Components of Energy(kcal) Expenditure:

* Note Use this to determine your *Actual Kcal Expenditure*

Kilocalorie - a dietary calorie; the amount of heat energy required to raise 1 kilogram of water 1 degrees Celsius.
NOTE: 80 calories = 80 dietary kilocalories

1. Basal Metabolism - 2/3 of all energy spent by the body. i.e., basic life processes.
- **determined by measuring the amount of O_2 consumed in an hour. eg. for 1 liter of O_2 consumed/hour, ~ 4.78 kcals is released from food.**

2. Physical activity - voluntary movement of muscle & support systems.
- **this changes according to the type of activity; anywhere from 10% of BMR to 100% of BMR.**

*** Basal Metabolic Rate (BMR) - the rate at which the body spends energy for basic life processes in kcals/kg/day.**
- **varies from person to person, gender, or for the same individual.**
- **obtained when body is at rest.**
- **decreases by 2% a decade.**

*** Total Activity Factor – voluntary physical activity for each hour of a 24 hour period. (see formula below)**

**** Actual Total Energy (kcal) Expenditure = BMR X Total Activity Factor**
(see table for BMR formulas on back)

Activity Category	Activity Factor
Resting: sleeping; reclining	1.0
Very light: seated and standing; cooking	1.5
Light: walking (3mph); cleaning	2.5
Moderate: recreational exercise; light jog	5.0
Heavy: intense physical activity; bustin' it	7.0

*** Example calculation for *total activity factor* over a 24 hour period:**

Activity category	X	Hours	=	Sum
1.0	X	14		14
1.5	X	6		9
2.5	X	2		5
5.0	X	1		5
7.0	X	1		7
		(24 hrs.)		(40)

So, Total Activity Factor = $\frac{\text{SUM}}{\text{24 hours}} ; \frac{40}{24} = 1.6$

Equations for Estimating BMR from Body Weight:

Sex and Age Ranges (yr)	Equation to Derive BMR in kCal/day (Wt. must be in kilograms)
Males:	
0 - 3	(60.9 X wt) - 54
3 - 10	(22.7 X wt) + 495
10 - 18	(17.5 X wt) + 651
18 - 30	(15.3 X wt) + 679
30 - 60	(11.6 X wt) + 879
> 60	(13.5 X wt) + 487
Females:	
0 - 3	(61.0 X wt) - 51
3 - 10	(22.5 X wt) + 499
10 - 18	(12.2 X wt) + 746
18 - 30	(14.7 X wt) + 496
30 - 60	(8.7 X wt) + 829
> 60	(10.5 X wt) + 596

Sample Calculation of BMR:

ESTIMATION OF ENERGY OUTPUT
Basal Metabolism:
One way to estimate your BMR is to use the equations above. For example, a 20-year-old male who weighed 160 pounds would first select the appropriate equation for his sex and age:

$$(15.3 \text{ X wt}) + 679$$

If necessary, he would convert his weight from pounds to kilograms:

$$160 \text{ lbs} \div 2.2 \text{ lbs/kg} = 72.7 \text{ kg}$$

And finally, he would insert his weight into the equation:

$$(15.3 \text{ X } 72.7 \text{ kg}) + 679 = 1791 \text{ kcal/day}$$

The estimated BMR for a 20-year-old male who weighs 160 pounds is 1791 kcalories/day