



Article published on April 1st 2012 | [K-12 Education](#)

The International System of Units (SI) proved itself very useful to humanity both in commerce and science; it has systematized our lives ever since it was introduced back in the 60s, so to speak. When the whole world accepted this system as a standard measuring tool, economy and development communicated without boundaries everywhere! As such everyone was using the same unit to measure things (e.g. the meter-kilogram and second rule). The world's leading scientists and mathematicians came together to create the SI system and it had remained flawless for over 5 decades. However, little do we know that the metric or SI is not perfect and in fact it is being calibrated every decade or so. The brains working behind the scenes are the meteorologists from all over the world and they estimate that about 10% of the SI system is being improved every 15 years or so.

This on-going calibration is essential to scientific research and development programs, because it makes our electronic measuring gadgets extremely accurate. Over the next 10 years we might be able to witness a dramatic change to the SI system since the Metric Treaty was signed in 1875. Proponents of this change argue that the artifact locked in a vault in Paris may not ultimately represent the unit of mass which is the kilogram. This creates a problem for the whole scientific community. Apparently, what defines the "kilogram" is just a metal ball that scientists designated as 1 kilogram. The kilogram is the only unit of measurement left unchanged in the SI system, and it is because it is represented by a physical artifact. Back in the 1960s the 1 meter length bar was replaced by the measurements on the properties of light. The real problem with that chunk of metal is that its mass might change over time; moreover we might not be able to determine the exact difference since we based our weight measurement on it.

Experts found new evidence that the artifact might be losing approximately 50 micrograms per century, but other scientists believe that it may have shed more than 20 times the calculated amount. With this much is at stake it is likely that the artifact will be stored as a museum display instead of being something useful. This causes a great deal for concern and confusion as scientists and experts attempt to mitigate the repercussions. The proper solution therefore is to formulate all standards of measurement based on the fundamental laws of physics, as it has become apparent that flaws might be inevitable if experiments are done in a laboratory. And where to find such competent laboratories is another question. New theories such as quantum physics have also helped contribute to the push for change in the SI system. [online weight conversion tool](#)

Thanks largely to the work of Brian David Josephson (Josephson Effect) and Edwin Herbert Hall (Hall Effect), measuring resistance and voltage became highly accurate even at quantum levels. Semiconductor manufacturers are now able to create electrical instruments that can measure things on the quantum plane than the current SI units. The research of Josephson and Hall enabled scientists to measure mass in electrical quantities; they did this by matching mechanical power (force $\times$ velocity) against electrical power (current $\times$ voltage). We now possess the knowledge to calculate mass with enough accuracy that replacing the "kilogram artifact" in Paris is a workable deal. If we look back at history we'll find that the SI has been transformed from its principles in standards of measurements in physical objects to the core functions of nature itself. An example of this is when the length "meter" was defined in terms of the actual speed of light back in 1983.

The electron charge, e , and Planck constant, h , are both also being considered to be the official units to define the kilogram and electrical quantities. Meanwhile the Boltzmann and Avogadro constants may replace (kelvin) on measuring temperatures as well as the unit of matter which is (mole). Rest assured that these changes won't come lightly, because the international metrology

community is very strict about it. It will be studied and debated upon and a lot of technical issues need to be resolved first before this change can be implemented and the estimated target date is 2015.

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[Robert](#) - About Author:

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Article Keywords:

stones, ounces, tones, pounds, metric tons, kilograms, grams, centigrams, milligrams, online conversion, converter, convert, calculator.

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