OoMA Fact Sheet

$G = (2/3) \times 10^{-7}$ dyne-cm^2/gram^2
$c = 3 \times 10^{10}$ cm/sec
$k = (1/7) \times 10^{-15}$ erg/K
$h = (2/3) \times 10^{-26}$ erg-sec
$\hbar = 10^{-27}$ erg-sec
$N_A = 6 \times 10^{23}$ nucleons/gram
$m_p/m_e = 1836$ $\quad m_pc^2 = 938$ MeV
$m_e \approx 10^{-27}$ gm $\quad m_ec^2 = 511$ keV
$e = 4.8 \times 10^{-10}$ esu $= 1.6 \times 10^{-19}$ Coulomb
$\alpha = e^2/\hbar c = 1/137$
$L_\odot = 4 \times 10^{33}$ erg/sec
Fusing H to He yields 0.7% of mc^2
He to C & C to Fe about 0.1% of mc^2 each
Solar Constant = 1.4 kW/m^2 at 1 AU
$M_\odot = 2 \times 10^{33}$ grams $\quad R_\odot = 7 \times 10^{10}$ cm
$R_\oplus = 6371$ km $\quad M_\oplus = 3 \times 10^{-6} M_\odot$
$M_J = 10^{-3} M_\odot$
Hubble radius $= c/H_\circ = 1.3 \times 10^{28}$ cm
Critical density $\sim 10^{-29}$ g/cm^3
$\sigma_T = (2/3) \times 10^{-24}$ cm^2
$\sigma_{SB} = 5.67 \times 10^{-5}$ erg/cm^2/sec/K^4
Flux from a blackbody surface is $\sigma_{SB} T^4$
1 Farad $= 9 \times 10^{11}$ cm
1 ohm $= 1/(9 \times 10^{11})$ sec/cm
1 gram calorie = 4.2 Watt-sec or Joules
Dietary calories are really kilocalories.
1 kiloton (kT) of TNT = KE of 1000 metric tonnes @ 2.9 km/sec. [1 kT = 10^{12} gram-cal exactly]
Supernova kinetic energy = 10^{51} ergs
1 AU $= (3/2) \times 10^{13}$ cm
1 radian $= 2 \times 10^5$ arc-seconds
1 square arcsec $= 2.4 \times 10^{-11}$ steradians
1 pc $= 3 \times 10^{18}$ cm
1 erg $= 6 \times 10^{11}$ eV
1 eV $\sim 12,000$ K $\quad$ 1 eV $\sim 1.2\ \mu$m
$hc/k \approx 1.44$ cm K
1 Jy $= 10^{-23}$ ergs/cm^2/sec/Hz
1 year $\approx \pi \times 10^7$ seconds
1 Mpc is 1 km/sec for 1000 Gyr
One atmosphere or 1 bar $= 10^6$ dyne/cm^2
Maximum mass for white dwarfs: 1.4 M$_\odot$

Typical mass of neutron stars: 1.4 M$_\odot$

Stellar spectra – from "early" = hot to "late" = cool:
Oh Be A Fine Girl Kiss Me Later Tonight
Luminosity class – the Roman numeral:
"I" = supergiant = low surface gravity
"III" = giant, "V" = dwarf = main sequence star = high surface gravity.

Sp.Type	$\log(L/L_\odot)$	M/M$_\odot$	T$_{eff}$ K
O5V	5.82	40	40,000
B0V	4.66	18	28,000
B5V	2.94	9	15,500
A0V	1.78	3	9900
A5V	1.15	2	8500
F0V	0.88	1.7	7400
F5V	0.54	1.3	6580
G0V	0.15	1.1	6030
G5V	-0.11	0.9	5520
K0V	-0.38	0.8	4900
K5V	-0.78	0.7	4130
M0V	-1.22	0.5	3480
M5V	-1.90	0.2	2800
L0	-3.65		2200
L5	-4.11		1700
T0	-4.57		1300
T5	-5.02		1000

1 magnitude is -4 db
A decibel (db) is a factor of $10^{0.1}$ in power.
0^{th} mag at V $\approx 10^3$ photons/cm^2/sec/Å.
$m_{bol} = 0$ for 2.5×10^{-5} erg/cm^2/sec.
Bands central wavelengths in μm:
U = 0.36, B = 0.44, V = 0.55, R = 0.7, I = 0.9, Z = 1.0, J = 1.25, H = 1.6, K = 2.2, L = 3.5, M = 4.6, N = 10, Q = 20
AB magnitudes have the same zeropoint flux in F_ν (3631 Jy) in all bands.
Johnson or "Vega" magnitudes have zeropoints that follow the spectrum of an A0V star.

$10^{n/10} = 1.26, 1.6, 2, 2.5, 3.2, 4, 5, 6.3, 8.$