

Standards of Measurement



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇨ المناهج الإماراتية ⇨ الصف الثامن ⇨ علوم ⇨ الفصل الأول ⇨ ملفات متنوعة ⇨ الملف

تاريخ إضافة الملف على موقع المناهج: 14:11:20 2026-09-06

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
علوم:

إعداد: Adel Rania

التواصل الاجتماعي بحسب الصف الثامن



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الثامن والمادة علوم في الفصل الأول

ملزمة مهمة لمنهج انسباير تحتوي على شرح دروس الفصل كامل بالإضافة الى تمارين بعد كل درس

1

ملزمة مفيدة

2

أسئلة الدرس الأول science of methods -منهج أنسباير

3

ملخص الدرس الأول - منهج انسباير: Science of Methods The

4

نموذج اختبار تجريبي Exam Mock وفق الهيكل الوزاري منهج انسباير متبوع بالإجابات

5



The nature of science

Standards of measurement



التاريخ

6/9/2026



المعلمة

Rania Adel



الصف

الثامن
أنسابير



المادة

science



افهم



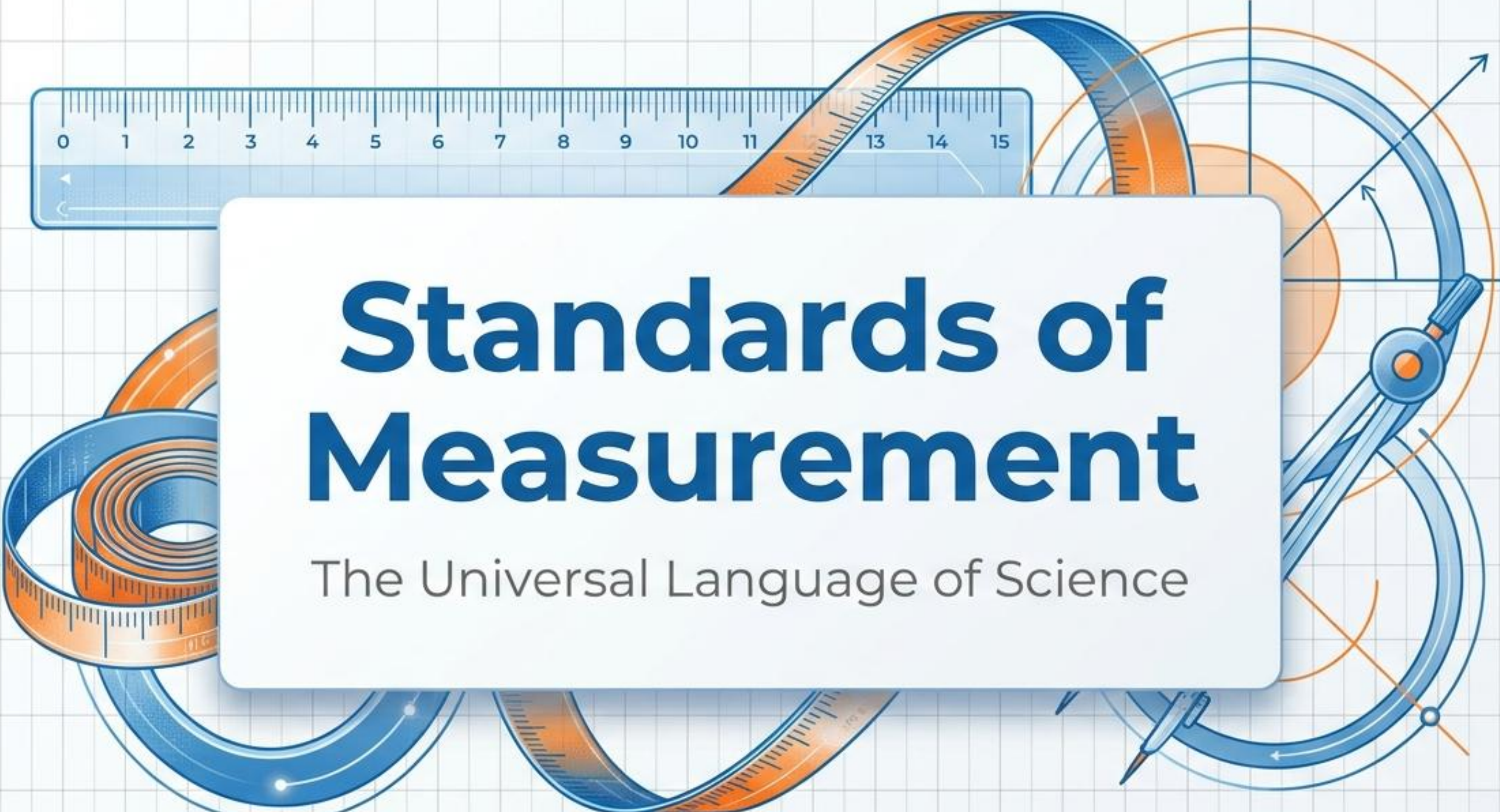
اكتشف



استكشف

<https://almanahj.com/ae>





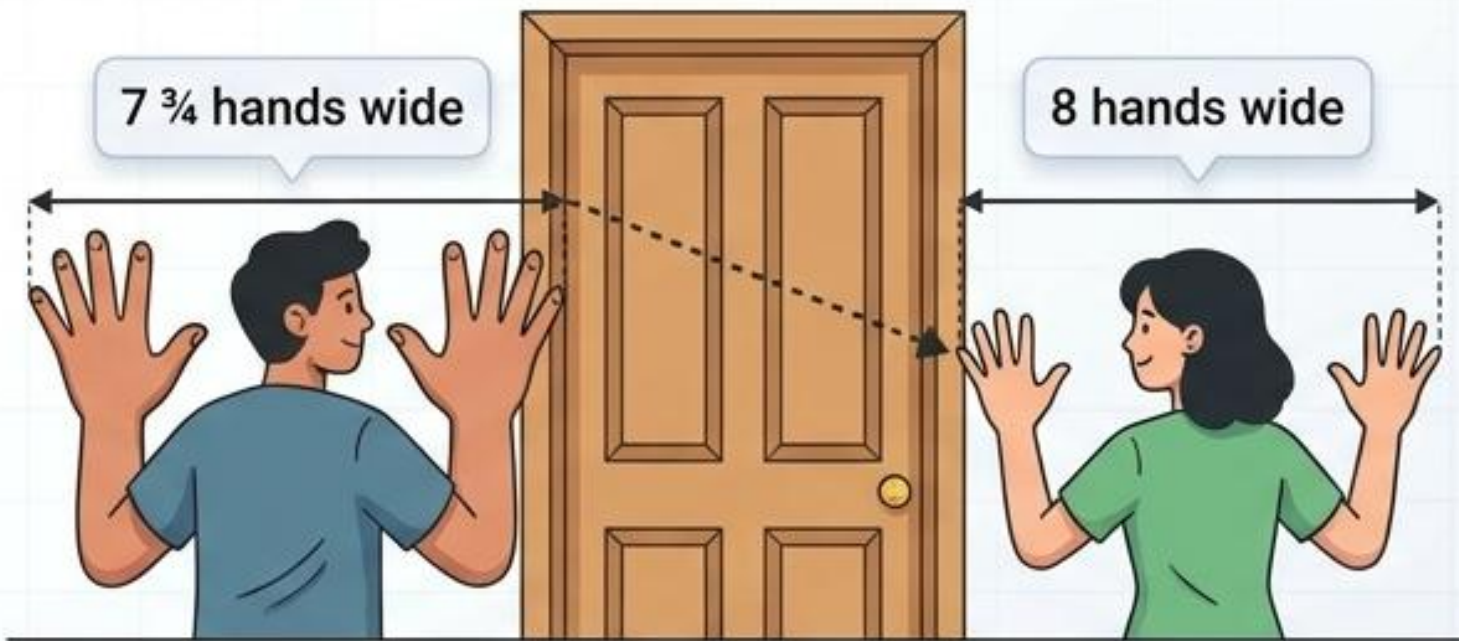
Standards of Measurement

The Universal Language of Science

What We Will Discover Today

- ✓ The need for exact standards
(Length, Volume, Mass)
- ✓ The International System of Units (SI)
- ✓ How to scale units using prefixes
- ✓ Calculating Density and Derived Units
- ✓ Comparing Temperature Scales
(Celsius, Kelvin, Fahrenheit)

Imagine Measuring a Doorway With Your Hands...



