

# Understanding Calories, Nutrition, and Metabolic Rates

## BASIC PREMISE

You need to expend more calories that you take in. You need to do extra road work above and beyond regular practice and eat less food, while at the same time, ensuring your body gets what it needs to stay healthy.

Burning 3500 calories will yield a drop in weight of .5Kg. Losing 500mL of water will yield a drop in weight of .5Kg. An hour run will drop .125Kg worth of body fat. Consuming 1200 calories instead of 2500 calories will drop a little more than .125Kg of body fat.

Increasing exercise and decreasing food intake creates an increase in nutrient requirements. You must supplement your daily meals with vitamins and minerals to remain healthy.

Water intake is the last thing you cut back, and you do it at the end. Drink 8 to 12 cups (1 cup is 250 mL) of water per day up until 24 hours before weigh ins. Between 24 and 12 hours before weigh ins, cut down to a quarter of that (2 or 3 cups). From 12 hours out until weigh ins, no water. The last 12 hours before weigh ins are spent doing vigorous road work, with heavy clothing.

Recovery consists of **\*\*\*slowly\*\*\*** drinking water to recover from the water loss. Then consume food high in electrolytes such as bananas, apple juice, PediaLite, or sport drinks. Food consumption needs to be done **\*\*\*slowly\*\*\***, and a little at a time, and very plain food.

## ESTIMATING YOUR CALORIE NEEDS

Your BMR (Basal Metabolic Rate) is the number of calories you'd burn over 24 hours while lying down but not sleeping. Your actual metabolic rate is estimated by adding the caloric cost of all the activities you engage in throughout the day to your BMR.

Men's BMR = 1 X Body weight (kg) X 24

Women's BMR = .9 X Body weight (kg) X 24

These formulas are reasonably accurate for people with average levels of body fat (i.e., 20% and 28% for men and women, respectively). One kg (kilogram) equals 2.2046 pounds. The higher your body fat percentage, the fewer calories you'll burn (lower activity level, and less muscle to burn calories). The lower your body fat percentage, the more calories you'll burn (bigger muscles burn more calories than little ones). Thus, it becomes much easier to get rid of fat permanently by increasing your metabolic rate. You do this by increasing both your muscle mass and your activity level. You can (and SHOULD) gain muscle mass and lose fat at the same time. Never sacrifice muscle tissue during the fat loss process. Instead, build more muscle to burn more calories. You'll

lose more fat faster, and you'll be more likely to keep it off.  
 Your actual daily calorie needs may vary slightly from the tabled values.

## KEY TO READING THE CHARTS BELOW

Lean Factor	Clinical Description	Percent Body Fat Levels Multiplier
1	"Lean"	Men + 10% -- Women + 14%
2	"Normal"	Men + 14% -- Women + 18%
3	"Clinically Obese"	Men + 20% -- Women + 28%
4	"Chronically Obese"	Men + 28% -- Women + 38%

## Average Daily Activity Level

To estimate your average activity level for a 24 hour period, read the INSTRUCTIONS below. You will easily be able to approximate the percentage that most closely describes your lifestyle. This percentage is used in the daily caloric expenditure charts below.

## Instructions

For each of the 24 hours in one of your "average" days, determine your energy expenditure by reading the descriptions below. Then, multiply your hourly BMR (BMR divided by 24) times your energy expenditure. Then multiply that figure by your lean factor multiplier (see the table above). For example, if your hourly BMR equals 85 calories, and your activity level during that hour was light (300 % for men), then you simply multiply 85 times 3. Assuming your lean factor is 3 (see above), you then multiply 255 times .90. Your hourly caloric expenditure equals 229.5 calories.

Do this for each hour of the day, add all of them together, and that is your daily caloric requirement. Be SURE to apportion your daily calories over at least five meals, with each meal reflective of your UPCOMING caloric needs. For example, if you expect to train eat more; if you expect to take a nap, eat less.

## ENERGY EXPENDITURE GUIDE

female	male	
-22%	-20%	sleeping
-0.1	0%	Lying down totally relaxed but not sleeping (this is your "basal metabolic rate")
180%	200%	Very Light: Sitting, studying, talking, little walking or other activities.
270%	300%	Light: Typing, teaching, lab/shop work, some walking.
360%	400%	Moderate: Walking, jogging, gardening type job.
450%	500%	Heavy: Heavy manual labor such as digging, tree felling, climbing.
540%	600%	Exceptionally Heavy: Fitness-oriented weight training, aerobic dance, cycling or similar vigorous activities.
630%	700%	Sports: Vigorous sports competition such as football, racquetball, tennis or other extended-play sports activities.
720%	800%	All-Out Training: Extremely high intensity weight training with little rest between sets or exercises.
810%	900%	Extended Maximum Effort: Extremely high intensity and high duration sports competition such as triathlon, cross country skiing or marathon.

If you really want to get sophisticated, here is an example of how it's done hour-by-hour.

If, however, you prefer to use averages, the tables below are quite accurate. You may have to adjust your personal caloric intake up or down a bit from these averages, however.

## YOUR HOURLY CALORIE REQUIREMENT GUIDE

AS AN EXAMPLE, LET'S SAY YOU WEIGHT 100 POUNDS...

100	Lean Factor	1	<b>1091</b> / 24 hours = <b>45</b> cal/hour average.
			Then, 45 X 200% (your average activity level for that hour)
			= 45 X 2 = 90 ...This is your hour's caloric requirement
		2	Less 5% = 85.5 (.95 of Lean Factor 1)
M = <b>1091</b> ( <b>45</b> )		3	Less 5% = 81 (.90 of Lean Factor 1)
F = 982 (41)		4	Less 5% = 76.5 (.85 of Lean Factor 1)

All of the values tabled below are based on the conventional method of estimating caloric requirements except that your day's AVERAGE activity level and your body fat percentage is factored into the calculation process (not simply total body weight), and may vary between individuals. Also, slight rounding error may occur.

