

Matter Is Made of Atoms



John Dalton's 1808 Atomic Theory and the foundational rules of modern chemistry.



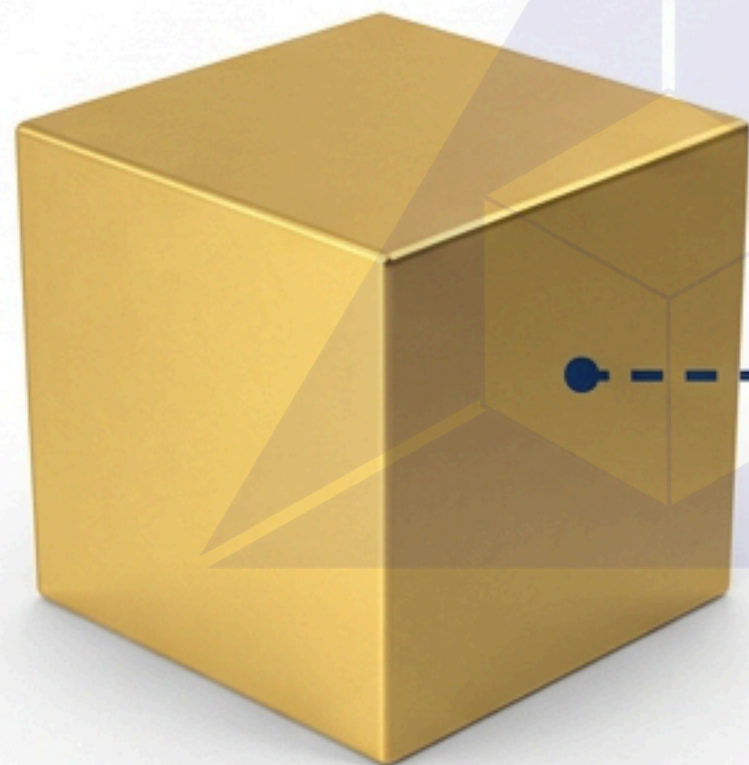
Tracing the concept from the Greek philosopher Democritus (460–370 BC) and his idea of a-tomio to the birth of quantitative chemical philosophy.

POSTULATE 01

Matter consists of indivisible atoms



Every physical substance is ultimately composed of microscopic building blocks.

