

LESSON NOTES

Year/Level: 11 C/D

Subject: Chemistry

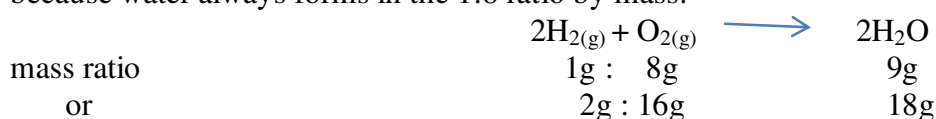
Strand	3 Reactions
Sub Strand	3.1 chemical equations and calculations
Content Learning Outcome	Carry out calculations to verify the Law of Definite Composition

Law of Definite Composition

- The law of definite composition was proposed by **Joseph Proust** based on his observations on the fixed composition of chemical compounds.
- **This law states that chemical compounds are composed of a fixed ratio of elements as determined by mass.**
- Elements combine in whole numbers: it is not possible to have a compound with portion an atom.

Example 1

The compound water, H₂O, always is a chemical combination of hydrogen and oxygen in a 1:8 ratio by mass. If a mixture of hydrogen and oxygen in some other ratio, say 1:2, were reacted, there would be water formed, but there would also be some un- reacted oxygen, because water always forms in the 1:8 ratio by mass.



Example 2

Glucose has the chemical formula C₆H₁₂O₆. This means that for glucose to be formed, it must be comprised of 6 atoms of carbon, 12 atoms of hydrogen, and 6 atoms of oxygen. The carbon makes up 40 % of glucose; the hydrogen makes up 6.7% of glucose and the oxygen makes up 53.3% of glucose.

Calculations on Law of Definite Proportion

$\% \text{ of element} = \frac{\text{Mass of the element}}{\text{Total mass of the compound}} \times 100$

Example 1

What is the experimental percentage of oxygen in CO₂ if 42.0 g of carbon reacted completely with 112.0 g of oxygen?