## YOUR DAILY CALORIE REQUIREMENT GUIDE

Total Weight & BMR	Your Lean Factor	Average Daily Activity Level (% more active than average person)									
		30%		55%		65%		100%		130%	
		M	F	M	F	M	F	M	F	M	F
100 M=1091 F= 982	1	1418	1277	1691	1522	1800	1620	2182	1964	2509	2259
	2	1347	1213	1606	1446	1710	1539	2073	1866	2384	2146
	3	1276	1149	1521	1370	1620	1458	1964	1768	2258	2033
	4	1205	1085	1437	1294	1530	1377	1858	1669	2133	1920
110 M=1200 F=1080	1	1560	1404	1860	1674	1980	1782	2400	2160	2760	2484
	2	1482	1334	1767	1590	1881	1693	2280	2052	2622	2360
	3	1404	1264	1674	1501	1782	1604	2160	1944	2484	2236
	4	1326	1193	1581	1423	1683	1515	2040	1836	2346	2111
120 M=1309 F=1178	1	1701	1531	2029	1826	2160	1944	2618	2356	3010	2709
	2	1616	1454	1928	1735	2052	1847	2487	2238	2860	2574
	3	1531	1378	1826	1643	1944	1750	2356	2120	2709	2438
	4	1446	1301	1725	1552	1836	1652	2225	2003	2559	2303
130 M=1418 F=1276	1	1843	1659	2198	1978	2340	2105	2836	2552	3261	2935
	2	1751	1576	2088	1879	2223	2000	2694	2424	3098	2788
	3	1659	1493	1978	1780	2106	1895	2552	2297	2935	2641
	4	1567	1410	1868	1681	1989	1789	2411	2169	2772	2495
140 M=1527 F=1375	1	1985	1788	2367	2131	2520	2269	3054	2750	3512	3163
	2	1886	1699	2249	2024	2394	2156	2901	2613	3336	3005
	3	1787	1608	2130	1917	2268	2041	2749	2474	3161	2847
	4	1687	1520	2012	1811	2142	1929	2596	2338	2985	2689
150 M=1636 F=1473	1	2127	1915	2536	2283	2699	2430	3272	2946	3763	3388
	2	2021	1819	2409	2169	2564	2309	3108	2799	3575	3219
	3	1914	1724	2282	2055	2429	2187	2945	2651	3387	3049
	4	1808	1628	2156	1941	2294	2066	2781	2504	3199	2880
160 M=1745 F=1571	1	2269	2042	2705	2435	2879	2592	3490	3142	4014	3613
	2	2156	1940	2570	2313	2735	2462	3316	2985	3813	3432
	3	2042	1838	2435	2191	2591	2332	3141	2827	3613	3251
	4	1929	1736	2299	2070	2447	2203	2967	2671	3412	3071

170	1	2412	2170	2875	2587	3061	2754	3710	3338	4267	3839
	2	2291	2062	2731	2458	2908	2616	3525	3171	4054	3647
M=1855	3	2171	1953	2588	2329	2655	2479	3339	3005	3840	3456
F=1669	4	2050	1845	2444	2199	2602	2341	3154	2837	3627	3263
180	1	2553	2297	3044	2739	3241	2916	3928	3534	4517	4064
	2	2425	2182	2892	2602	3079	2770	3732	3357	4291	3861
M=1964	3	2298	2068	2740	2466	2917	2625	3535	3182	4065	3659
F=1767	4	2170	1952	2587	2328	2755	2479	3339	3004	3839	3454
190	1	2694	2425	3213	2891	3420	3077	4146	3730	4768	4290
	2	2559	2304	3052	2746	3249	2923	3939	3544	4530	4076
M=2073	3	2424	2183	2892	2603	3078	2770	3731	3358	4291	3862
F=1865	4	2290	2061	2731	2457	2907	2615	3524	3171	4053	3647
200	1	2837	2553	3382	3044	3600	3241	4364	3928	5019	4517
	2	2695	2425	3213	2892	3420	3079	4146	3732	4768	4291
M=2182	3	2553	2298	3044	2739	3240	2916	3928	3535	4517	4065
F=1964	4	2411	2170	2875	2587	3060	2755	3709	3339	4266	3839
210	1	2978	2681	3551	3196	3780	3402	4582	4124	5269	4743
	2	2829	2547	3373	3036	3591	3232	4353	3918	5006	4506
M=2291	3	2680	2412	3196	2876	3402	3062	4124	3711	4742	4269
F=2062	4	2531	2279	3018	2717	3213	2892	3895	3505	4479	4032
220	1	3120	2808	3720	3348	3960	3564	4800	4320	5520	4968
	2	2964	2668	3534	2668	3762	2668	4560	4104	5244	4720
M=2400	3	2808	2527	3348	3023	3564	3207	4320	3888	4968	4471
F=2160	4	2652	2387	3162	2846	3366	3029	4080	3672	4692	4223
230	1	3262	2935	3889	3500	4140	3726	5018	4516	5771	5193
	2	3099	2788	3695	3325	3933	3540	4767	4290	5482	4933
M=2509	3	2936	2642	3500	3150	3726	3353	4516	4065	5193	4674
F=2258	4	2603	2495	3306	2975	3519	3167	4265	3839	4905	4414
240	1	3403	3063	4058	3652	4320	3887	5236	4712	6021	5419
	2	3232	2910	3855	3469	4104	3693	4974	4476	5720	5148
M=2618	3	3063	2756	3652	3287	3888	3499	4712	4241	5419	4877
F=2356	4	2893	2604	3449	3104	3672	3304	4451	4005	5118	4606
250	1	3545	3192	4227	3805	4500	4051	5454	4910	6272	5647
	2	3368	3032	4016	3615	4275	4285	5181	4665	5958	5365
M=2727	3	3191	2971	3804	3424	4050	3645	4090	4418	5645	5080
F=2455	4	3013	2713	3593	3234	3825	3443	4636	4174	5331	4800
260	1	3687	3319	4396	3957	4679	4212	5672	5106	6523	5872
	2	3503	3153	4176	3759	4445	4001	5388	4851	6197	5578
M=2836	3	3318	2986	3956	3561	4211	3790	5105	4594	5871	5284
F=2553	4	3134	2821	3737	3363	3977	3580	4821	4340	5545	4991
270	1	3829	3446	4565	4109	4859	4374	5890	5302	6774	6097
	2	3638	3274	4337	3904	4616	4155	5596	5037	6435	5792
M=2945	3	3446	3101	4109	3698	4373	3936	5301	4771	6097	5487
F=2651	4	3255	2929	3880	3493	4130	3718	5007	4507	5758	5182

## Calories burned per minute according to activity and bodyweight

EXERCISE	BODY WEIGHT ( kg )									
	58	64	70	76	84	90	96	102	107	115
Reading	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2	2.1
Dusting	2.3	2.7	3.1	3.4	3.7	3.9	4.7	4.5	4.8	5.1
Vacuuming	2.8	3.1	3.4	3.7	4	4.3	4.7	5	5.3	5.7
Walking slow	4.5	5.1	5.4	5.7	6	6.4	6.7	7.3	8	9
Walking brisk	5.5	6.3	7	7.5	8	8.6	9.4	10	10.6	11.3
Bike moderate	6.5	7.5	8	9	9.5	10.3	11	11.7	12.5	13.6
Swimming mod.	8	9.2	10	10.8	11.5	12.5	13.7	14.4	15.4	16.5
Rowing vig.	11	13	14.3	15	16.5	17.5	19	20.5	21.8	23.5
Jogging mod.	13	14.5	16	17.5	19	20	22	23.5	24.5	26.5
Running brisk	16	18.5	20	22	23.5	25	27.5	29	31	33.5
Sprinting	19	21.5	24	26	28	30	32.5	34.7	36.5	39

- wrestling practice probably falls somewhere equivalent to moderate jogging because you are not always active, and at times have very intense activity.
- These numbers will not be exactly the same as the Energy Expenditure Guide above, but they will give a good indication.
- .454 Kg of body fat is equivalent to 3500 calories.