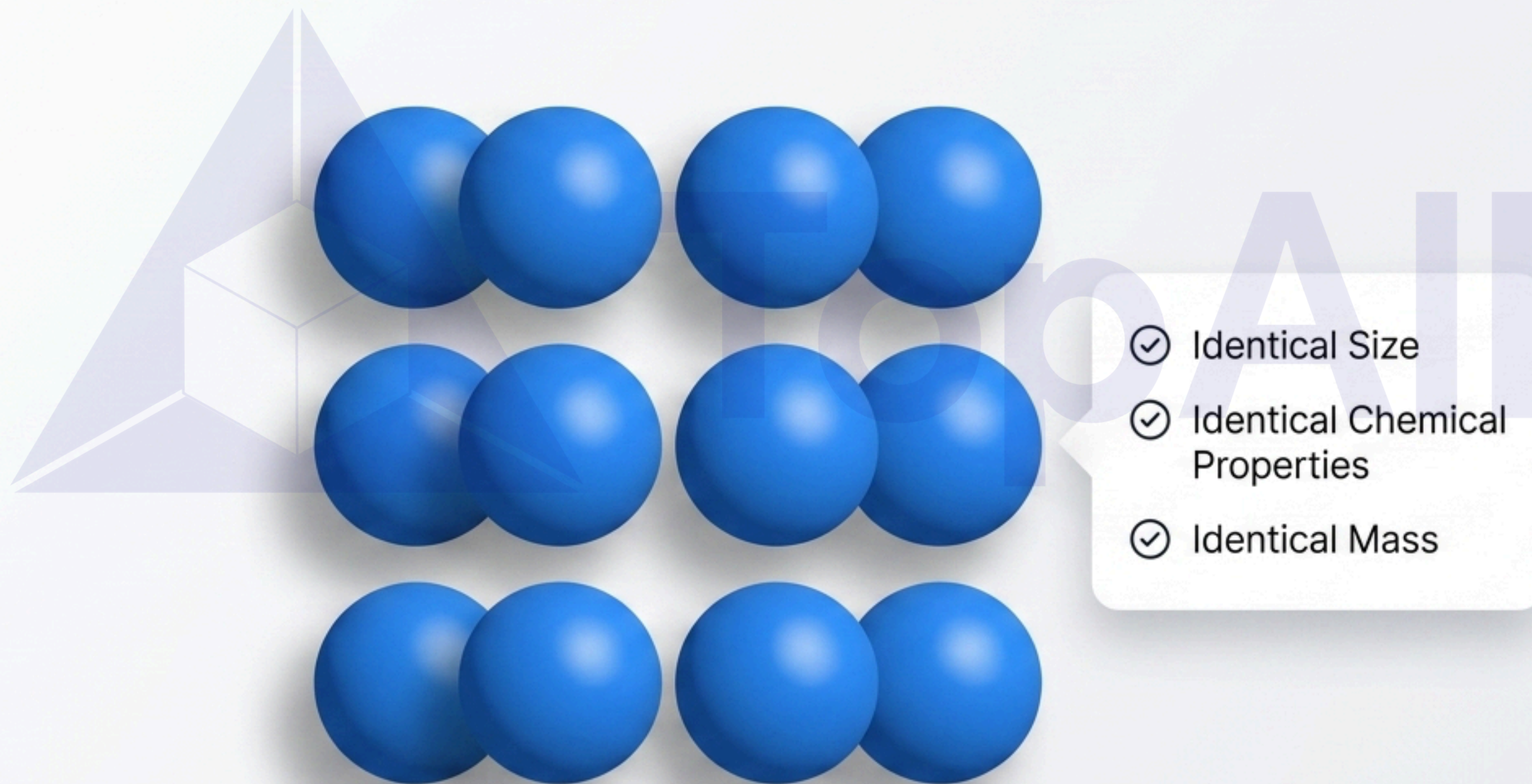


The Indivisible Limit

Dalton proposed that matter cannot be divided infinitely. At the most fundamental level, it consists of distinct, unbreakable particles called atoms (from the Greek a-tomio, meaning indivisible).

Atoms of a given element are identical

If you isolate a pure element, every single atom within it shares the exact same physical and chemical profile.





You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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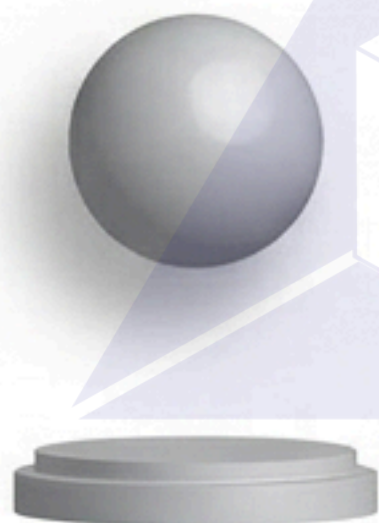
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Atoms of different elements differ in mass

Dalton defined the boundary between different elements by their mass. No two elements share the same atomic weight.



Hydrogen (H)

1.008 u



Carbon (C)