You measure it as $7 \frac{3}{4}$ hands wide. Your friend measures it as 8 hands wide. **Who is right? You can't compare measurements without checking if your hands are the same size!**

To avoid confusion, scientists use a **Standard.**



Standard:

An exact quantity that people agree to use to compare measurements.

The SI System: The 7 Pillars of Science

In 1960, scientists universally adopted the International System of Units (SI). All SI units are based on fundamental physical constants of the universe.



Length
meter (m)



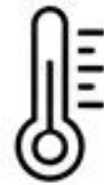
Mass
kilogram (kg)



Time
second (s)



Electric Current
ampere (A)



Temperature
kelvin (K)



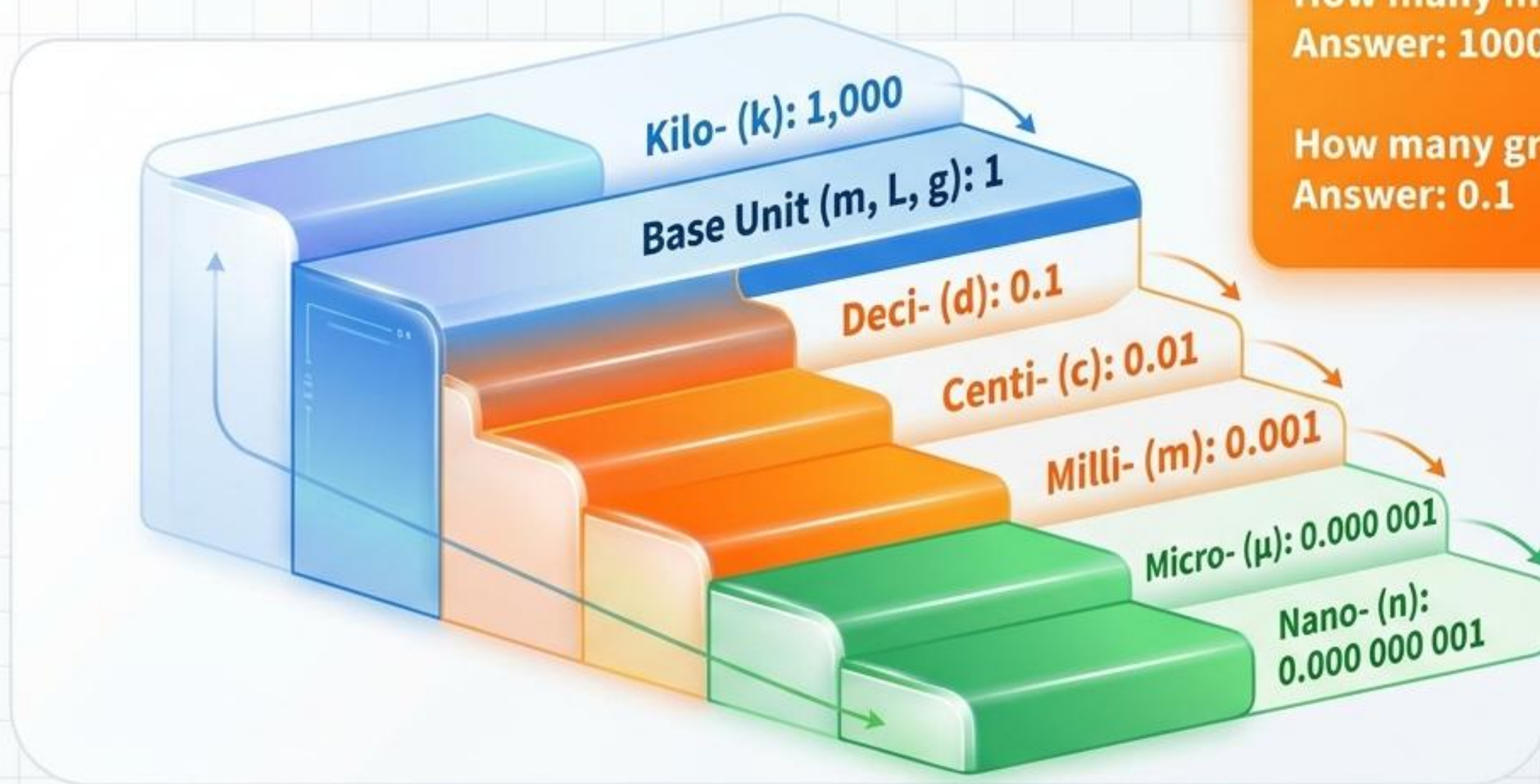
**Amount of
Substance**
mole (mol)



