Health and Hydration!
With the Drexel University College of Nursing and Health Professions

Objectives

- Understand the importance of hydration and water in maintaining a healthy body
- Learn about the negative effects of sugary drinks on their health
- Calculate the sugar content of popular sugary drinks
- Identify and define key vocabulary related to hydration and water

Next Generation Science Standards (NGSS) addressed

- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost.
- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Materials

- Whiteboard and markers
- Calculator
- Handouts for vocabulary list and sugar content calculations
- PFPC Challenge homework assignment sheet

Vocabulary List

- **Hydration:** The process of adding water to the body
- **Dehydration:** A lack of water or the process of removing water from the body
- **Electrolytes:** Minerals in the body that carry electrical charges and help regulate bodily functions
- **Thirst:** A feeling of needing to drink water or other fluids

Introduction (10 minutes)

Ask the students if they know how much of their body is made up of water. Discuss how important water is for the body and the various functions it serves.

The majority of our body is made up of water, although this amount varies by size and age. An infant's body is approximately 75% water, while adults are closer to 60% water. Water is essential to everyone — a person cannot live more than a few days without water, compared to more than three weeks without food.

Given the large percentage of water in our bodies, it is not surprising that water plays an extremely important role in many of the body's critical functions. Temperature regulation, lubrication, digestion, synthetic reactions and excretion are all influenced by how much water is in our bodies.

Water carries essential nutrients throughout the body and moves waste out. Blood, which is mainly water, carries nutrients, hormones, enzymes, oxygen (bonded to hemoglobin in red blood cells) and other life-sustaining elements to our cells. Kidneys and large intestines use water to help remove waste through urination and defecation.

Water cools us when it is transported out of the skin through sweating. When we exhale, we lose carbon dioxide and water — both by-products of respiration.

Introduce key vocabulary terms such as hydration, dehydration, electrolytes and thirst. Explain that staying hydrated is essential for good health and that the human body needs water to function properly.

Sugar Content Calculations worksheet (20 minutes)

Introduce the concept of sugary drinks and their negative effects on the body. Provide pictures of popular sugary drink labels and have students estimate the amount of sugar in each drink.

Provide a handout with the formula for calculating sugar content, as well as a list of popular sugary drinks and their sugar content per serving.

Using the information on the label and a calculator, students will calculate the exact amount of sugar in each drink.

Sugar Content Calculation formula:
Sugar Content (g) = Total Carbohydrates (g) - Fiber (g)
Example: 12 oz. can of soda:
Total Carbohydrates: 39g
Fiber: 0g
Sugar Content: 39g - 0g = 39g

Discuss the results as a class and compare the sugar content of different drinks.

Conclusion (10 minutes)

Recap the importance of hydration and water for the body. Reiterate the negative effects of sugary drinks on health. Assign the PFPC homework challenge.

- PFPC Challenge: For one week, students are challenged to replace sugary drinks with water. Have them keep a log of their daily water intake and record what decisions went into choosing water over sugary drinks. Were there obstacles? Reflect on how they feel after the week is over.

Questions to ask during activity

- What makes you pick one drink over another?
- What factors influence your choice of drink? (If it is warm or cold out, do you prefer a type of drink? Or depending on the time of day?)
- How do people around you feel about specific drinks?
- Do you think that advertising affects your drink choices? What about your family's or friends' choices?
- What would make you consider drinking more water?
- What drink leaves you the most satiated when you are thirsty?

Level Up: Higher level thinking prompts and questions

- In addition to discussing the benefits of hydration, you could introduce the science behind how water is absorbed and utilized by the body. This could include topics like osmosis, the role of electrolytes, and the effect of dehydration on body functions.
- You could introduce students to the different types of water available, such as tap water, bottled water and alkaline water. Discuss the benefits and drawbacks of each type and encourage students to research the water sources in their own communities.
- Older students could benefit from exploring the marketing strategies used by beverage companies to promote sugary drinks. Discuss the tactics used to appeal to consumers, such as celebrity endorsements, product placement and colorful packaging. Encourage students to think critically about these strategies and how they influence consumer behavior.
- For older students, you could explore the issue of water scarcity and its impact on communities around the world. Discuss the causes and effects of water scarcity and brainstorm solutions for addressing this global problem.
- In addition to discussing the health benefits of hydration, you could also introduce the environmental impact of bottled water. Encourage students to research the energy and resources required to produce and transport bottled water, and consider the alternatives, such as reusable water bottles and water filtration systems.