12.011 u

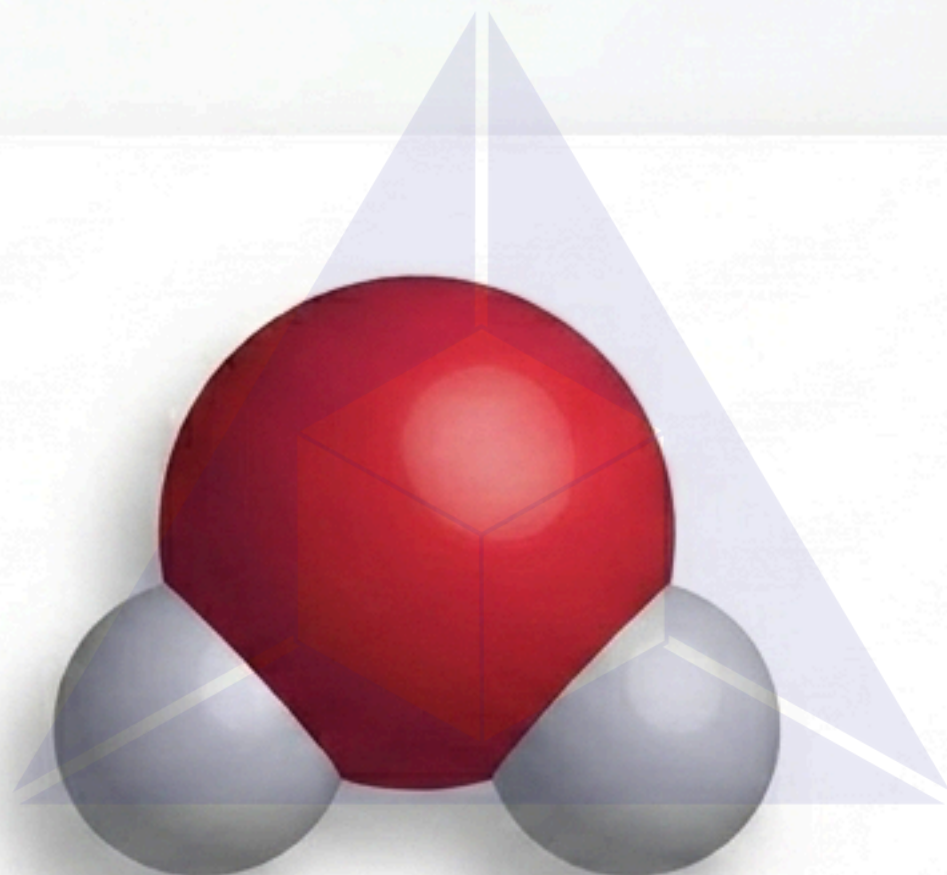


Oxygen (O)

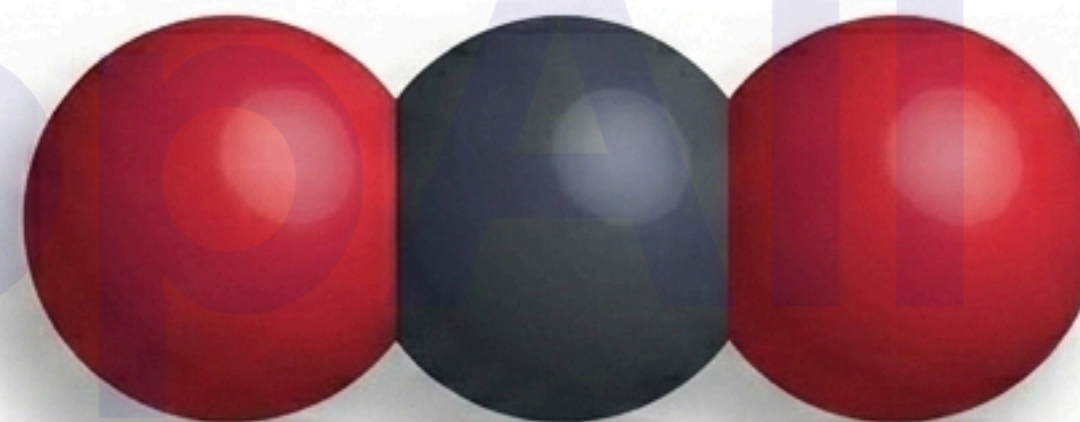
16.00 u

Compounds form in fixed ratios

Atoms do not combine randomly. They lock together in simple, whole-number integer ratios to form compounds.

