

Case Study: Are Artificial Sweeteners Toxic?

Due _____

Directions: Use the information about fructose and aspartame below to answer all questions. You will then **make an informational presentation** to display this information (shared via **google slides**). Color and pictures are encouraged 😊

Background Information:

- Fructose ($C_6H_{12}O_6$) and aspartame ($C_{14}H_{18}N_2O_5$) are two types of sweeteners.
- Fructose and aspartame are used to sweeten soft drinks.
Assume a can of regular soft drink contains 40.0 g of fructose and a can of diet soft drink contains 0.225 g of aspartame.
- The lethal dose of fructose is 29,700 mg of fructose/kg of body weight
- The lethal dose of aspartame is 10,000 mg of aspartame/kg of body weight

****All mathematical calculations should be shown using DIMENSIONAL ANALYSIS!**

Things to include in your presentation:

- **Introduction/Purpose** (5 pts): Briefly talk about the chemistry content related to this case study and state the purpose of the case study.

- **Questions to Answer:**

Part 1: Comparing Sweeteners

1. What is the mass of 1 mole of each sweetener? SHOW WORK (4 pts)
2. How many moles of fructose are in a can of the regular soft drink? SHOW WORK (2 pts)
3. How many moles of aspartame are in a can of the diet soft drink? SHOW WORK (2 pts)
4. Which has more molecules of sweetener, a can of regular soft drink or a can of diet soft drink? Explain. (2 pts)
5. If both regular and diet soft drinks taste the same in terms of sweetness level, which molecule is sweeter, fructose or aspartame? Explain your reasoning. (2 pts)

Part 2: Artificial Sweetener Debate

6. Based on the given lethal dose values, which sweetener is more toxic? (2 pts)
7. How many cans of a regular soft drink would a 64 kg person have to consume in a short period of time to reach the lethal dose of fructose? SHOW WORK (4 pts)
8. How many cans of a diet soft drink would a 64 kg person have to consume in a short period of time to reach the lethal dose of aspartame? SHOW WORK (4 pts)
9. Based on your answer above, should aspartame be considered unsafe and banned? Explain your answer. (4 pts)
10. What other factors (other than lethal dose) do you think should be taken into consideration when determining the safety of a substance? (4 pts)

- **Organization, creativity, neatness, timeliness:** (5 pts)

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