## **Vitamin and Mineral Information:**

### **Vitamin A (retinol, carotene)**

**Helps growth and repair of body tissue, immune functions, night vision**

**Best sources: eggs, dark green & yellow vegetables & fruits, low fat dairy products, liver.**

*Recommended daily allowance:* 5000 IU (international units)

*Symptoms of deficiency:* Night blindness, lack of tear secretion, poor bone growth, weak tooth enamel, susceptibility to respiratory infection.

*Benefits:* Helps eye disorders. Necessary for growth of bones and reproduction system. Builds body's immunity system. Helps treat acne and other skin problems when applied externally. Promotes healthy skin. May help arthritis.

*Good food sources:* Sweet potatoes, carrots, cantaloupe, leafy vegetables, broccoli, squash. Cautions: Consult doctor if you have: Cystic fibrosis, gout, diabetes, intestinal disease with diarrhea, kidney disease, liver disease, overactive thyroid function, disease of the pancreas. Don't take mega-doses if pregnant or breast-feeding.

*Substance interactions:* These medications decrease the absorption of vitamin A: Antacids, cholestyramine, colestipol, tobacco, excessive alcohol use. These increase the likelihood of vitamin-A toxicity: mineral oil, neomycin, sucralfate, isotretinoin. Anti-coagulants increase likelihood of spontaneous or hidden bleeding.

*Signs of toxicity:* Bleeding from gums or sore mouth. Confusion or agitation. Headache. Dry and peeling skin. Seizures and vomiting.

\* Toxicity to vitamin A is not common, but a safer form of the vitamin is beta-carotene (water-soluble precursor of vitamin A). It offers better protection against cancer. Algae-derived vitamin A is also a safe alternative.

\* Some beta-carotenes will turn the skin slightly orange. This is harmless and will fade as the beta-carotene level returns to normal.

\* Combining vitamin A with vitamin D will help to promote healthy skin. Also may control premenstrual acne and oiliness.

\* Both vitamin A and beta-carotene in large doses can damage the liver of a heavy drinker.

---

## Vitamin B-1 (Thiamine)

**carbohydrate metabolism appetite maintenance, nerve function, growth & muscle tone**

**Best sources: wheat germ, port, whole & enriched grains, dried beans, seafood**

*Recommended daily allowance:* 1.5 mg (milligrams)

*Symptoms of deficiency:* Loss of appetite, fatigue, lack of concentration, personality changes, gastrointestinal disorders, tender and atrophied muscles, mental problems.

*Benefits:* Maintains normal function of nervous and muscular systems, aids in treatment of herpes zoster, treats beriberi, keeps mucous membranes healthy.

*Good food sources:* Meat, wheat germ, oatmeal, cereals, enriched pastas, fresh peas, beans, oranges.

*Cautions:* Consult your doctor if you have kidney disease. Don't take mega- doses if pregnant or breast feeding.

*Substance interactions:* Don't take with the muscles relaxants used in surgery. Notify doctor before undergoing surgery.

*Signs of toxicity:* May cause drowsiness or rash.

\* The best dietary sources are meat and whole-grain cereals. Cook foods in a minimal amount of water. Avoid high cooking temperatures and long heat exposure. Avoid carbonates and citrates in beverages as these decrease thiamine's effect.

\* For those with normal kidney function, the excess vitamin will be excreted in the urine.

\* Thiamine aids the brain in its ability to use glucose. Without glucose, mental function suffers. Thiamine is vital in the production of neurotransmitters, which are molecules that send transmissions between the brain and the body. It also maintains the transmission of electrical impulses in the nerves. Mega-doses may be beneficial to Alzheimer's patients in slowing memory loss.

\* People suffering from Parkinson's disease are usually deficient in the B vitamins, which includes thiamine, as well as diabetics, the elderly, smokers, and alcoholics.

---

## Vitamin B-2 (Riboflavin)

**Carbohydrate, fat & protein metabolism, needed for cell respiration, mucous membranes**

**Best sources: low-fat milk products, green leafy vegetables, whole & enriched grains, beef, lamb, eggs**

Recommended daily allowance: 1.7 mg (milligrams)

Symptoms of deficiency: Severe dermatitis, eye and sight problems (fatigue, blurred vision, light sensitivity, itching and bloodshot eyes), cracks and sores in corners of mouth, mild anemia.

Benefits: Promotes normal growth and development. Helps in treating infections, burns and stomach problems. Anti-oxidant.

Good food sources: Poultry, fish, organ meats, fortified grains and cereals, dark leafy vegetables, dairy products. Cautions: Consult your doctor if you have chronic kidney failure.

Substance interactions: These medications decrease riboflavin's effect: anti-depressants, phenothiazines, probenecid.

Signs of toxicity: Large doses will turn urine bright yellow. Mega-doses (3500 mg) may cause kidney stones.

\* It is recommended that people who are elderly, exercise regularly, take oral contraceptives or drink alcohol take vitamin B supplements since their need for B2 is greater. Otherwise, those who eat a balanced diet probably don't need to supplement.

\* Food processing decreases the amount of B2 in foods.

\* Black youths who have a low milk intake are usually deficient in vitamin B2.

---

### **Vitamin B-6 (pyridoxine)**

**Carbohydrate & protein metabolism, formation of antibodies, red blood cells, nerve function**

**Best sources: fish, poultry, lean meat, whole grains, potatoes**

Recommended daily allowance: 2 mg (milligrams)

Symptoms of deficiency: Memory impairment, weakness, insomnia, poor coordination when walking, skin lesions, discoloration of tongue, muscle twitching.

Benefits: Helps brain function normally. Maintains chemical balance among body fluids. Treats some forms of anemia. Helps in energy production. Aids stress relief. May relieve morning sickness and other nausea. May prevent tooth decay and may lower blood cholesterol.

Good food sources: Bananas, avocados, meat, brewer's yeast, eggs, whole grains, soybeans, walnuts, peanuts.

Cautions: Consult doctor before taking more than 100 mg daily.

Substance interactions: Avoid B6 supplements if undergoing levodopa therapy for Parkinson's disease. These medications increase the excretion of B6, thereby causing anemia or peripheral neuritis: chloramphenicol, cycloserine, ethionamide, hydralazine, isoniazid, penicillamine, and immuno-suppressants.

Signs of toxicity: Mega doses lead to nerve disorders, including loss of neuromotor coordination and muscle weakness. Oversensitivity to sunlight, which produces a skin rash and numbness.

\* Doses of 100 mg help relieve carpal tunnel syndrome, PMS, and possibly depression and arthritis.

