

A Letter from Dalton: Problem Handouts



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A Letter from Dalton

Problem Statement

It is the autumn of 1804 and you have just returned to the University of Edinburgh after a brief holiday to resume your studies in chemistry under the noted Professor Thomas Thomson. Professor Thomson is quite glad to see you and clearly very excited about a letter he has recently received:

Since you have been conducting the chromium-oxygen studies referred to in the letter, Thomson hands the request to you. Just before the holiday, you had worked out the mass compositions of several products from these reactions, as indicated below:

Sample #	Appearance	Mass of O (g)	Mass of Cr (g)
1	orange crystals	1.3509	0.9319
2	orange crystals	0.6289	0.2892
3	red powder	0.6441	0.1481
4	yellow powder	0.2228	0.1537
5	orange crystals	0.4949	0.2276

Questions:

1. Is Dalton's hypothesis supported by your data? State the hypothesis clearly, and show how you analyzed the data to reach your conclusion.
2. Professor Thomson asks you to prepare a report to send to Dalton. Can you first assign chemical formulas to these samples? If you assume that sample #1 is CrO , how would you formulate the other four samples?
3. Could any of these samples be the same compound? Explain.
4. How are Lavoisier's and Proust's discoveries explained by the atomic theory of matter?



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Dalton's Letter

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