Background info

1. Centers for Disease Control and Prevention. (2021). Water: Meeting your daily fluid needs. https://www.cdc.gov/nutrition/data-statistics/plain-water-the-healthier-choice.html
2. Harvard T.H. Chan School of Public Health. (2021). The nutrition source: Sugary drinks. https://www.hsph.harvard.edu/nutritionsource/healthy-drinks/sugary-drinks/
3. Mayo Clinic. (2021). Water: How much should you drink every day? https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256
4. National Institute of Diabetes and Digestive and Kidney Diseases. (2019). Hydration for health. https://www.niddk.nih.gov/health-information/weight-management/hydration-health
5. American Heart Association. (2021). How much sugar is in your drink? https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/sugar/how-much-sugar-is-in-your-drink
6. Project WET Foundation (2017). Water we made of? activity, Pgs 12-16

Lesson content developed by Ale Gonzales Montoya, Drexel University

Infographic courtesy of www.childrens.com

(https://www.childrens.com/health-wellness/effects-of-sugary-drinks-on-your-childs-health-infographic)

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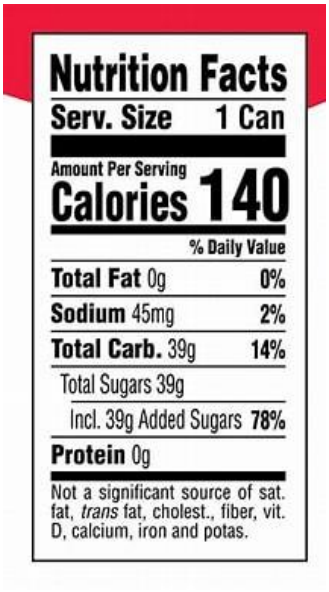
Formula: Sugar Content (grams) = Total Carbohydrates (grams) - Fiber (grams)

12 oz. can of soda

- Total Carbohydrates: 39g
- Fiber: 0g
- Sugar Content: 39g - 0g = 39g

Soda:



Nutrition Facts

Serv. Size 1 Can

Amount Per Serving

Calories 140

	% Daily Value
Total Fat 0g	0%
Sodium 45mg	2%
Total Carb. 39g	14%
Total Sugars 39g	
Incl. 39g Added Sugars	78%
Protein 0g	

Not a significant source of sat. fat, *trans* fat, cholest., fiber, vit. D, calcium, iron and potas.

Soda:

Diet Soda:

Energy Drink:

Nutrition Facts

Serving Size 8.0 fl. oz. (240mL)
Servings Per Container 2

Amount Per Serving	Per 8 fl. oz.	%DV*	Per Can	%DV*
Calories	110		210	
Total Fat	0g	0%	0g	0%
Sodium	180mg	8%	370mg	15%
Total Carb	27g	9%	54g	18%
Sugars	27g		54g	
Protein	0g		0g	
Riboflavin (Vit. B2)		100%		200%
Niacin (Vit. B3)		100%		200%
Vitamin B6		100%		200%
Vitamin B12		100%		200%

Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium and iron.

*Percent Daily Values are based on a 2,000 calorie diet.

INGREDIENTS: CARBONATED WATER, SUGAR, GLUCOSE, CITRIC ACID,

Sports Drink:

Nutrition Facts

Serving Size 20 fl oz (591 mL)
Servings Per Container 1

Amount Per Serving

Calories 140

	% Daily Value*
Total Fat 0g	0%
Sodium 270mg	11%
Potassium 75mg	2%
Total Carbohydrate 36g	12%
Sugars 34g	
Protein 0g	

Not a significant source of calories from fat, saturated fat, *trans* fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium, and iron.

*Percent Daily Values are based on a 2,000 calorie diet.

WATER, SUGAR, DEXTROSE, CITRIC ACID, SALT, SODIUM CITRATE, MONOPOTASSIUM PHOSPHATE, GUM ARABIC, NATURAL FLAVOR, SUCROSE ACETATE ISOBUTYRATE, GLYCEROL ESTER OF ROSIN, YELLOW 5, YELLOW 6

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