\* Must take for at least 6 weeks to receive benefit.

\* Vital in the metabolism processes. B6 deficiencies in diabetics has been linked to glucose intolerance, which is an abnormally high rise in blood sugar after eating.

\* Shortages can lead to nerve damage in the hands and feet. Diabetics experience less of disease-caused nerve damage when taking B6 and B12 supplements.

\* May be helpful in the treatment of asthma by lowering the body's histamine levels.

\* Those who should take supplements: People over 55. Pregnant or breast-feeding mothers. Those who abuse alcohol and drugs. Dieters. People under stress or recovering from surgery, illness, injuries, or burns. Women taking oral contraceptives or estrogen, smokers.

---

### **Vitamin B-12 (cobalamin)**

**Carbohydrate, fat & protein metabolism, maintains nervous system, blood cell formation**

**Best sources: lean beef, fish poultry, eggs, lowfat & nonfat milk**

Recommended daily allowance: 6 mcg (micrograms)

Symptoms of deficiency: Pernicious anemia, memory loss, dementia, fatigue, loss of balance, impaired touch and pain perception, tinnitus and some hearing impairments, deterioration of the nervous system's myelin sheath.

Benefits: Promotes normal growth. Treats pernicious anemia and some types of nerve damage. May help to prevent mental and nervous disorders. Improves the body's immune system. Improves memory and increases energy. Good food sources: Shellfish, meat, cold water fish, milk products, eggs (vitamin B-12 is not found in plants).

Good food sources: Vitamin B12 is naturally found in animal foods including fish, milk and milk products, eggs, meat, and poultry. Fortified breakfast cereals are an excellent source of vitamin B12 and a particularly valuable source for vegetarians.

Cautions: Consult your doctor if you have gout or Leber's disease.

Substance interactions: These may reduce the effect of the vitamin: aminosalicylates, vitamin C (take 1 hour apart), chloramphenicol, cholestyramine, colchicine, folic acid, oral neomycin, extended-release potassium, tobacco.

Signs of toxicity: If taken with mega-doses of vitamin C, vitamin B-12 may cause nosebleed, ear bleeding, dry mouth. Otherwise very low toxicity.

- \* Strict vegetarians should take supplements. Vitamin B-12 is vital to maintaining the nervous system and promoting growth in children.
- \* Deficiencies have been linked to high homocysteine levels in the blood, which has been linked to heart disease and a possible link to Alzheimer's disease.
- \* Several forms available: Shots, oral tablets, sublingual tablets (placed under the tongue), and nasal spray. The sublingual tablets are usually recommended for those who have trouble absorbing the vitamin.
- \* The body breaks down B-12 for storage in the liver and muscles till needed. People over 60 usually don't secrete enough gastric acid for breaking down meats and dairy products. They should consult their doctor about supplements.

---

## **Biotin**

**carbohydrate, fat & protein metabolism, formation of fatty acids, utilization of B vitamins**

**Best sources: egg yolk, meat, low-fat & nonfat milk, dark green vegetables; also made by microorganisms in intestinal tract.**

Recommended daily allowance: 300 mcg (micrograms)

Symptoms of deficiency: Depression, sleepiness, loss of appetite, muscular pains, tongue becomes smooth and pale, hair loss, anemia, skin disorders.

Benefits: Helps the body to process dietary fat and protein. Lowers blood sugar levels in type II diabetics.

Good food sources: Brewer's yeast, cereals and grains, peanuts, walnuts, molasses, milk, egg yolks, lentils and peas.

Cautions: Check with doctor before taking mega-doses if pregnant or breast feeding.

Substance interactions: Antibiotics and sulfonamides destroy the good bacteria in the intestinal tract which produce biotin. Can lead to deficiency. Tobacco decreases absorption.

Signs of toxicity: Very low toxicity.

\* Supplements of 9 milligrams (9000 micrograms) daily for a month have been shown in studies to significantly lower blood sugar levels of type II (non- insulin dependent) diabetics to almost half of previous levels.

\* Biotin is destroyed by canning and heat curing foods. Choose fresh fruits, vegetables and meats.

\* Intestinal bacteria produces biotin. Normal, healthy adult may not need to supplement.

---

### **Niacin (Vitamin B3)**

**Carbohydrate, fat & protein metabolism, health of digestive system, blood circulation, nerve function, appetite**

**Best sources: poultry, fish, whole & enriched grains, dried beans & peas**

Recommended daily allowance: 20 mg (milligrams)

Symptoms of deficiency: Depression, sleepiness, loss of appetite, muscular pains, tongue becomes smooth and pale, hair loss, anemia, skin disorders.

Benefits: Maintains normal function of skin, nerves, digestive system. Prevents premenstrual headache. Reduces cholesterol levels. May improve poor digestion and offer protection from toxins and pollutants.

Good food sources: Chicken and turkey breast, cold water fish, pork, veal, enriched breads and cereals.

Cautions: Don't take if you have: impaired liver function, have an active peptic ulcer or are pregnant. Consult a doctor if you have: diabetes, gout, gallbladder or liver disease, over 55.

Substance interactions: These medications lower blood pressure to extremely low levels: beta-adrenergic blockers, mecamylamine, pargyline. These decrease the medication's effect: anti-diabetics, chenodiol. Decreases vitamin's effect: isoniazid.

Signs of toxicity: Body flush, nausea, vomiting abdominal cramps, diarrhea, high blood sugar, high uric acid, heart-rhythm disturbances, jaundice.

\* Prevents pellagra, a very rare and sometimes fatal condition that affects alcoholics and people suffering from severe gastrointestinal problems.

\* Prevents the release of histamine, which triggers allergies, asthma, and bronchitis.

\* High doses of niacin, especially the slow-release form, can cause liver damage. Niacinamide, a form of niacin included in multivitamin supplements, does not produce the side effects associated with niacin.

---

## **Vitamin C (ascorbic acid)**

**Wound healing, strengthens blood vessels, collagen maintenance, resistance to infection, healthy gums**

**Best sources: citrus fruits, tomatoes, melons, berries, green & red peppers, broccoli**

Recommended daily allowance: 60 mg (milligrams)

Symptoms of deficiency: Scurvy, muscle weakness, swollen gums, loss of teeth, bruising, anemia, frequent infections, slow healing of wounds, digestive difficulties.

Benefits: Promotes overall body functions. Helps form collagen in connective tissue. Aids in the treatment of cancer, cholesterol, heart disease, blood clots, allergies, and arthritis. Contributes to hemoglobin and red-blood-cell production in bone marrow. Helps heal wounds and broken bones.

Good food sources: Citrus fruits and juices, strawberries, vegetables.

Cautions: Consult your doctor if you have gout, kidney stones, or sickle-cell anemia. If you suffer from glucose-6-phosphate dehydrogenase (red blood cell enzyme efficiency), consult your doctor before taking mega-doses.

