

Percent Composition

Student Worksheet | g09_u07_w27

I can: calculate and interpret an element's percent by mass in a compound.

Frozen values: Classroom calculation values from `audits/atomic_masses_v2024.1.json`, derived from CIAAW/IUPAC Standard Atomic Weights 2024 (accessed 2026-07-26). H 1.008, C 12.011, N 14.007, O 15.999, Na 22.990, Mg 24.305, S 32.06, Cl 35.45, Ca 40.078, Cu 63.546. Use $\%X = \frac{\text{mass of X in 1 mol compound}}{\text{molar mass compound}} \times 100\%$; retain guard digits and round at the end.

1. Find the molar mass of H_2O and its percent H by mass.

2. Find the percent O by mass in H_2O .

3. Find the molar mass of CO_2 and its percent C by mass.

4. Find the percent O by mass in CO_2 .

5. Use your CO_2 results to calculate $\%C + \%O$. What should a small rounding difference from 100% mean?

6. Find the percent Na and percent Cl by mass in NaCl .

7. Find the molar mass of MgO and its percent Mg by mass.

8. Find the percent S by mass in H_2SO_4 .

9. Find the percent O by mass in H_2SO_4 .

10. A limestone chip is modeled as CaCO_3 . Find its percent Ca by mass.

11. Find the percent O by mass in CaCO_3 .

12. Find the molar mass of $\text{Ca}(\text{NO}_3)_2$ and its percent N by mass.

13. Find the percent O by mass in $\text{Ca}(\text{NO}_3)_2$.

14. A blue crystal is $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. Find the percent of its mass due to water of hydration.

15. A 25.0 g CO_2 sample is pure. Use percent composition to find grams of C in it.

16. A 36.0 g H_2O sample is pure. Use percent composition to find grams of O in it.

17. A 50.0 g NH_3 sample is pure. Find its percent N and then grams of N.

18. Find the percent N by mass in NH_4NO_3 . Interpret what that percentage says about 100.0 g of this fertilizer ingredient.

19. An oxide sample has mass 10.00 g and contains 6.03 g Mg. Calculate experimental %Mg. Compare with theoretical MgO and state whether the data support MgO.

20. A fertilizer analysis uses H_2SO_4 as a sulfur source. How many kilograms of S are in 18.0 kg H_2SO_4 ? State the percent-to-mass factor you used.