**Water**H2O**Ratio**

2 : 1

**Carbon Dioxide**CO2**Ratio**

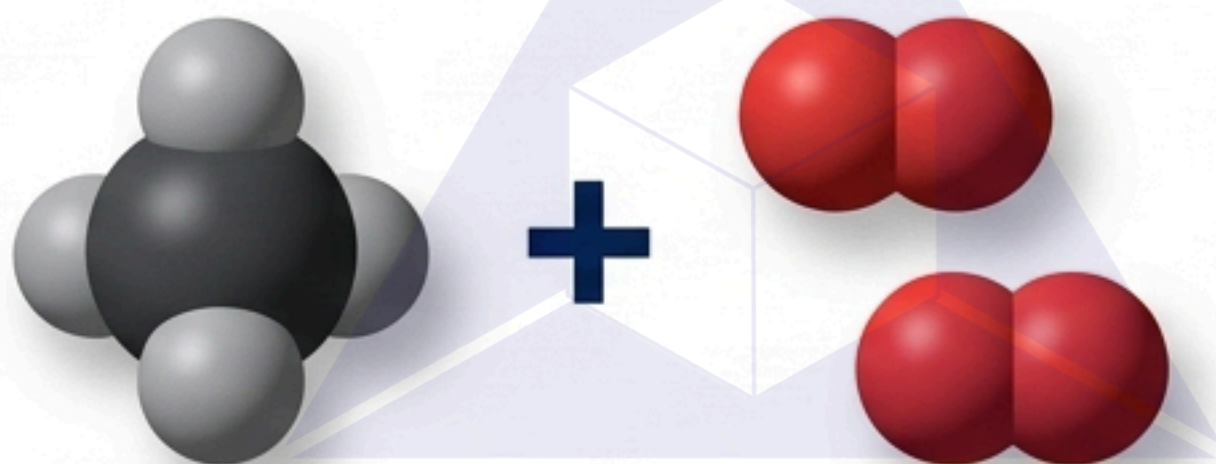
1 : 2

POSTULATE 04

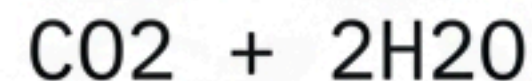
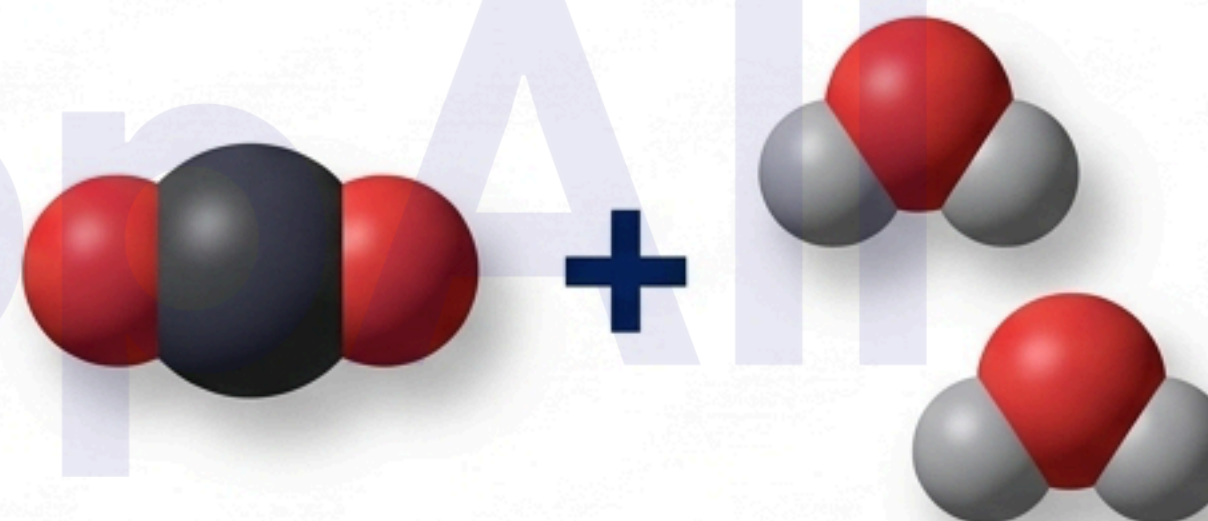
Chemical reactions reorganise atoms



Atoms are immortal in a chemical reaction. They are neither created nor destroyed, merely separated and snapped into new arrangements.



Inventory: 1 C, 4 H, 4 O



Inventory: 1 C, 4 H, 4 O

Key takeaway: Dalton explained laws of chemical combination

Postulates **1 & 4**



Law of Conservation of Mass (Lavoisier, 1789)

Because atoms cannot be created or destroyed, the total mass of reactants must perfectly equal the total mass of products.

Postulates **2 & 3**



Law of Definite Proportions (Proust)

Because atoms combine in fixed integer ratios, a specific compound will always contain the exact same proportion of elements by weight.



Historical Limitation: While Dalton solved mass and proportions, his theory could not explain Gay Lussac's 1808 Law of Gaseous Volumes. The distinction between atoms and diatomic molecules (like O_2) would require Avogadro in 1811.



You've Learned the Theory.

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