Substance interactions: Decreases vitamin's effect: Aspirin, tobacco, barbiturates, mineral oil, oral contraceptives, salicylates, sulfa drugs, tetracyclines. Decreases medicine's effect: Anti-cholinergics, oral anticoagulants, copper. Mega-doses of vitamin C increase chance of formation of drug crystals in urine if combines with aminosalicic acid (PAS for tuberculosis).

Signs of toxicity: Flushed face, frequent urination, mild diarrhea, nausea.

- \* Large doses will break down alcohol more rapidly in the body.
- \* Neutralizes potentially cancer-causing nitrites (preservatives found in hot dogs and lunch meats) and nitrates (found naturally in vegetables and drinking water).
- \* A powerful antioxidant. Reduces risk of heart disease, cancer, cataracts, arthritis.
- \* Builds up the body's immune system to make it stronger against colds and viruses.
- \* Reduces the histamine levels in the body, which trigger allergy and asthma attacks. People taking at least 200 mg daily have a 30% reduced risk of bronchitis.
- \* May aid diabetics by helping to regulate insulin release. Vitamin C has been shown to prevent the sugar inside cells from converting to sorbitol (sugar alcohol). Sorbitol accumulates in cells and is connected to diabetes-related eye, nerve and kidney damage.
- \* Some doctors recommend limiting the use of chewable vitamin C tablets because they can cause enamel loss from the surface of the teeth.
- \* Supplements are extremely beneficial for pregnant and nursing mothers.

---

## **Vitamin D (cholecalciferol)**

### **Calcium & phosphorus metabolism (bone & teeth formation)**

**Best sources: egg yolk, fatty fish, fortified milk; also made in skin exposed to sunlight**

Recommended daily allowance: 400 IU (international units)

Symptoms of deficiency: Rickets in children, which is characterized by weak, soft leg bones and knobby joints. Osteomalacia in adults, which is similar to rickets, but occurs in developed bones. Aggravates osteoporosis.

Benefits: Treats low blood calcium in kidney disease, necessary for proper bone growth and development, prevents rickets, treats post-operative muscle contractions.

Good food sources: Vitamin D fortified milk, egg yolks, fortified cereals, cod liver oil, salmon, sardines, herring, mackerel.

Cautions: Consult your doctor if you have epilepsy, heart or blood-vessel disease, kidney, liver, or pancreatic disease, intestinal problems or diarrhea, sarcoidosis, or if you are pregnant or planning on becoming pregnant.

Substance interactions: These medications may reduce the effects of vitamin D: antacids with aluminum, anti-convulsants, barbiturates, cholestyramine, colestipol, hydantoin, primidone. Antacids with magnesium may cause too much magnesium in the bloodstream of people with kidney problems. Mega-doses of calcium, diuretics and thiazide increases the risk of hypercalcemia. Vitamin D reduces the effect of calcitonin when treating hypercalcemia. Digitalis preparations increases the risk of heartbeat irregularities. Phosphorous-containing medicines may release too much phosphorous into the body.

Signs of toxicity: High blood pressure, irregular heartbeat, nausea, weight loss, seizures, diarrhea, mental confusion, vomiting. Long-term mega-doses can lead to kidney and cardiovascular damage. Doses of 1800 IU daily can cause stunted growth in children.

\* Unfiltered sunlight is another source of vitamin D. UV light is processed in the cholesterol within the skin and made into vitamin D. Growing children on vegetarian diets and those living in extreme climates (winter darkness) may want to consider supplementing. Most elderly people have deficiencies, making osteoporosis worse.

\* Newborns are born with a 9 month supply of vitamin D. Vitamin D is stored in the body's fat cells during the summer for use during dark winter months, providing an adequate diet is followed.

\* Because of toxicity, don't exceed 600 IU per day without a doctor's specific instructions.

---

## **Vitamin E (tocopherol)**

**Protects cell membranes & red blood cells from oxidation, may be active in immune function**

**Best sources: vegetable oil, wheat germ, nuts, dark green vegetables, whole grains, beans**

Recommended daily allowance: 30 IU (international units)

Symptoms of deficiency: Lack of vitality, irritability, disinterest in physical activity, decreased sexual performance, muscle weakness, neurological and reproductive problems.

Benefits: Retards aging. Heals burns and wounds. Improves muscle strength. Eases menstrual problems. Prevents and treats cancer. Sickle-cell anemia. Beneficial to damaged retinas.

Good food sources: Nuts and seeds, wheat germ, whole-wheat flour, vegetable oils, spinach.

Cautions: Don't take mega-doses if pregnant or breast feeding. Consult your doctor if you have: iron-deficiency anemia, bleeding or clotting problems, cystic fibrosis, liver disease, or an overactive thyroid. Very high doses (over 800 mg/day) may deplete vitamin-A reserves in the body.

Substance interactions: Decreases absorption of vitamin E: tobacco, antacids, cholestyramine, colestipol, mineral oil, sucralfate, iron supplements. May increase spontaneous or hidden bleeding when taken with: anticoagulants, coumarin or indandione-type.

Signs of toxicity: Very low toxicity.

- \* A very powerful antioxidant. Protects the body from free radicals.
- \* A natural anticoagulant. It offers some protection against heart attacks and thrombotic strokes.
- \* Useful in the treatment of fibrocystic breast disease, PMS, and painful or excessive menstruation. It may be applied topically on scars following surgery, burns, and other skin injuries (do not apply it until wounds have closed).
- \* It should be taken if exercising regularly. Exercising stimulates the body to create free-radicals. Taking 400 IU per day will help counteract the damage.
- \* Studies indicate that it fights heart disease, prevents cancer, alleviates respiratory problems and boosts your immune system's ability to fight off infectious diseases. It may also prevent some of the damage that diabetes does to the body, particularly to the eyes.
- \* For disease prevention, studies show that getting between 200 and 600 IU is necessary for maximum benefit.

---

## **Folic Acid**

**Red blood cell formation, protein metabolism, growth & cell division**

**Best sources: green leafy vegetables, dried beans, poultry, fortified cereals, oranges, nuts.**

Recommended daily allowance: 400 mcg (micrograms)

Symptoms of deficiency: Sore, red tongue. Mild mental symptoms, such as forgetfulness and confusion. Hemolytic and megaloblastic anemia in which red blood cells are large and uneven in size, have a shorter life span or are likely to have cell membranes rupture.

Benefits: May prevent heart disease. Promotes normal red-blood-cell formation. Regulates fetal development of nerve cells. Maintains nervous system, intestinal tract, sex organs, white blood cells, normal patterns of growth. Treats anemias due to folic-acid deficiency occurring from alcoholism, liver disease, hemolytic anemia, sprue, pregnancy, breast feeding, and oral contraceptive use.

Good food sources: Oranges, orange juice, rice, soybeans, wheat germ, fruits, beans, leafy vegetables, beans, cereals.

