Useful Data

Metric Prefixes

M-	mega-	10^{6}
k-	kilo-	10^{3}
m-	milli-	10^{-3}
μ- (Greek mu)	micro-	10^{-6}
n-	nano-	10^{-9}
p-	pico-	10^{-12}
f-	femto-	10^{-15}

(Centi-, 10^{-2}, is used only in the centimeter.)

Notation and Units

quantity	unit	symbol
distance	meter, m	$x, \Delta x$
time	second, s	$t, \Delta t$
mass	kilogram, kg	m
density	kg/m^3	ρ
velocity	m/s	$\mathbf{v}$
acceleration	m/s^2	$\mathbf{a}$
force	$N = kg \cdot m/s^2$	$\mathbf{F}$
pressure	Pa=1 N/m^2	P
energy	$J = kg \cdot m^2/s^2$	E
power	$W = 1\ J/s$	P
momentum	$kg \cdot m/s$	$\mathbf{p}$
period	s	T
wavelength	m	λ
frequency	s^{-1} or Hz	f
charge	coulomb, C	q
voltage	volt, $1\ V = 1\ J/C$	V
current	ampere, $1\ A = 1\ C/s$	I
resistance	ohm, $1\ \Omega = 1\ V/A$	R
capacitance	farad, $1\ F = 1\ C/V$	C
inductance	henry, $1\ H = 1\ V \cdot s/A$	L
electric field	V/m or N/C	E
magnetic field	tesla, $1\ T = 1\ N \cdot s/C \cdot m$	B

Fundamental Constants

gravitational constant	$G = 6.67 \times 10^{-11}\ N \cdot m^2/kg^2$
Coulomb constant	$k = 8.99 \times 10^{9}\ N \cdot m^2/C^2$
quantum of charge	$e = 1.60 \times 10^{-19}\ C$
speed of light	$c = 3.00 \times 10^{8}$ m/s

Conversions

Nonmetric units in terms of metric ones:

1 inch	= 25.4 mm (by definition)
1 pound-force	= 4.5 newtons of force
(1 kg) · g	= 2.2 pounds-force
1 scientific calorie	= 4.18 J
1 kcal	= 4.18×10^{3} J
1 gallon	= 3.78×10^{3} cm^3
1 horsepower	= 746 W

When speaking of food energy, the word "Calorie" is used to mean 1 kcal, i.e., 1000 calories. In writing, the capital C may be used to indicate 1 Calorie=1000 calories.

Relationships among U.S. units:

1 foot (ft)	= 12 inches
1 yard (yd)	= 3 feet
1 mile (mi)	= 5280 feet

Earth, Moon, and Sun

body	mass (kg)	radius (km)	radius of orbit (km)
earth	5.97×10^{24}	6.4×10^{3}	1.49×10^{8}
moon	7.35×10^{22}	1.7×10^{3}	3.84×10^{5}
sun	1.99×10^{30}	7.0×10^{5}	—

Subatomic Particles

particle	mass (kg)	radius (fm)
electron	9.109×10^{-31}	$\lesssim 0.01$
proton	1.673×10^{-27}	~ 1.1
neutron	1.675×10^{-27}	~ 1.1

The radii of protons and neutrons can only be given approximately, since they have fuzzy surfaces. For comparison, a typical atom is about a million fm in radius.