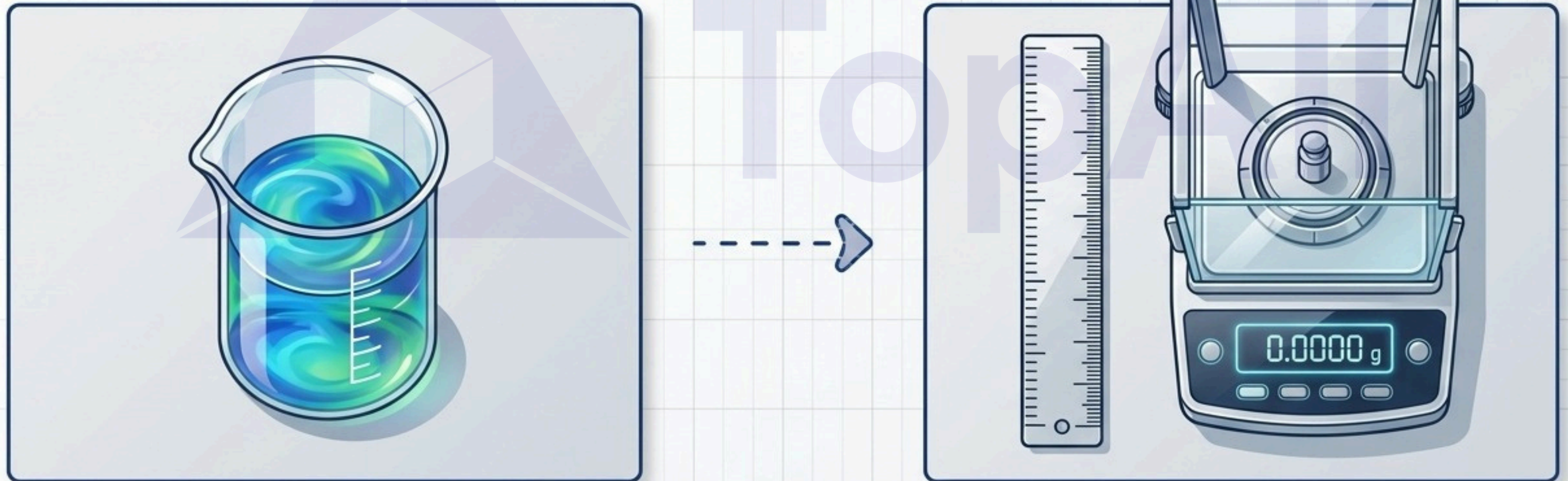


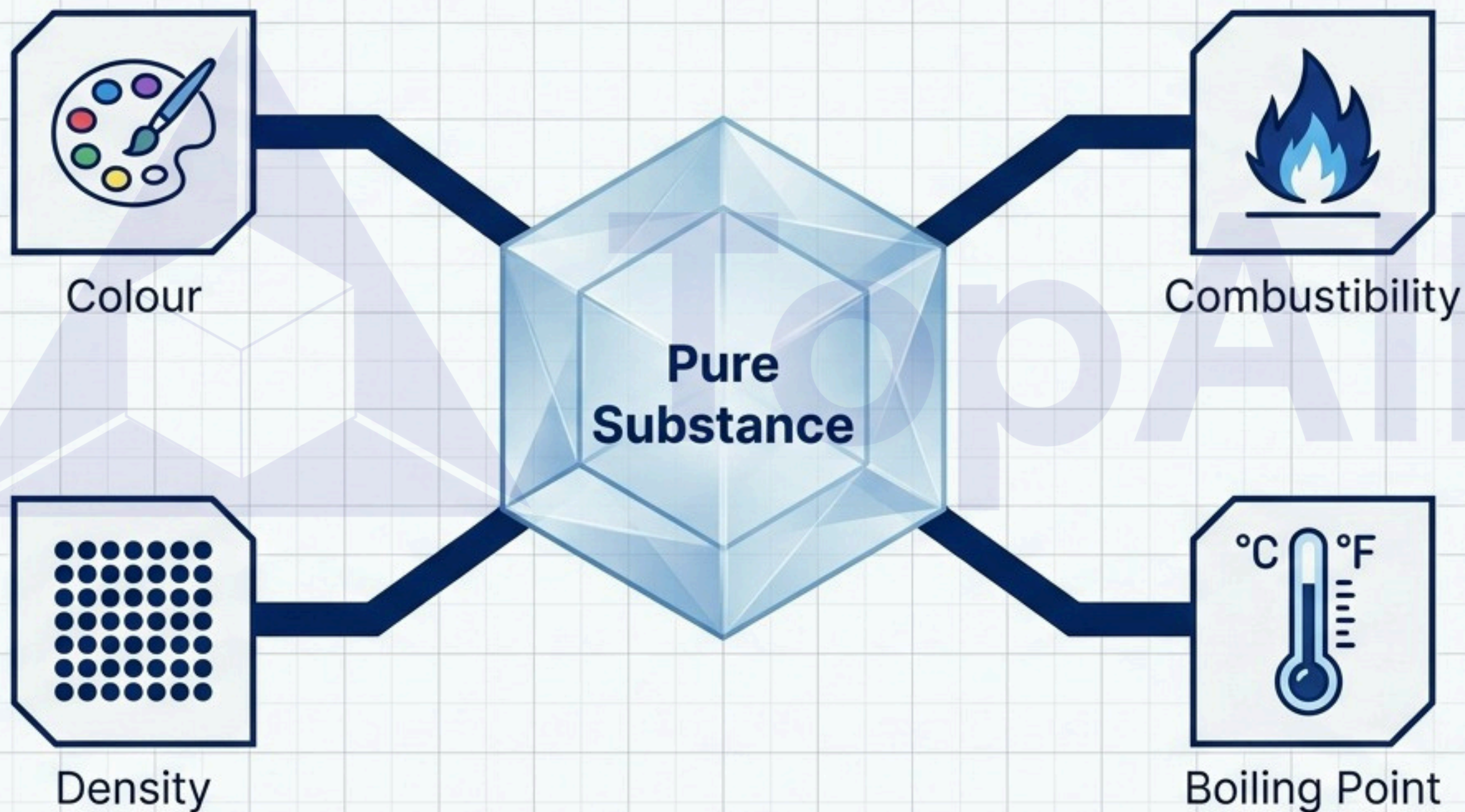
Properties of Matter and Their Measurement