**Intensity of
Light**
candela (cd)

The Language of Size: SI Prefixes

The SI system is based on multiples of ten.



How many meters in 1 km?

Answer: 1000

How many grams in 1 dg?

Answer: 0.1

How to Convert Between SI Units

We use a conversion factor: a ratio that is equal to 1.

Step 1: Identify Ratio

We know $1000 \text{ mL} = 1 \text{ L}$.

$$\text{So, } \frac{1000 \text{ mL}}{1 \text{ L}} = 1.$$

Step 2: Set up the Equation

Put the new units in the numerator and old units in the denominator.

Step 3: Calculate

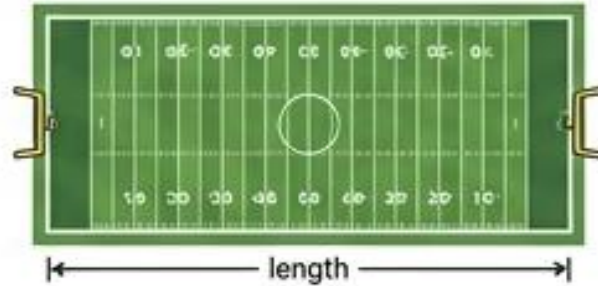
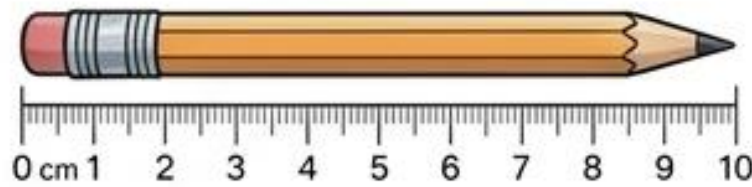
$$1.255 \cancel{\text{ L}} \times \frac{1000 \cancel{\text{ mL}}}{1 \text{ L}} = \mathbf{1255 \text{ mL}}$$

Measuring Length

Length is the distance between two points.



Millimeters (mm): A dime is about **1 mm** thick. (Great for tiny distances).



Centimeters & Meters (cm/m): Measure a pencil in **cm**. A football field is about **91 m** long.

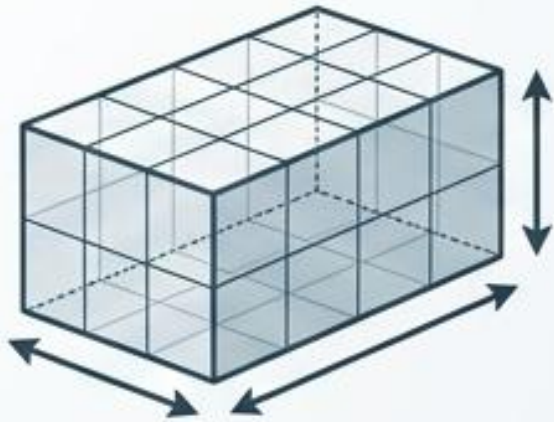


Kilometers (km): The distance from your house to the store. (We choose **km** to avoid large, messy numbers like **21,000 m**).

Measuring Volume

The amount of space occupied by an object.

Solid Volume



Solid Volume: $V = \text{length} \times \text{width} \times \text{height}$.
Calculated in **cubic centimeters (cm^3)** or
cubic meters (m^3).

Liquid Volume



Liquid Volume: Measured in **Liters (L)** or
milliliters (mL).

