

Energy drinks: What Are You Really Drinking?



Standard(s):

7.1.3.4.2 Determine and use appropriate safety procedures, tools, measurements, graphs, and mathematical analysis to describe and investigate natural and designed systems in a life science context.

7.4.1.1.2 Describe how the organs in the respiratory, circulatory, digestive, nervous, skin and urinary systems interact to serve the needs of vertebrate organisms.

8.1.1.1.1 Evaluate the reasoning in arguments in which fact and opinion are intermingled or when conclusions do not follow logically from the evidence given.

8.1.3.3.3 Provide examples of how advances in technology have impacted the ways in which people live, work and interact.

9.1.1.2.2. Evaluate the explanations of others by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the scientifically-acceptable evidence, and suggesting alternative scientific explanations.

Objective:

Upon completion of this lesson, students will be able to:

- a. Gather information on nutritional data of various popular energy drinks.
- b. Research and examine the side effects of 3 of the active ingredients commonly found in many energy drinks.

- c. Analyze and critique advertisements and commercials for various energy drink products.
- d. Identify common public misconceptions related to energy drinks.
- e. Collect and compare data on pH levels of various energy drinks.
- f. Explain how the pH of drinks can affect the human body.

Type of Activity: research, lab experiment

Duration: Three 45-minute class periods

Timing in relation to Nobel Conference:

- pre-conference activity
- during conference activity
- post-conference activity

Connection to Nobel Conference:

Marion Nestle, Professor of Nutrition, Food Studies, and Public Health at New York University, New York City. Nestle's research focuses on analysis of the scientific, social, cultural and economic factors that influence the development, implementation and acceptance of federal dietary guidance policies. She is the author of *Pet Food Politics: The Chihuahua in the Coal Mine* (2008).

Teacher Tips: For successful completion of this lesson we recommend the following:

a. When students are choosing ingredients in energy drinks to examine, it may be helpful to limit their choices to the following:

1. Taurine
2. Guarana / yerba mate
3. Acai
4. Ginseng
5. Ginkgo biloba
6. Creatine
7. Inositol
8. Aspartame
9. Phenylalanine

*Note: not all of these ingredients may appear in all energy drinks, but they are commonly found in many of them.

b. Energy drinks should be purchased in advance for this activity. They may be purchased at many locations, including convenience stores, grocery stores, nutrition stores, and sporting stores. Make sure not to buy sugar-free. Examples may include but are not limited to:

1. Red Bull
2. Monster
3. RockStar
4. Full Throttle
5. 5-hour Energy
6. AMP Energy
7. NOS

c. Following the introductory discussion of the survey results, it is advised that you introduce energy drinks more in depth with your students. Some topics worthy of discussion may include:

1. Effects of chemical stimulants on the human body.
2. You could also have students read one of the following articles:

[Overuse of Energy Drinks Worries Health Pro's](#) (USA Today)
[Kids + energy drinks = dangerous mix](#) (Seattle Times)

d. Once all of the student groups have delivered their presentations, it would be wise to discuss the results as a class and compare the different energy drinks.

e. The effect of pH on dental health

Recommended Prior Student Knowledge:

- a. Role of various nutrients and ATP in the human body.
- b. Metabolism
- c. The pH scale
- d. Effects of chemical stimulants on the human body.

Concepts, Connections, and Terms addressed in activity:

- a. Caffeine as a drug.
- b. Lack of regulation by the FDA of certain products.
- c. Advertising strategies used to sell products to consumers.
- d. Effects of chemical stimulants on the human body.
- e. Metabolism of high fructose corn syrup in the human body.
- f. pH levels of various energy drinks.

Materials:

- a. Various popular energy drinks (1 per group)
- b. Advertisements from popular energy drinks (TV commercials or printed ads)
- c. Computer with Internet access
- d. Activity handouts ([student survey](#), rubric, [data sheet & analysis questions student handout](#))
- e. pH paper or pH sensor (1 per group)

Description of Activity:

Working in groups, students will analyze the contents of a popular energy drink and examine the side effects of some of the ingredients. Students will also examine various marketing strategies for target audiences currently used by energy drink companies and determine their appeal to the consumer. At the end of the activity, groups will add their information to the group/class data table.

Procedure:

Part I: Pre-activity survey

1. Students will individually complete a survey on their preconceptions of energy drinks.
2. As a class, discuss the results of the survey.

Part II: Research

1. Divide into groups of two or three and pick an energy drink to analyze.
2. Examine and record the nutritional facts of their selected energy drink using the nutrition facts label.
3. Perform pH test on the energy drink using pH strips or sensors. Record data.
4. Using the Internet, determine the amount of caffeine in the energy drink.
5. Research three of the active ingredients, with one of them being caffeine. Also, identify the reason for the addition of this ingredient and whether it produces positive or negative effects on the human body.
6. Research different advertisements for the energy drink. Determine target audience and sales strategy utilized.

Part III: Presentation of results

1. Discuss the advertisement techniques used and claims made by the company for their target audience.
2. Discuss ingredient side effects along with any FDA regulations of those ingredients.
3. Visually display your results (ingredient amounts and pH levels).
4. Discuss pH and how the pH of your energy drink could affect the human body when consumed.

Assessment:

Group/class data table

Extensions:

1. Measure specific amounts of ingredients in the energy drink as a lab activity.
2. Create a set of regulations that could be used by the FDA to better regulate energy drinks.
3. Create your own energy drink recipe, including why you would include each ingredient.
4. Perform the same activity, focusing on substances such as preservatives rather than stimulants.