

Percent Composition of Gum

Name _____

Purpose:

1. Students will understand the concept of percent composition of compounds and be able to perform the associated calculations. A lab will be used to reinforce the concept.
2. Students will be able to define percent composition. Students will be able to calculate the percent composition of a compound.
3. Calculate Percent Composition of Chewing Gum.

Required Materials: Calculator, Balances, Chewing Gum, Paper Cups

Background:

How do you calculate percent? (Part/Whole x 100)

How do you calculate the grade on your test?

(Number of points you got/Total Points x 100)

We're going to do the same thing for elements in compounds

Define percent composition - gives the percent of mass each element contributes to the compound

Give formula: $\text{Mass element} / \text{Total Mass Compound} \times 100$

We're assuming chewing gum has 2 components - gum and sugar. The sugar will dissolve when you chew it, leaving behind only the gum. Thus we can calculate the percent of sugar in the gum.

Examples:

NaCl

$1(22.99 \text{ g/mol}) + 1(35.45 \text{ g/mol}) = 58.44 \text{ g/mol}$

$\% \text{ Na} = 1(22.99) / 58.44 \times 100 = 39.3\%$

CaF₂

$1(40.08 \text{ g/mol}) + 2(19.00 \text{ g/mol}) = 78.08 \text{ g/mol}$

$\% \text{ Ca} = 1(40.08) / 78.08 \times 100 = 51.3 \%$

$\% \text{ F} = 2(19.00) / 78.08 \times 100 = 48.7 \%$

Procedure:

1. Each student gets a piece of gum.
2. Get the mass of gum and wrapper
3. Unwrap and get the mass of the empty wrapper

4. Be sure to **save the wrapper!**

5. Each person chews their piece of gum for ~45 minutes.

6. Then place your chewed gum back in its wrapper and record the new mass

Data:

| | | |
|---|--|--|
| 1 | mass of wrapper + gum (g) | |
| 2 | mass of wrapper alone | |
| 3 | Determine mass of pre-chewed gum | |
| 4 | mass of chewed gum + wrapper | |
| 5 | mass of chewed gum (This is just the gum, no sugar.) | |
| 6 | Mass of sugar in gum (#3 - #5) | |
| 7 | Calculate the percent of sugar in the gum. (mass sugar/ mass of pre-chewed gum x 100) | |

Conclusion Questions:

1) Would a dentist recommend chewing this gum? Why or why not?

2) Would changing the number of pieces of gum change the results of the lab? Explain.