicker, higher in protein and lower in sugar, sodium, calcium and phosphorus). Later in the lesson, students will complete an activity sheet using the Nutrition Facts labels for both products.
4. Describe how the class will break into small groups and take turns starting the straining process to make Greek yogurt. The following day, students will use the Greek yogurt with fruit and other healthful foods to create parfaits for tasting.

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Making and Tasting

Make Your Own Greek Yogurt

Number of participants in a group: 2-4

Ingredients

2 cups plain, traditional yogurt (non-fat, low-fat or whole)

Equipment (see appendix A)

Small to medium colander
Large bowl (colander should fit completely over the bowl to promote draining)
2 coffee filters (large size)
Large Spoon
Small clear cups to make parfaits and spoons for tasting
Measuring cups and spoons

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.

Day 1: (see appendix B)

1. Place the colander over the mixing bowl and make sure there is room for liquid to drain into the bowl.
2. Place 2 coffee filters inside the colander.
3. Carefully measure and scoop two cups of yogurt into the coffee filters.
4. Cover the colander/bowl with plastic wrap before placing in the refrigerator.
5. Refrigerate overnight and allow yogurt to drain overnight.

Day 2: (see appendix C)

1. The next day, there will be a clear liquid at the bottom of the bowl (whey) and thick, strained (Greek) yogurt in the coffee filter.
2. Use a measuring cup to measure the amount of both strained (Greek) yogurt as well as the amount of liquid (whey) that drained off. Record your results.
3. Carefully scoop the strained yogurt into a container and take to the tasting table, where you will use the Greek yogurt to make parfaits.

Yield: Will vary depending on type of yogurt used and length of time in strainer. After 24 hours, 2 cups of traditional yogurt will yield approximately 1 cup of Greek yogurt.
Note: The whey portion can be used in smoothies, baked goods or other recipes.

Tasting

Once a group of students completes their Greek yogurt, they can move to a separate table set with small clear cups, spoons and toppings such as granola, berries, coconut and sweetener. They should be encouraged to layer the yogurt with berries or other fruit and then top with granola, coconut and a touch of honey or another sweetener, if desired.

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Appendix

A

B

C

References

1. The History of Yogurt, Dairy Farmers of Canada
   https://www.dairygoodness.ca/yogurt/the-history-of-yogurt
2. The complete history of yogurt-making, Yogurt In Nutrition Initiative for a Balanced Diet
   http://www.yogurtinnutrition.com/complete-history-yogurt-making/ (includes a colorful and detailed infographic)
3. Yogurt, the food of ancient nomads, Yogurt In Nutrition Initiative for a Balanced Diet
   http://www.yogurtinnutrition.com/yogurt-the-food-of-ancient-nomads/
4. Ever Wonder About Yogurt?, Science World at TELUS World of Science
   https://www.scienceworld.ca/blog/ever-wonder-about-yogurt
5. Yogurt Production, Cornell Dairy Extension
   http://www.milkfacts.info/Milk%20Processing/Yogurt%20Production.htm

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Lesson Activity

Answer the following questions after completion of the lesson.

1. Change in Volume
    a. How much yogurt did you begin with?
    b. How much strained yogurt was present in the coffee filter the next day?
    c. How much liquid drained off the yogurt?

2. Fermentation of milk into yogurt:
    a. Requires live, active bacterial strains and proper temperature
    b. Occurs when milk spoils in the refrigerator
    c. Converts all the protein into sugars
    d. Is a recent process that started in the 1900s

3. Yogurt provides a high-quality source of protein, is a source of healthy probiotics and fills important nutrient gaps, including calcium and potassium.
    a. True
    b. False

4. Use the Nutrition Facts labels to answer the following questions.
    a. Which type of yogurt has the most protein?
    b. Which type of yogurt has the most calcium?
    c. Which type of yogurt has the most sugar?
    d. Is the sugar in either type of yogurt from added sources?
    e. Katie is a soccer player and she is looking for a high protein recovery snack to eat after practice. Would you recommend she eat fruit with Greek yogurt or fruit with traditional yogurt?
    f. Sarah does not drink a lot of milk, but she does enjoy eating yogurt. She is concerned about getting enough calcium in her diet. Would you recommend she choose Greek yogurt or traditional yogurt?

5. List at least five ways that Greek yogurt can be used in foods and beverages.

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

GREEK YOGURT

Nutrition Facts	
4 servings per container	
Serving size	**1 cup (225g)**
Amount Per Serving	
Calories	**120**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 15mg	**5%**
Sodium 80mg	**3%**
Total Carbohydrate 9g	**3%**
Dietary Fiber 0g	**0%**
Total Sugars 9g	
Includes 0g Added Sugars	**0%**
Protein 22g	**44%**
Vitamin D 0mcg	0%
Calcium 250mg	20%
Iron 0mg	0%
Potassium 240mg	6%

*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.

TRADITIONAL YOGURT

Nutrition Facts	
4 servings per container	
Serving size	**1 cup (225g)**
Amount Per Serving	
Calories	**120**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 10mg	**3%**
Sodium 150mg	**7%**
Total Carbohydrate 18g	**7%**
Dietary Fiber 0g	**0%**
Total Sugars 15g	
Includes 0g Added Sugars	**0%**
Protein 10g	**20%**
Vitamin D 0mcg	0%
Calcium 400mg	30%
Iron 0mg	0%
Potassium 490mg	10%

*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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Answer Key

1. Change in Volume
a. How much yogurt did you begin with? **2 cups**
b. How much strained yogurt was present in the coffee filter the next day? **(answer varies)**
c. How much liquid drained off the yogurt? **(answer varies)**

2. Fermentation of milk into yogurt:
a. Requires live, active bacterial strains and proper temperature
b. Occurs when milk spoils in the refrigerator
c. Converts all the protein into sugars
d. Is a recent process that started in the 1900s.

