Symbol	*Represents*	*Units*
Δx, Δy, Δz	change in length in x, y or z direction	length, meters
A	area = xy (or πr^2 if area of a circle)	length^2, meters^2
V	volume = xyz (or $\pi r^2 l$ if volume of a cylinder)	length^3, meters^3
v	velocity, $\frac{dx}{dt}$	length/time, meters/second
a	acceleration (rate of change of velocity, $\frac{dv}{dt}$	lenght/time^2, m/sec^2
g	acceleration due to earth's gravity, approximately 9.8 m/sec^2	m/sec^2
m	mass (amount of material)	grams or kilograms

F = ma	force = mass x acceleration	newton (N) = $\frac{\text{kg m}}{\text{sec}^2}$
	weight = mg (mass x acceleration due to earth's gravity)	
E_k (or KE)	kinetic energy = $^1/_2 mv^2$	joule (J) = $\frac{\text{kg m}^2}{\text{sec}^2}$
E_{pg} (or PE)	potential energy due to gravity = $mg\Delta z$ (weight x height)	joule (J) = $\frac{\text{kg m}^2}{\text{sec}^2}$
$W = \Delta(E_k + E_p)$	mechanical work = change in energy:	joule (J) = $\frac{\text{kg m}^2}{\text{sec}^2}$
$W = F\Delta x$	mechanical work is also equal to force x distance (1 joule = 1 newton x 1 meter)	

E_T (or TE)	thermal energy, a function of an objects mass and its temerpature	(see below)
T	temperature ($\Delta T = T_2 - T_1$, change in temperature,)	°C
Q	heat flow (a transfer of thermal energy, from hot to cold)	calorie
	1 calorie = amount of heat needed to raise the temperture of 1 gram of water 1°C	
$Q = mc\Delta T$	heat flow as a consequence of changing an object's temperature ($\Delta T = \frac{Q}{mc}$)	
c	specific heat (heat capacity); for water, c is defined as 1 calorie per gram per °C	
$W + Q = \Delta(E_k + E_p + E_T)$	work done + heat flow = change in energy	

P	power or rate of energy use: $\text{power} = \frac{\text{work done}}{\text{time taken}} = \frac{\text{energy used}}{\text{time}}$	$1 \text{ watt} = \frac{1 \text{ joule}}{1 \text{ second}}$
	energy used = power applied x time in use (e.g. kilowatt-hour)	

Symbol	*Represents*	*Units*
$\frac{Q_c}{t} = K\frac{\Delta T}{\Delta x}A$	Conductive heat flow	
$\frac{Q_c}{t}$	*rate* of heat flow by conduction	1 watt = 0.239 cal/sec
K	thermal conductivity	watt per °C per meter
$\frac{\Delta T}{\Delta x}$	temperature gradient	°C/meter
A	cross-sectional area through which heat is being conducted	meter^2

$\frac{Q_r}{t} = \sigma\varepsilon A T^4$	Radiative heat flow (Stefan-Boltzman Law)	
$\frac{Q_r}{t}$	*rate* of heat flow by radiation	1 watt = 0.239 cal/sec
σ	universal constant (fudge factor)	
ε	emissivity, a property of the material doing the radiation and its surface characteristics	
A	surface area of the radiator	meter^2
T^4	absolute temperature, raised to the fourth power	°K

$W = Q_{hot} - Q_{cold}$	Work done by a "Heat Engine"
	from a flow of heat between source (hot or input) and sink (cold or output)
$\frac{Q_{in} - Q_{out} = W}{Q_{in}}$	Efficiency = useful work done / total energy input
$\frac{T_{hot} - T_{cold}}{T_{hot}}$	Carnot's theoretical maximum Heat Engine efficiency (T in °K)

1st Law: Conservation of Energy: input = output + change in storage

2nd Law: Energy Conversion: input = useful output + heat (heat—increase in entropy—must be > 0)

Efficiency = useful work done / total energy input

a consequence of the 2nd law is that Efficiency will always be < 100%

Energy Consumption= intensity of use x level of activity (power x time)