The Vital Link: $1 \text{ mL} = 1 \text{ cm}^3$

One cubic centimeter and one milliliter
are the exact same volume!

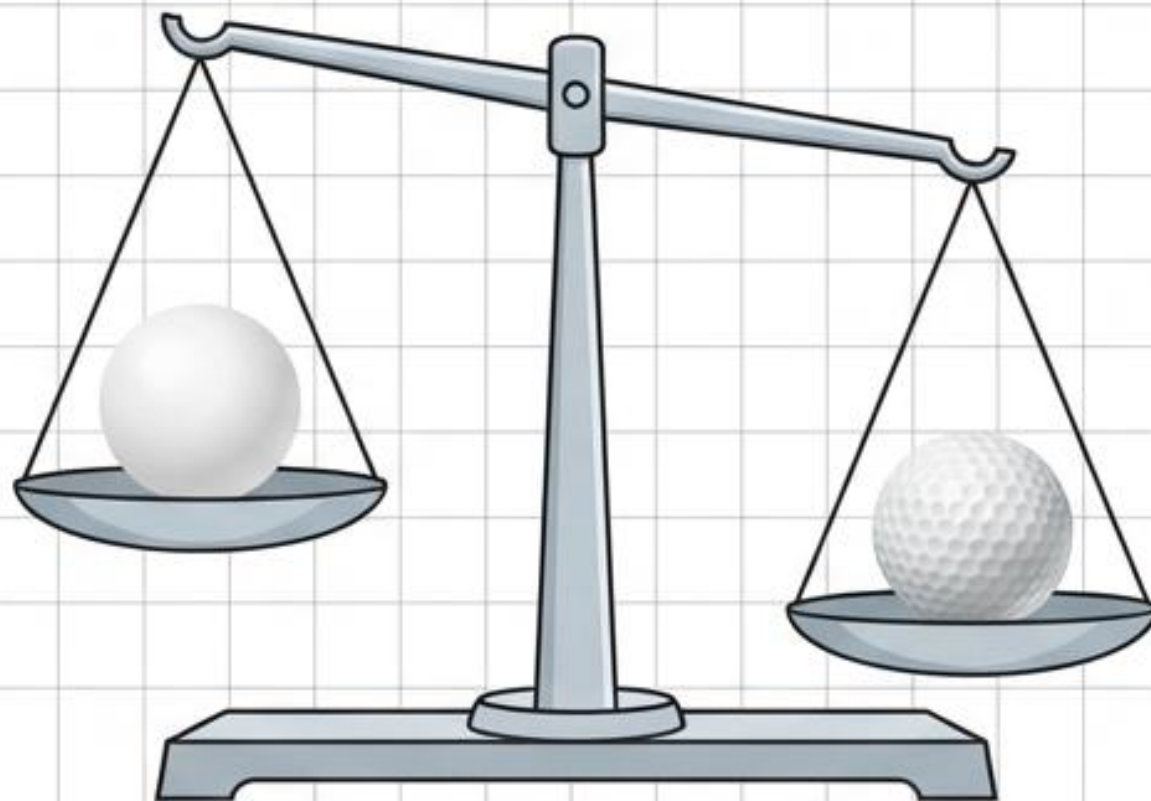
Compare & Remember: Mass vs. Volume

Don't confuse the space something takes up with the stuff inside it!

Volume (The Space)

Both a table-tennis ball and a golf ball have about the same volume.

They take up the same amount of space.



Mass (The Matter)

A measurement of the quantity of matter in an object.

The Result: The golf ball has roughly **18 times MORE** mass (about **45 g**) than the table-tennis ball (about **2.5 g**).