Transitioning from Qualitative Observation to Quantitative Precision.



Every Substance is Unique

Every substance possesses unique or characteristic properties that define its identity. Chemists use these properties to describe, interpret, and predict the behavior of matter.



The Two Lanes of Property Classification



PHYSICAL PROPERTIES

Measured or observed without changing the identity or composition of the substance.

Colour

Odour

Color

Melting
Point

Boiling
Point

Density



CHEMICAL PROPERTIES

Measurement or observation requires a chemical change to occur.

Composition

Combustibility

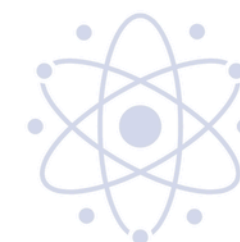
Reactivity
with Acids

Reactivity
with Bases



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

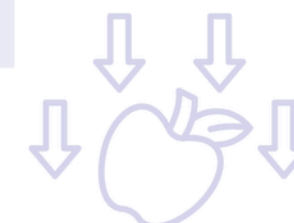
$$E=mc^2$$



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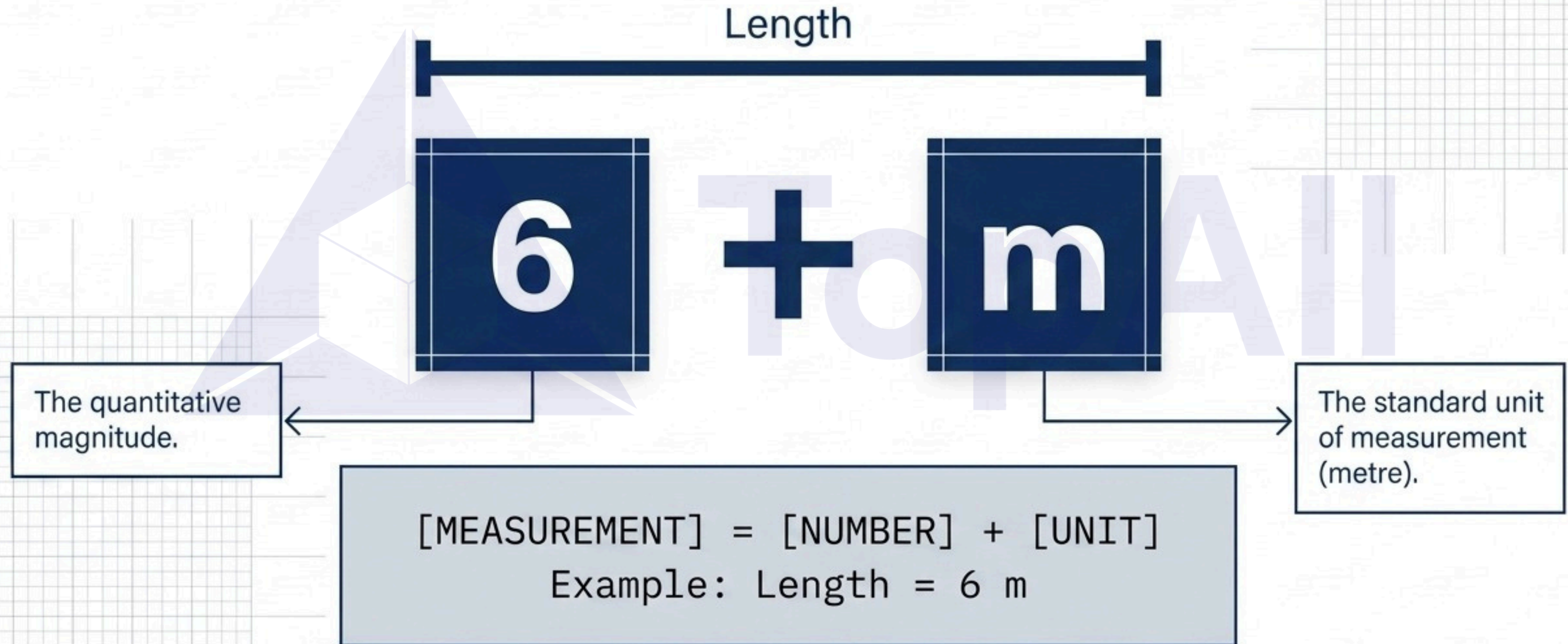
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The Rule of Quantitative Measurement

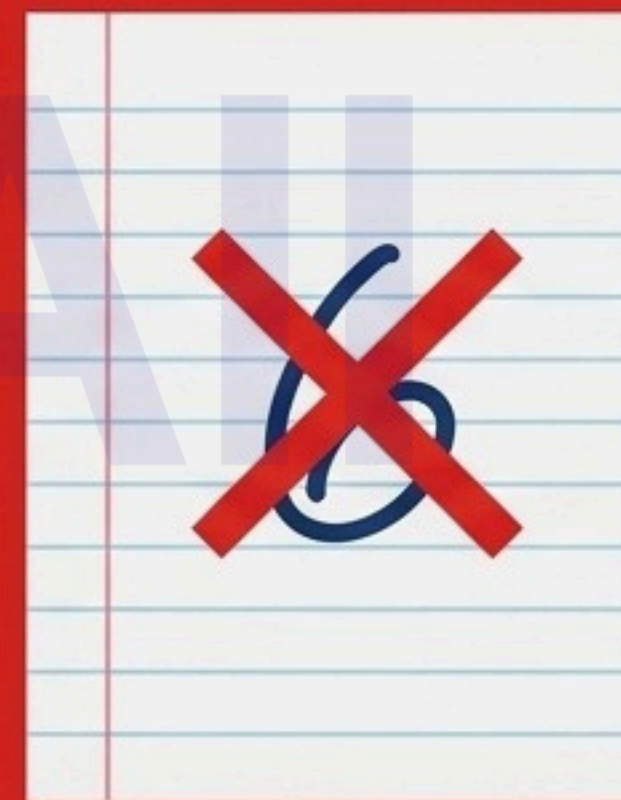


The Danger of 'Naked' Numbers



TRAP: Writing a number without its unit is an incomplete, meaningless answer in chemistry.

Explanation: Dropping the unit (e.g., writing '6' instead of '6 m') strips the number of its physical anchor. In stoichiometric calculations or property definitions, this leads to dimensional errors, physical meaninglessness, and lost exam marks.



Mini Application: Classify the Following

[Colour]

[Density]

[Combustibility]

[Acidity]

Physical Bucket

Chemical Bucket

Solution Key:

- **Physical:** Colour, Density (Observation preserves identity).
- **Chemical:** Combustibility, Acidity (Observation requires chemical reaction).

Chapter Synthesis

- 1. Identity:** Matter is defined by unique characteristic properties.
- 2. Classification:** Properties are strictly divided by whether observing them changes the substance's identity (Physical vs. Chemical).
- 3. Investigation:** Scientific investigation demands quantitative measurement.
- 4. The Rule:** Measurement transforms chemistry into an exact science –it is always a pairing of a **specific number** and a standard unit.



You've Learned the Theory.

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