

LESSON
79

CLASSWORK

How Sweet It Is

Comparing Amounts

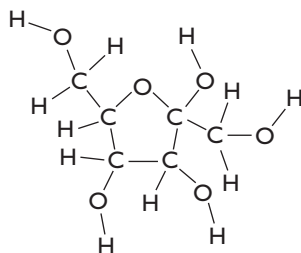
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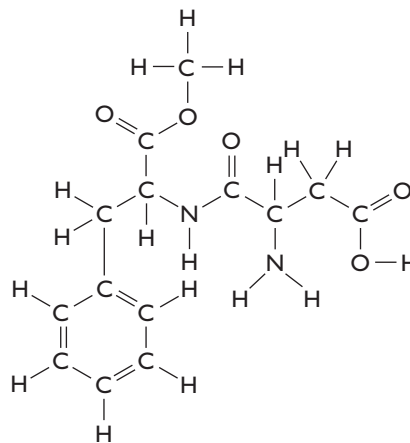
Purpose

To practice comparing mass to moles.

Part I: Compare Sweeteners



Fructose (sugar), $C_6H_{12}O_6$



Aspartame, $C_{14}H_{18}O_5N_2$

- Which do you think has more mass, 1 mole of fructose or 1 mole of aspartame? Explain your reasoning.
- What is the mass of 1 mole of each sweetener? Show your work. (Round values to the nearest gram.)
- Which has more molecules, 40 g of fructose or 40 g of aspartame? Explain your reasoning.

Part 2: Compare Diet and Regular Soft Drinks

Fructose and aspartame are used in soft drinks. A can of regular soft drink contains 40.0 g of fructose. A can of diet soft drink contains 0.225 g of aspartame.

- How many moles of fructose are in a can of regular soft drink? Show your work.
- How many moles of aspartame are in a can of regular soft drink? Show your work.
- Which has more molecules of sweetener, a can of regular soft drink or a can of diet soft drink?

4. Which is sweeter, fructose or aspartame? Explain your thinking.
5. Why does the diet soft drink float and the regular soft drink sink in water?

Part 3: Artificial Sweetener Debate

Saccharin is a common artificial sweetener. Use the information and assumptions from a laboratory study to decide for yourself whether saccharin is safe.

Assumptions:

- Lab rats were given 40.0 g saccharin every day for a year.
- An average person consumes one can of soft drink each day, and a can of soft drink has 0.20 g of saccharin.
- An average person weighs 70 kg, and an average rat weighs 1 kg.

Questions

1. How much saccharin did each rat consume over the course of a year?
2. How much saccharin would you consume in a year if you drank one diet soft drink a day?
3. How much saccharin (in grams) would a person who weighs 70 kg have to consume in order to be exposed to a dose equivalent to what the 1 kg rats were fed in a year?
4. How many cans of diet soft drink would a person have to drink in order to consume the amount of saccharin you calculated in the previous question?
5. **Making Sense** Should saccharin be banned? Explain your answer.
6. **If You Finish Early** How many grams of fructose (sugar) would you consume in a year if you drank one regular soft drink a day? How many moles of fructose is this? If 1 kg is 2.2 lb, how many pounds of fructose is this?