Bringing It Together: Density & Derived Units

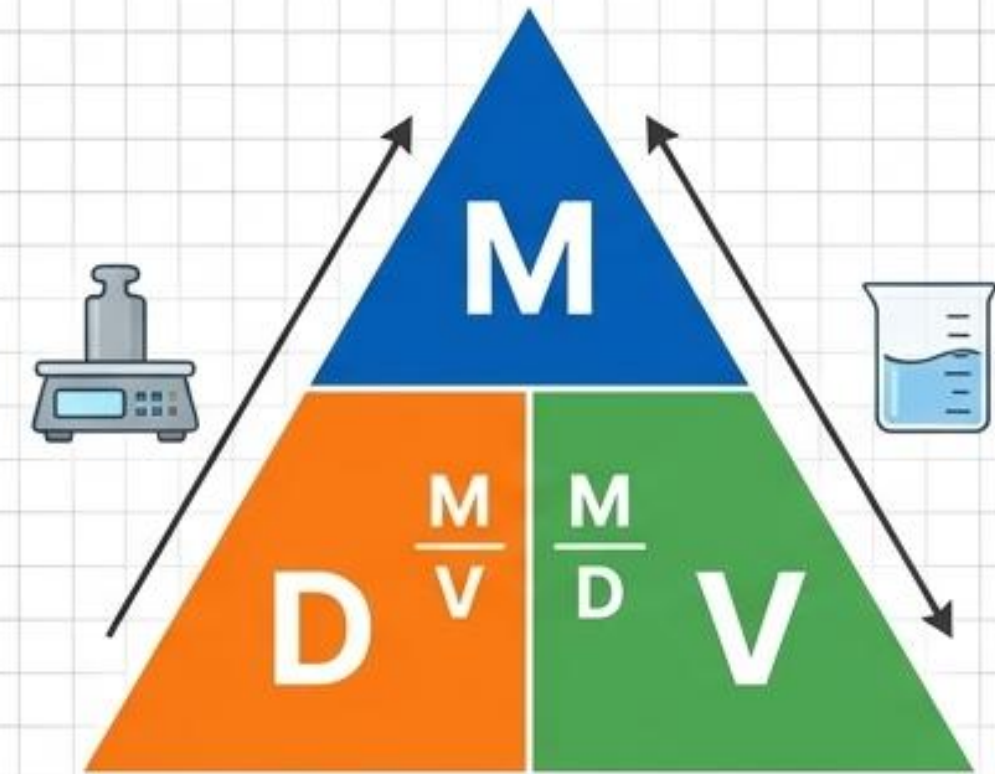
Derived Units

Units obtained by combining different SI units (like multiplying $m \times m \times m$ to get m^3 , or dividing grams by cm^3).

Density

The mass per unit volume of a material.

$$\text{Density} = \text{Mass} / \text{Volume}$$



Aluminum
(2.7 g/cm³)



**They may look the same size,
but Gold is much denser!**



Gold
(19.3 g/cm³)

Measuring the Invisible: Time & Temperature



Time (The Interval)

The interval between two events.

The SI unit is the **second (s)**.