Cautions: Don't take if you have pernicious anemia or take anti-convulsant medication.

Substance interactions: Decreases the effects of folic acid: analgesics, anti-convulsants, chloramphenicol, cortisone drugs, methotrexate, oral contraceptives, quinine, sulfa drugs, trimethoprim, trimterene. Folic acid decreases the effect of these prescription drugs: phenytoin and pyrimethamine.

Signs of toxicity: Very low toxicity.

\* Women of childbearing age should take a daily multivitamin containing 400 mcg. Pregnant women should get 800 mcg.

\* Folic acid may help in the prevention and treatment of cervical dysplasia (precancerous cells in the cervix). Women with this condition usually have low levels of folate.

\* Folate deficiency may be partially responsible for restless legs syndrome.

\* It reduces the body's levels of homocysteine, an artery-damaging chemical that accumulates in the blood of people who eat meat, and may prevent heart disease and strokes.

\* May also prevent cancers of the lung and colon.

\* Increase the folate in the diet if you use any of the following: alcohol, tobacco, aspirin, nonsteroidal anti-inflammatory drugs, oral contraceptives, pancreatic extracts, estrogen, antacids, arthritis drugs such as methotrexate and medications prescribed for convulsions, malaria and bacterial infections. Also if over 55 years of age, undergoing renal dialysis, suffering from an illness or recovering from surgery.

---

## **Vitamin K**

**Formation of blood clotting agents & bone**

**Best sources: green leafy vegetables, cereal egg yolk**

Recommended daily allowance: 80 mcg (micrograms)

Symptoms of deficiency: Abnormal blood clotting and bruising.

Benefits: Helps the blood to clot. Promotes normal growth and development.

Good food sources: Cauliflower, broccoli, spinach, kale, green tea, cheddar and camembert cheese, Brussels sprouts.

Cautions: Consult your doctor if you have: liver disease, cystic fibrosis, intestinal problems, upcoming surgery.

Substance interactions: These medications decrease vitamin's effect: antibiotics, cholestyramine, colestipol, coumarin, mineral oil, quinidine, salicylates, sucralfate, sulfa drugs. Decreases anti-coagulant effect. Vitamin K with primaquine increases potential for toxic side effects.

Signs of toxicity: Large doses may impair liver function. May cause brain damage in infants.

\* Best absorbed if taken with a fatty food (salad dressing on spinach, for example). Most people have adequate amounts of vitamin K (the body can produce it) and do not have to supplement. The exception being those who have cystic fibrosis.

\* Antibiotics may destroy the normal, beneficial bacteria in the intestinal tract - the same bacteria which produces vitamin K. Anyone taking antibiotics may want to increase intake of leafy vegetables.

---

## **Pantothenic Acid**

**Converts nutrients into energy, vitamin utilization, nerve function**

**Best sources: most plant & animal foods, especially lean meats, whole grains, legumes**

Recommended daily allowance: 10 mg (milligrams)

Symptoms of deficiency: Excessive fatigue, insomnia, loss of appetite.

*Benefits:* Detoxifies our bodies from harmful man-made compounds found in herbicides, insecticides and drugs. Aids the body in releasing the energy from foods. May help treat alcoholism, fatigue and stomach ulcers.

*Good food sources:* Whole grains, mushrooms, salmon, peanuts, meats, eggs, soybeans, liver, brewer's yeast. Cautions: Don't take if you take levodopa for Parkinson's disease. Consult your doctor if you have hemophilia.

*Substance interactions:* Pantothenic acid counteracts levodopa's effect.

*Signs of toxicity:* Very low toxicity.

\* The elderly, heavy drinkers and people who take cholesterol-lowering drugs are the most likely to have a deficiency.

\* The best source is in unprocessed whole grains, fortified cereals, and multivitamin/mineral supplements. Half of pantothenic acid is destroyed by food processing and cooking.

\* Pregnant and breast feeding women may want to increase their daily intake, however, mega-doses aren't advised.

---

## Minerals

### Calcium

Support of bones, teeth, muscle tissue, regulates heartbeat, muscle action, nerve function, blood clotting

Best sources: low-fat or nonfat milk products, calcium fortified orange juice & soy milk, salmon with bones, green leafy vegetables

---

### Chromium

Needed for glucose metabolism, increases effectiveness of insulin, muscle function

Best sources: cheese, whole grains, meat, peas, beans

---

### Copper

Formation of red blood cells, pigment, needed for bone health

Best sources: nuts, dried beans, oysters, cocoa powder

---

### Iodine

Function of thyroid gland, which controls metabolism

Best sources: seafood, oxidized salt

---

## **Iron**

Formation of hemoglobin in blood & myoglobin in muscle, which supply oxygen to cells

Best sources: meat, fish, poultry, organ meats, beans, whole & enriched grains, green leafy vegetables

---

## **Magnesium**

Enzyme activation, nerve & muscle function, bone growth

Best sources: nuts, green vegetables, whole grains, beans

---

## **Manganese**

Bone growth & development, sex hormone production, cell function

Best sources: nuts, whole grains, vegetables, fruits, tea, coffee, bran

---

## **Phosphorus**

Bone development, carbohydrate, fat & protein utilization

Best sources: meat, poultry, fish, eggs, lowfat milk products, beans, whole grains

---

## **Potassium**

Fluid balance, control activity of heart muscle, nervous system

Best sources: vegetables, fruits, beans, bran cereal, low-fat milk products

---

## **Selenium**

Fights cell damage from oxidation

Best sources: seafood, lean meat, grains, eggs, chicken, garlic

---

## **Zinc**

Taste & smell sensitivity, regulation of metabolism, aids in healing

Best sources: lean meat, eggs, seafood, whole grains, lowfat milk products

---

## How to determine how much weight you may safely lose:

- Calculate amount of body fat you have as a percent of total body weight (see skinfold measurement below). We'll call this **PBF** (percentage body fat).
- Men may safely stay at 5%, women may safely drop to 12% for short periods of time. We'll call this **MSP** (minimum safe percentage).
- Take current body fat percent, and subtract from it your target percent (5 or 12). This will give you a value for the amount of fat you can lose as a percentage of your body weight. We'll call this **MFL** (maximum fat loss). **MFL = PBF - MSP**
- Multiply this value by your body weight. The result is how much body fat in Kg you may safely lose. Max wt loss (Kg) = current body weight (Kg) **X** MFL
- For example, if I am 78Kg, and have 14% body fat, I may safely lose 9% (14% – 5% = 9%) of my body weight or 78Kg **X** .09 = 7 Kg.
- Keep in mind, it is safe to lose no more than 1.5 Kg per week, so the more need to lose, and the more you can safely lose, the longer you have to plan for it.

