Again with Gay-Lussac--Law of Combining Volumes



1) Show, using dimensional analysis, what 1 m3  of volume is equivalent to:

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2) Write the above sketch as a BCE:

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Under [STP](https://en.wikipedia.org/wiki/Standard_conditions_for_temperature_and_pressure), a reaction between three cubic meters of hydrogen gas and one cubic meter of nitrogen gas will produce about two cubic meters of [ammonia](https://en.wikipedia.org/wiki/Ammonia).

The law of combining volumes states that, **when gases react together to form other gases, and when all volumes are measured at the same temperature and pressure:**

**The ratio between the volumes of the reactant gases and the gaseous products can be expressed in simple**[**whole numbers**](https://en.wikipedia.org/wiki/Natural_number)**.**

For example, Gay-Lussac found that 2 volumes of hydrogen and 1 volume of oxygen would react to form 2 volumes of gaseous water.

Write the BCE for the previous statement:

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Based on Gay-Lussac's results, [Amedeo Avogadro](https://en.wikipedia.org/wiki/Amedeo_Avogadro%22%20%5Co%20%22Amedeo%20Avogadro) theorized that, at the same temperature and pressure, equal volumes of gas contain equal numbers of molecules ([Avogadro's law](https://en.wikipedia.org/wiki/Avogadro%27s_law)). This hypothesis meant that the previously stated result:

**2 volumes of hydrogen + 1 volume of oxygen = 2 volumes of gaseous water**

could also be expressed as:

**2 molecules of hydrogen + 1 molecule of oxygen = 2 molecules of water**

and therefore could also be expressed as:

**2 moles of hydrogen + 1 mole of oxygen = 2 moles of water**

The law of combining gases was made public by Joseph Louis Gay-Lussac in 1808.[[7]](https://en.wikipedia.org/wiki/Gay-Lussac%27s_law#cite_note-7)[[8]](https://en.wikipedia.org/wiki/Gay-Lussac%27s_law#cite_note-8)

Avogadro's hypothesis, however, was not initially accepted by chemists until the Italian chemist [Stanislao Cannizzaro](https://en.wikipedia.org/wiki/Stanislao_Cannizzaro%22%20%5Co%20%22Stanislao%20Cannizzaro) was able to convince the First International Chemical Congress in 1860.