

## Units of Measurement

### Weight/Mass

Da	dalton	1 Da	= $1.65 \times 10^{-24}$ g
g	gram	1 g	= 0.3035 oz (avoirdupois)
kg	kilogram	1 kg	= 2.2 lb
Mg	megagram, metric ton	1 Mg	= $10^6$ g or 2,205 lb
μg	microgram	1 μg	= $10^{-6}$ g
mg	milligram	1 mg	= 1/1,000 g; $10^{-3}$ g
mol	mole	1 mol	= molecular weight in grams
ng	nanogram	1 ng	= $10^{-9}$ g
oz	ounce (avoirdupois)	1 oz	= 28.3 g
pg	picogram	1 pg	= $10^{-12}$ g
lb	pound	1 lb	= 0.45 kg

### Length

cm	centimeter	100 cm	= 1 m
dm	decimeter	1 dm	= 1/10 m
ft	foot	1 ft	= 0.3 m
in.	inch	1 in.	= 2.54 cm
km	kilometer	1 km	= 0.6 mi
m	meter	1 m	= 3.3 ft
μm	micrometer, micron	1 μm	= $10^{-6}$ m
mi	mile	1 mi	= 1.6 km
mm	millimeter	1 mm	= 1/1,000 m; $10^{-3}$ m
nm	nanometer	1 nm	= $10^{-9}$ m

### Area

A	acre	1 A	= 4047 m <sup>2</sup>
Ha	hectare	1 Ha	= 2.47 A
m <sup>2</sup>	square meter	1 m <sup>2</sup>	= 10.8 ft <sup>2</sup>

### Volume

ft <sup>3</sup>	cubic foot	1 ft <sup>3</sup>	= 0.028 m <sup>3</sup>
m <sup>3</sup>	cubic meter	1 m <sup>3</sup>	= 35 ft <sup>3</sup>
cm <sup>3</sup> or cc	cubic centimeter	1 cc	= approximately 1 mL
gal	gallon (U.S.)	1 gal	= 3.8 L
L	liter	1 L	= 1.05 liquid quarts
mL	milliliter	1 mL	= $10^{-3}$ L
p.g.	proof gallon	1 p.g.	= 1 liquid gal of spirits that contains 50% alcohol at 60°F

### Concentration

mM	millimolar	1 mM	= 1 M/1,000
mppcf	millions of particles per cubic foot	mppcf × 35.3	= millions of particles/m <sup>3</sup>
M	molar; moles of solute per liter of solution		
N	normal; 1 gram equivalent of solute per L of solution		
ppm	parts per million	1 ppm	= 1 mg/kg = (mg/m <sup>3</sup> )(24.45)/(mol wt)
ppb	parts per billion	1 ppb	= 1 μg/kg
ppt	parts per trillion	1 ppt	= 1 ng/kg

### Pressure

kPa	kilopascal	1 kPa	= 0.145 lb/in <sup>2</sup>
MPa	megapascal	1 MPa	= 1 Pa × $10^6$
mm Hg	millimeter of mercury	1 mm Hg	= 0.0193 lb/in <sup>2</sup>
Pa	pascal	1 Pa	= 1 N/m <sup>2</sup>

### Force

N	newton	1 N	= 1 kg × m per s <sup>2</sup>
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### Temperature

°C	degrees Celsius	=	(°F – 32) × 5/9
°F	degrees Fahrenheit	=	(°C × 9/5) + 32
K	kelvin	1 K	= $3.6609 \times 10^{-3}$ of the thermodynamic temperature of the triple point of pure water = °C + 273.15 = [(°F – 32)/1.8] + 273.15

### Energy/Power

A	ampere	1 A	= 1 C/s
C	coulomb	1 C	= 1 A × s
eV	electronvolt	1 eV	= $1.6 \times 10^{-12}$ erg
	erg	1 erg	= $10^{-7}$ J
J	joule	1 J	= $10^7$ erg
keV	kiloelectronvolt	1 keV	= 1,000 eV
MeV	megaelectronvolt	1 MeV	= $1 \times 10^6$ eV
mW	milliwatt	1 mW	= $10^4$ erg/s

### Radiation

Bq	becquerel	1 Bq	= 1 disintegration per second
Ci	curie	1 Ci	= $3.7 \times 10^{10}$ disintegrations per second
Gy	gray	1 Gy	= 1 J/kg (physical quantity)
mCi	millicurie	1 mCi	= $10^{-3}$ Ci
pCi	picocurie	1 pCi	= $10^{-12}$ Ci
	rad	1 rad	= 0.01 Gy
R	roentgen	1 R	= $2.58 \times 10^{-4}$ C per kg
rem	roentgen equivalent man	1 rem	= 0.01 Sv
Sv	sievert	1 Sv	= 1 J/kg (biological effect)

### DNA or RNA (length of nucleic acid chain)

kb	kilobase	1 kb	= 1,000 nucleotides of RNA = 2,000 nucleotides of DNA (1,000 pairs of nucleotides)
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### Exponentials (Scientific Notation)

$10^2$ ,  $10^3$ ,  $10^6$ , etc.: superscripts refer to the number of times 10 is multiplied by itself, e.g.,  $10^2 = 10 \times 10 = 100$ ;  $10^3 = 10 \times 10 \times 10 = 1,000$ , etc.