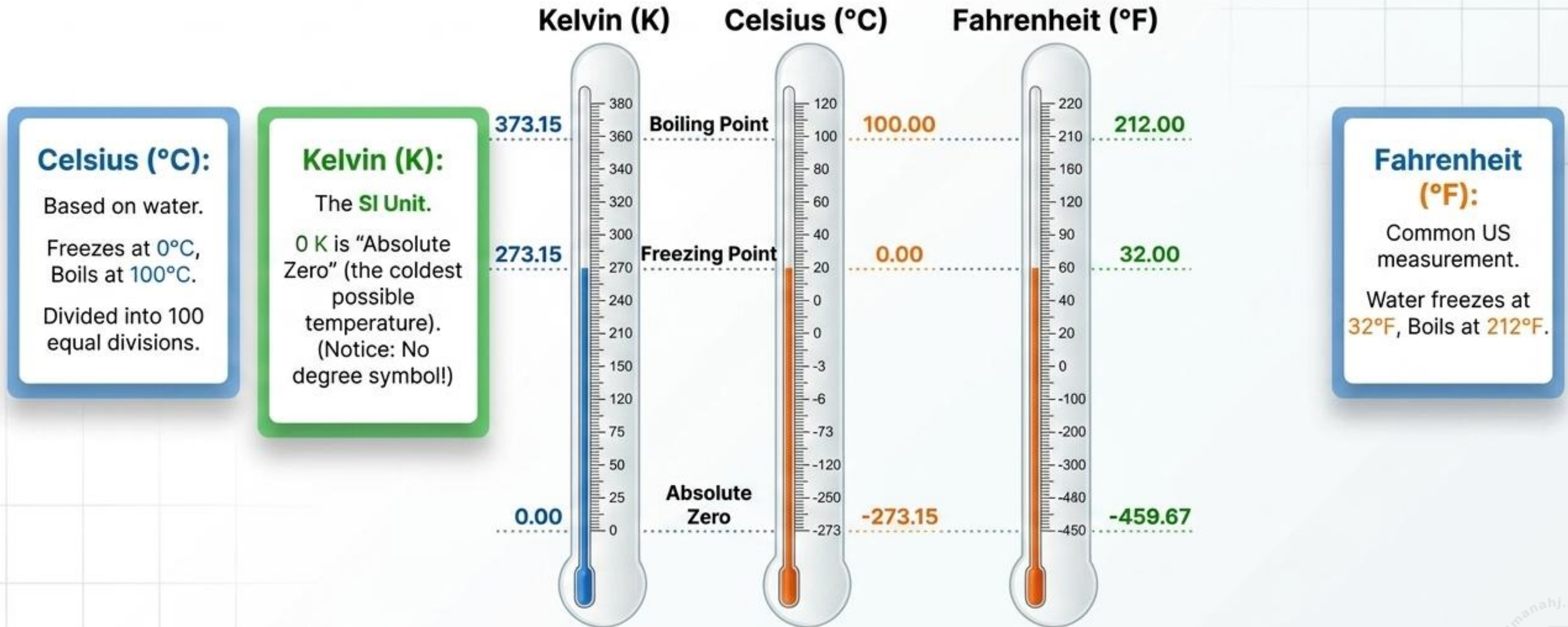


Temperature (The Energy)

A measure of how hot or cold something is.

Scientists primarily use the **Kelvin (K)** or **Celsius (°C)** scales.

How Are They Different? Temperature Scales



The Measurement Universe



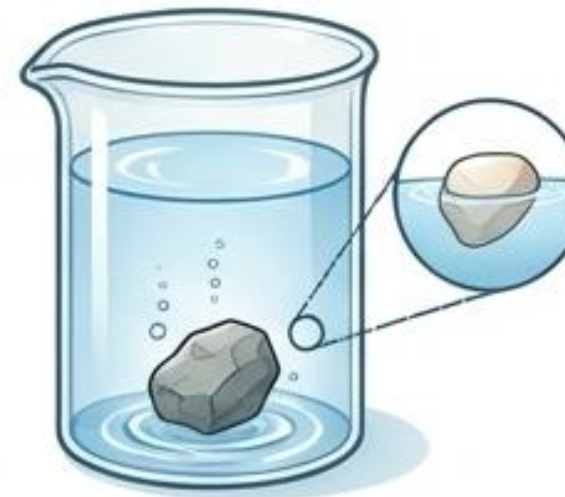
Mass can be measured in **grams (g)**.



Liquid volume can be measured in **Liters (L)**.



Speed is a derived unit: **meters per second (m/s)**.



Sinks because it has more **grams per cubic centimeter (g/cm^3)** than water.

Key Takeaways



1. The **International System of Units (SI)** provides a universal standard of measurement to eliminate scientific confusion.



2. We use **conversion factors** (a ratio equal to 1) to smoothly change one unit to another.



3. The size of the object determines which unit is appropriate to use (e.g., **mm** for a dime, **km** for a highway).



4. Units like **Density (g/cm^3)** are **Derived Units**, created by mathematically combining base SI units.

Quick Check: Be the Scientist!

Think About It!

Question 1: Why is it important to have **exact standards** of measurement?

*Answer: So scientists worldwide can accurately **compare** data without confusion.*

Math Connection

Question 2: You find an unknown metal. It has a **mass** of **158 g** and a **volume** of **20 mL**.

Step A: What is its **density**?

$$D = \frac{158 \text{ g}}{20 \text{ mL}} = 7.9 \text{ g/mL or } 7.9 \text{ g/cm}^3$$

Step B: Look at the Density Table...
What is the metal?

Answer: It's **Iron!**



Teacher Rania Adel