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The SI Units and Their Calibration by [Robert](#)

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Common SI Units

The SI system employs 7 basic units which covers length, temperature, mass, amount of substance, time, luminous intensity and electric current. Four out of the 7 basic units are often seen and used in everyday life (length, mass, time and temperature), while the remaining 3 units are for scientific purposes (electric current, amount of substance and luminous intensity). The individual basic particles in matter are what determines the "amount of substance" and is measured by the unit called "mole". Meanwhile "candelas" and "amperes" are used to determine the luminous intensity of light and electrical pressure. Other units include the "second" for time, the "meter" for length, the "degree Celsius" for temperature and the "kilogram" for mass.

Calibration

Calibration is the process of assessing and tuning a device or measuring instrument in order for it to perform up to par with accepted standards. For instance, the most accurate time piece is the atomic clock that sits in the United States Naval Observatory in Washington, D.C. Fortunately there's the internet and people across the U.S. can calibrate their time pieces accordingly. Not to worry though, because there are also non-governmental scientific laboratories that took the responsibility of making the same calibrations the U.S. Naval Observatory does and they range from torque wrenches to clocks, and from laser-beam power analyzers to thermometers. The standards set by NIST (National Institute of Standards and Technology) is what high-tech industries and scientific research studies use to calibrate their devices or instruments that need to have exact precision. The NIST does not use physical models of measuring equipment, but rather they keep an on-hand definition of measurements. This method is in line with the standards accepted by scientists: where using any physical representation of a unit becomes indefinitely useless as it can be corrupted by physical means as well, instead using standards that can be quantified and are common manifestations in nature are far more acceptable. Click here for online conversion/online conversion tool

Kilograms and Meters

The "meter" (which is approximately 3.281 feet) was at one time measured in accordance with the size of our planet Earth. Early 20th century experts measured the distance from one point of the Equator crossing all the way to the North Pole using an imaginary line drawn through Paris, France; they then divided the distance into 10 million parts where 1 part is considered the "meter". However, when the U.S. launched the global positioning satellites (GPS) they discovered that the geological features of the Earth changes from 10 millimeters to 3 feet per year (especially in major plate tectonic fault lines, which also forces them to calibrate the satellites annually) therefore determining the exact measure of the meter against Earth's size may not be very efficient after all. Since 1960 the length of a meter have been determined by the speed of light. The official length accepted as the meter is calculated to be 1/299,792,458 of a second.

The kilogram is also a unit of weight here on Earth and is roughly the equivalent of 2.21 pounds, but it isn't universal in the sense that it's only applicable for use on our planet which has a unique constant gravitational pull. If one wanted to measure something to its exact proportion in terms of mass and weight then it must be based on the perpetual law of physics. Only theory floats around the scientific community and they have yet to find properties in nature that cannot be changed in terms of mass, therefore weight, and its varying units such as the kilogram and pounds will have to

be calibrated based on a 200-year old principle. The bar of platinum-iridium alloy that sits in a vault somewhere in Sèvres, France still remains the standard for calibrating the kilogram and it is known as the International Prototype Kilogram.

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