## Skinfold Measurement to Determine Body Fat Percent

- **description / procedure:** Estimation of body fat by skinfold thickness measurement. Measurement can use from 3 to 9 different standard anatomical sites around the body. The right side is usually only measured. The tester pinches the skin at the appropriate site to raise a double layer of skin and the underlying adipose tissue, but not the muscle. The calipers are then applied 1 cm below and at right angles to the pinch, and a reading taken 2 seconds later. The mean of two measurements should be taken. If the two measurements differ greatly, a third should then be done, then the median value taken.
- **the sites:** the following descriptions are for the common sites at which the skinfold pinch is taken. The caliper is then applied 1 cm below and at right angles to the pinch. I have added some lay terms (in brackets) that may help the non-medical users to find the correct sites for taking the skinfold measurements.

TRICEPS	A vertical pinch at the level of the mid-point between acromial process (boney tip of shoulder) and proximal end of the radius bone (elbow joint), on the posterior (back) surface of the arm.
BICEPS	The pinch position is at the same level as for triceps, though on the anterior (front) surface of arm.
SUBSCAPULA	The pinch is made 2 cm below the lower angle of the scapula (bottom point of shoulder blade) on a line running laterally (away from the body) and downwards (at about 45 degrees). The fold is lifted in this direction.

AXILLA	The pinch is made at the intersection of a horizontal line level with the bottom edge of the xiphoid process (lowest point of the breast bone), and a vertical line from the mid axilla (middle of armpit).
ILIAC CREST	The pinch is made at a site immediately above the iliac crest (top of hip bone), at the mid-axillary line. The fold is directed anteriorly and downward.
SUPRASPINALE	The pinch is made at the intersection of a line joining the spine (front part of iliac crest) and the anterior (front) part of the axilla (armpit), and a horizontal line at the level of the iliac crest. The pinch is directed anteriorly and downward
ABDOMINAL	The vertical pinch is made 5 cm adjacent to the umbilicus (belly-button)
FRONT THIGH	A vertical pinch is made at the mid-point of the anterior surface of the thigh, midway between patella (knee cap) and inguinal fold (crease at top of thigh).
MEDIAL CALF	A vertical pinch is made at the point of largest circumference on medial (inside) surface of the calf.
CHEST	A diagonal pinch is made between the axilla and nipple as high as possible on the anterior axillary fold (males only).

- **results:** Because of the increased errors involved, it is not appropriate to convert skinfold measures to percentage body fat (%BF). It is best to use the sum of several sites to monitor and compare body fat measures. In order to satisfy many of you who want a percentage body fat measure, I have included a couple of equations for calculating this. There are hundreds of equations available, and it is best to use one that is based on a sample that most closely resemble you. Use them at your own risk. You will find that you get different results depending on which equation you use.

Some of the following equations give a measure of body density (D), which then needs to be converted to %BF using the Siri equation:  $\%BF = (495/D) - 450$ .

### MALES:

$D = 1.10938 - (0.0008267 \times \text{sum of chest, abdominal, thigh}) + (0.0000016 \times \text{square of the sum of chest, abdominal, thigh}) - (0.0002574 \times \text{age})$ , based on a sample aged 18-61.

Jackson, A.S. & Pollock, M.L. (1978) *Generalized equations for predicting body density of men*. British J of Nutrition, 40: p497-504.

$D = 1.1043 - (0.001327 \times \text{thigh}) - (0.00131 \times \text{subscapular})$ , based on a sample aged 18-26.

Sloan AW: *Estimation of body fat in young men.*, J Appl. Physiol. (1967);23:p311-315.

%BF = (0.1051 x sum of triceps, subscapular, supraspinale, abdominal, thigh, calf) + 2.585, based on a sample of college students.

Yuhasz, M.S.: Physical Fitness Manual, London Ontario, University of Western Ontario, (1974).

## FEMALES:

$D = 1.0994921 - (0.0009929 \times \text{sum of triceps, suprailiac, thigh}) + (0.0000023 \times \text{square of the sum of triceps, suprailiac, thigh}) - (0.0001392 \times \text{age})$ , based on a sample aged 18-55.

Jackson, et al. (1980) *Generalized equations for predicting body density of women.* Medicine and Science in Sports and Exercise, 12:p175-182.

$D = 1.0764 - (0.0008 \times \text{iliac crest}) - (0.00088 \times \text{tricep})$ , based on a sample aged 17-25.

Sloan, A.W., Burt A.J., Blyth C.S.: *Estimating body fat in young women.*, J. Appl. Physiol. (1962);17:p967-970.

%BF = (0.1548 x sum of triceps, subscapular, supraspinale, abdominal, thigh, calf) + 3.580, based on a sample of college students.

Yuhasz, M.S.: Physical Fitness Manual, London Ontario, University of Western Ontario, (1974).

- **equipment required:** [skinfold calipers](#) (e.g. Harpenden, Holtain, Slimslide, Lange). These should be calibrated for correct jaw tension and gap width.
- **target population:** suitable for all populations, though it is sometimes difficult to get reliable measurements with obese people.
- **validity:** using skinfold measurements is not a valid predictor of percent body fat, however they can be used as a monitoring device to indicate changes in body composition over time.
- **reliability:** can vary from tester to tester depending on the skill and experience of the tester.
- **advantages:** Skinfold measurements are widely utilised to assess body composition. It is a lot simpler than hydrostatic weighing. After the outlay for callipers, the tests costs are minimal.

## Meal Plan Template

Meal	Mon	Tue	Wed	Thur	Fri	Sat	Sun
Servings of each food group	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out	%RDA vitamins and Minerals Cal. in Cal. out
<b>Breakfast</b> Grains Veg. Fruits Milk meats	A B C D E K Calcium Chromium Copper Flouride Iodine Iron Magnesium Manganese Molybdenum Phosphorus Selenium Zinc Cal. In= Cal. Out=						
<b>Snack</b> Grains Veg. Fruits Milk meats							

Meal	Mon	Tue	Wed	Thur	Fri	Sat	Sun
<b>Lunch</b> Grains Veg. Fruits Milk meats							
<b>Snack</b> Grains Veg. Fruits Milk meats							
<b>Supper</b> Grains Veg. Fruits Milk meats							
<b>Snack</b> Grains Veg. Fruits Milk meats							

If you find on any given day your caloric intake is greater than your caloric expenditure, you will gain weight.

If on any given day, you fail to meet the RDA for a given Vitamin or mineral, you must correct the deficiency either using a supplement or extra food. Remember though, you **absolutely cannot** overuse supplements because some have toxic effects with high doses.

