

Metrology

Measurement in Sport

Standard Units and the SI System

Quantity	Unit	Based on
Length	metre	Distance travelled by light in a specified fraction of a second
Mass	kilogram	Mass of the International prototype of the kilogram
Time	second	Frequency of a particular type of light
Electric current	ampere	Flow of electricity required to produce a specified force between conductors
Temperature	kelvin	A fraction of the temperature of water at its triple point (where water, ice and water-vapour co-exist)
Amount of substance	mole	Number of atoms in a specified mass of carbon
Luminous intensity	candela	Intensity of light-source of a particular colour

Everything that is measured has a unit associated with it, from wind chill to heat insulation, and there are thousands of such units in use around the world.

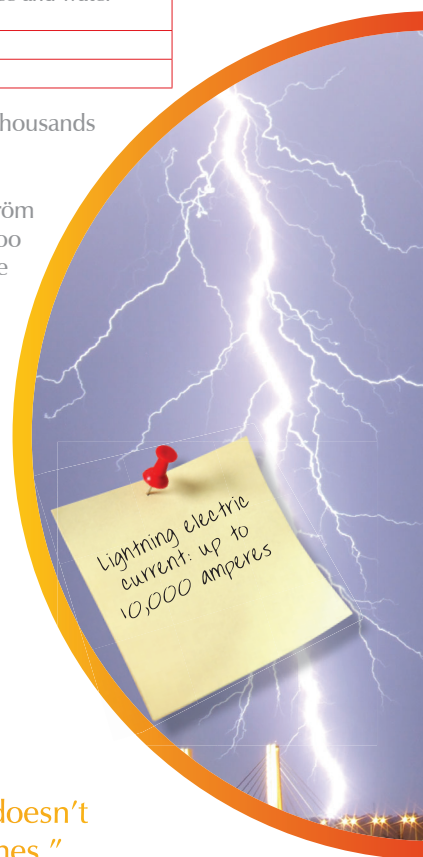
The first step in simplifying this is the metric system – so while distance units like the mile, hand or ångström are still in use, the internationally recognised standard unit of length is the metre. Where distances are too short or long to be measured in metres, new units are defined simply by multiplying or dividing the metre by ten as many times as necessary (left).

SI Prefixes		
Prefix	Symbol	Multiply by
Yotta-	Y	1 000 000 000 000 000 000 000 000
Zetta-	Z	1 000 000 000 000 000 000 000 000
Exa-	E	1 000 000 000 000 000 000
Peta-	P	1 000 000 000 000 000
Tera-	T	1 000 000 000 000
Giga-	G	1 000 000 000
Mega-	M	1 000 000
myria-	My	10 000
kilo-	k	1000
hecto-	h	100
deka-	da	10
deci-	d	0.1
centi-	c	0.01
milli-	m	0.001
micro-	μ (m _μ)	0.000 001
nano-	n	0.000 000 001
pico-	p	0.000 000 000 001
femto-	f	0.000 000 000 000 001
atto-	a	0.000 000 000 000 000 001
zepto-	z	0.000 000 000 000 000 000 001
yocto-	y	0.000 000 000 000 000 000 000 001

Engineers and scientist have shown that it is possible to reduce all necessary units to just seven **base units**. These base units are the core of the SI (le Système international d'unités).

Did you know? In the 1968 Olympics, gold medallist pole vaulter, Robert Seagen, decided to skip the 5.35 metre height – a gamble which paid off when he cleared the 5.40 metre. "If I'd known the metric system better I might not have passed that high – 5.35 metres doesn't sound as high as 17 feet 6½ inches."

Many other units are based on combinations of the base units. For instance, force is measured in newtons, but 1 newton = (1 kilogram) X (1 metre per second per second). Such units, created by combinations of the base units are called **derived units**.



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No games without Measurement

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