3. Yogurt provides a high-quality source of protein, is a source of healthy probiotics and fills important nutrient gaps, including calcium and potassium.
a. True
b. False

4. Use the Nutrition Facts labels to answer the following questions.

a. Which type of yogurt has the most protein? **Greek**
b. Which type of yogurt has the most calcium? **Traditional**
c. Which type of yogurt has the most sugar? **Traditional**
d. Is the sugar in either type of yogurt from added sources? **No, it is naturally occurring**
e. Katie is a soccer player and she is looking for a high protein recovery snack to eat after practice. Would you recommend she eat fruit with Greek yogurt or fruit with traditional yogurt? **Greek yogurt will provide more protein.**
f. Sarah does not drink a lot of milk, but she does enjoy eating yogurt. She is concerned about getting enough calcium in her diet. Would you recommend she choose Greek yogurt or traditional yogurt? **Traditional yogurt will provide more calcium**.

5. List at least five ways that Greek yogurt can be used in foods and beverages.
Answers will vary – possibilities include smoothies, parfaits, dips, sauces, substitute for sour cream or mayo, ingredient in baked goods, soups, etc.

6. BONUS: The liquid whey that drains off of the yogurt contains important nutrients. Can you think of ways to use this liquid in food preparation? **The liquid whey can be used in smoothies and also as an ingredient in baked goods to replace part of the liquid.**

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Take Home Activity

TRY THIS AT HOME!

Now that you have created your own Greek yogurt at school, you can make it at home for your family and use as part of many dishes!

Make Your Own Greek Yogurt
Ingredients
1-2 cups plain traditional yogurt (non-fat, low-fat or whole)

Equipment
Medium to Large Mixing Bowl
Colander which fits over the mixing bowl
2 Coffee Filters (12 cup size or larger)
Measuring Cup

Directions

1. Place the colander over the mixing bowl and make sure there is room for liquid to drain into the bowl
2. Place 2 coffee filters inside the colander.
3. Carefully scoop one cup of yogurt into the coffee filters. Cover the colander/bowl with plastic wrap before placing in the refrigerator overnight.
4. Refrigerate and allow yogurt to drain overnight.
5. In the morning, you will have a clear liquid at the bottom of the bowl (whey) and thick, strained (Greek) yogurt in the coffee filter. Carefully scoop into a container, place in refrigerator and use within 5-7 days.

Yield: Will vary depending on type of yogurt used and length of time in strainer. After 24 hours, 1 cup traditional yogurt will yield approximately ½ cup of Greek yogurt.

Using Your Greek Yogurt

Tzatziki

This Greek savory sauce can be used as a dip, salad dressing or topping for grilled fish or chicken.
Ingredients/Supplies:
1 cup plain Greek yogurt
1 medium cucumber, peeled, seeded and grated or chopped
1 clove finely minced garlic (or ½ tsp. garlic powder)
1 tablespoon lemon juice (can substitute 1 tbsp. wine vinegar)
2 tablespoons chopped fresh dill (or 2 tsp. dried dill)
Salt and pepper to taste
Mixing bowl, measuring cup, measuring spoons, whisk
Directions: To seed the cucumber, cut in half lengthwise and use the tip of a spoon to scrape out the seeds. Combine ingredients in a medium sized bowl and whisk together. Add salt and pepper as desired. Note: If you chop or slice the cucumber in large chunks, this can be served as a salad.
Yield: 1 ½ cups

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Take Home Activity (continued)

Pumpkin Pie Dip
A delicious and healthy way to enjoy the flavor of fall pumpkins with your favorite fruit

Ingredients/Supplies:
1 cup plain nonfat Greek yogurt
2 tbsp. whipped cream cheese
1/2 cup pureed or canned pumpkin
1 tsp. pumpkin pie spice
2 tbsp. honey
mixing bowl, measuring cup, measuring spoons, spoon

Directions: Mix ingredients well and serve with an assortment of colorful fresh cut-up fruit for dipping.
Yield: 7 servings (approx. 1/4 cup each)

More Fun Ways to Use Greek Yogurt

Parfait: In a tall glass, spoon layers of shredded coconut, Greek yogurt, and chopped kiwis and strawberries to make a tropical parfait.

Smoothie: Combine frozen strawberries, Greek yogurt, 100% cranberry juice, and a drizzle of honey in a blender; blend until smooth

Tomato soup: Garnish a bowl of warm or cold tomato soup with an oversized dollop of Greek yogurt

Dip: Make your own white bean dip using a 15-ounce can of cannellini beans, 1-2 tablespoons of Greek yogurt, olive oil, salt, and sprinkle of paprika.

Tuna salad: Substitute half the mayonnaise in tuna salad for Greek yogurt. The Greek yogurt blends so nicely with mayonnaise that you can't even tell it's there.

Baked potato: Combine 2 tablespoons each of reduced fat sour cream with nonfat plain Greek yogurt and top over a baked potato. Sprinkle with chopped dill and hot sauce, if you want to add extra spice.