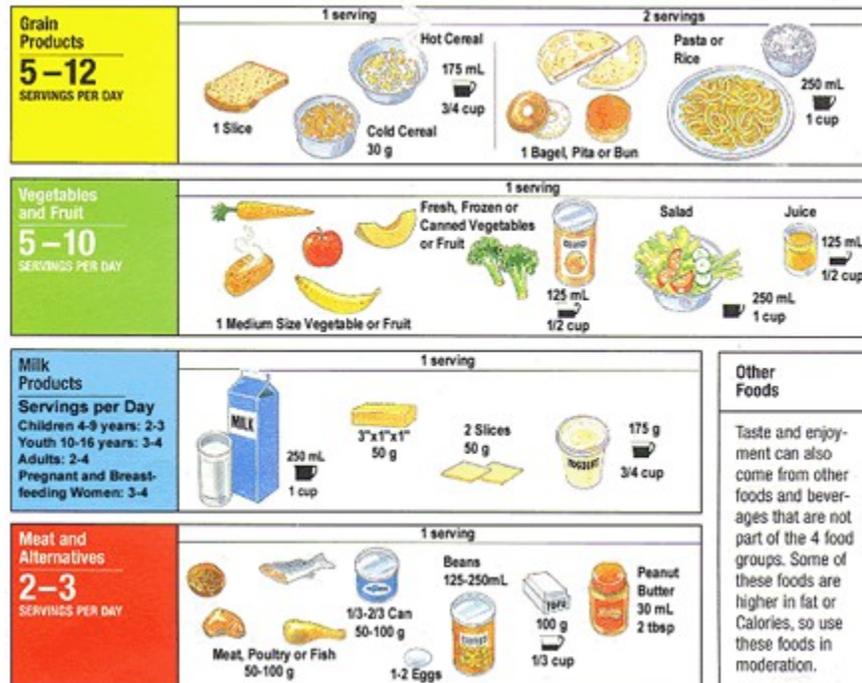
Use the Canada food guide below to help spread your food requirements out through the day, or use the tools found at <http://www.nutritiondata.com/index.html> to decide how much you need of each nutrient, and what food to find it in.

The low end of the food guide serving suggestions are for toddlers or older (+50) sedentary people, the higher end of the suggested servings are for young adults and active adults.

# Canada's Food Guide to Healthy Eating



Grain Products	Vegetables and Fruit	Milk Products	Meat and Alternatives
Choose whole grain and enriched products more often.	Choose dark green and orange vegetables and orange fruit more often.	Choose lower-fat milk products more often.	Choose leaner meats, poultry and fish, as well as dried peas, beans and lentils more often.



## Example BMI & Calories Burned Report

(This from <http://www.nutritiondata.com/index.html>)

If you are a 17 year old boy, 176 centimeters tall, with a current weight of 76 kgs. You lead a very active lifestyle, and participate in the following exercise:

120 minutes of wrestling

### Your Body Mass Index

Your current Body Mass Index (BMI) is **24.5**.

BMI is a standardized ratio of weight to height, and is often used as a general indicator of health. The "Normal" BMI for an adult man of your height is 18.5 to 24.9. This translates to a healthy weight range of 57 to 77 kgs. However, BMI does not take body composition into account. A weight above this range could still be considered healthy if your percentage bodyfat is less than average.

### Your Calories Burned

Here is an estimate of your daily energy needs...

## Calories Burned

Daily Energy Expenditure:	4174 kcal (17476 kJ)
Additional Calories from Exercise:	+ 864 kcal (3617 kJ)
Allowance for Growth:	+ 25 kcal (105 kJ)
Estimated Energy Requirement:	<b>5063 kcal (21198 kJ)</b>

**Note:** Accurate determination of the Calories you burn can only be accomplished by individual physiological testing. This calculation is merely an estimate that was derived from regression formulas and data provided by these sources:

2002, "Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids," Food and Nutrition Board, Institute of Medicine.

Ainsworth B.E., 2002, January, "The Compendium of Physical Activities Tracking Guide," Prevention Research Center, Norman J. Arnold School of Public Health, Univ of SC.

In the above table, the Daily Energy Expenditure includes Basal Energy Expenditure (BEE), the energy consumed by daily activities, and the Thermic Effect of Food (TEF). Additional Calories from Exercise also includes the effects of Excess Post-exercise Oxygen Consumption (EPOC).

This estimate represents the total daily Calories needed to maintain your current body weight. To gain or lose weight, you may need to adjust your Calories upward or downward from this amount.

## Your Recommended Minimum Daily Needs

Here is an estimate of your minimum daily nutrient needs, based on the Dietary Reference Intakes (DRI) established by the Food and Nutrition Board, Institute of Medicine (IOM)...

### Recommended Minimums

#### Macronutrients

<a href="#">Total Carbohydrate</a>	130 g
<a href="#">Dietary Fiber</a>	38 g
<a href="#">Linoleic Acid</a>	16000 mg
<a href="#">Alpha-Linolenic Acid</a>	1600 mg
<a href="#">Protein</a>	61 g

#### Vitamins

<a href="#">Vitamin A</a>	3000 IU
<a href="#">Vitamin C</a>	75 mg
<a href="#">Vitamin D</a>	200 IU
<a href="#">Vitamin E</a>	15 mg
<a href="#">Vitamin K</a>	75 mcg
<a href="#">Thiamin</a>	1.2 mg

<a href="#">Riboflavin</a>	1.3 mg
<a href="#">Niacin</a>	16 mg
<a href="#">Vitamin B6</a>	1.3 mg
<a href="#">Folate</a>	400 mcg
<a href="#">Vitamin B12</a>	2.4 mcg
<a href="#">Pantothenic Acid</a>	5 mg
Biotin	25 mcg
Choline	550 mg
Minerals	
<a href="#">Calcium</a>	1300 mg
Chromium	35 mcg
<a href="#">Copper</a>	0.89 mg
Flouride	3 mg
Iodine	150 mcg
<a href="#">Iron</a>	11 mg
<a href="#">Magnesium</a>	410 mg
<a href="#">Manganese</a>	2.2 mg
Molybdenum	43 mcg
<a href="#">Phosphorus</a>	1250 mg
<a href="#">Selenium</a>	55 mcg
<a href="#">Zinc</a>	11 mg

Click on nutrients for best sources

**Note:** The above recommendations are only estimates of your minimum needs, and do not take into account any illness or genetic individuality. These recommendations are specific to boys between the ages of 14 and 18, and may differ from the standardized Daily Values used on nutrition facts labels. Some of the nutrients included in these recommendations are not yet tracked by NutritionData.com.

## Your Recommended Macronutrient Distribution

Based on your age, the IOM has established the following recommended ranges for macronutrients in your diet...

### Recommended Ranges

- Carbohydrate: 45 to 65% of total  
Calories
- Fat: 25 to 35% of total Calories
- Protein: 10 to 30% of total Calories

## Links

<http://www.nal.usda.gov/fnic/>

<http://www.nutritiondata.com/index.html>

\*This one has a wealth of tools and info

<http://www.geocities.com/~slopitch/drsquat/fredcalo.htm>

[http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food\\_guide\\_rainbow\\_e.html](http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_rainbow_e.html)

<http://www.topendsports.com/testing/index.htm>