

**NEW TRIER HIGH SCHOOL  
ATHLETICS**

**NUTRITION GUIDE  
FOR  
ATHLETES**

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## BASIC NUTRITION

### Maximize Your Athletic Performance

We are all looking to be on the cutting edge of athletic performance. We are searching for the things that will make us bigger, faster, and stronger in the least amount of time. We research and follow the latest in training practices. Yet, in this quest, we fail to commit to one major aspect of training, NUTRITION. The ergogenic aid we are all searching for is proper nutrition.

The food we consume helps us in the areas of body growth, body functions, tissue repair, athletic performance, and health. When our bodies do not have the proper nutrition, we get:

tired (lack of endurance and chronic fatigue),  
sick (colds, flu, and infections),  
muscle fatigue (cramps, muscle strains, and general muscle soreness),  
joint and connective tissue slow healing (tendonitis and shin splints),  
athletic performance drops or performance stagnates.

How do you ensure that you are getting all of the nutrition you need? According to the Food Group approach, you are to consume:

- 6 – 11 servings of breads and cereals
- 3 – 5 servings of vegetables
- 2 – 4 servings of fruit
- 2 – 3 servings of dairy
- 2 – 3 servings of meat, poultry, fish, and beans

This approach to eating is a good one as long as we eat the right kind of foods contained in the group. We will not get all of the nutrients that we need just by eating servings from these food groups. Eating a slice of plain white bread will not give you the same nutritional value as a plain slice of quality whole grain bread. The food group approach will work if you make healthy choices within them.

Athletes need extra nutrients to ensure proper performance. To do this, they need to consume more breads and cereals, vegetables, and fruits than their non-athletic counterparts. These three groups give you the additional carbohydrates needed to perform; carbohydrates are the primary energy source for exercising muscles.

The following pages will focus on hydration, sports nutrition, carbohydrate loading, losing weight, gaining weight, boosting iron intake, top sports foods, and supplements, i.e., creatine. If you still feel you are not getting enough nutrients, a once a day, multi-vitamin is all you need. Mega-dosing on vitamins can be toxic.

# HYDRATION

Water is the most important nutrient that effects our health and athletic performance. Unfortunately, it is often overlooked and forgotten. Our body weight is approximately 60% water. Our hydration level depends on the amount of water we have consume and lost. We get water from a variety of sources including: liquids, food, metabolic water (the body produces about 10 grams/day), and glycogen bound water (water that is tied up with glycogen and stored in the liver and muscle tissue). We lose water through a variety of venues including urination, defecation, sweating, and breathing (as water vapor).

Athletic performance drops once dehydration occurs. Our body depends on the cardiovascular system to deliver oxygen and nutrients to the working tissues. Blood carries away heat from the working muscles; it then delivers that heat to the skin where the process of sweating and evaporation cool the body. As the water levels in our body drop, so does the body's ability to dissipate heat and provide nutrition to the exercising muscles; therefore, performance decreases.

## **Prevent Dehydration During Training**

On a daily basis drink adequate fluids. This is easily determined by monitoring the amount and color of your urine.

1. Urination should be frequent throughout the day: morning, noon, and night.
2. Urine should be clear in color and significant in quantity.  
If the urine is dark, concentrated and scanty, consume more water and other fluids.  
NOTE: If you take vitamin supplements, your urine may be brightly colored.
3. To increase awareness of sweat loss during exercise, weight yourself before and after a hard workout. Each pound lost represents one pound (3 cups) of sweat. Replace it accordingly, and try to lose less than 2% of your body weight during a workout.
4. You do not have to drink water for fluids. Juice, lemonade, sports drinks, and water-foods such as soup, oranges, cucumbers, yogurt, and melon all have high water content that contributes to your overall fluid balance.
5. Be aware that coffee, tea, and alcohol have a dehydrating effect; they cause urination and fluid loss. If you choose to drink beverages with caffeine, do so after quenching your thirst with other fluids.

## **Prior to Hard, Endurance Exercise**

1. The day before an endurance exercise bout or event, drink extra water, juice, or other fluids to be sure the body is well hydrated.
2. On the morning of the event, 2 hours prior, drink 2 – 3 large glasses of fluids. Since the kidneys require about 90 minutes to process liquids, this will allow time to empty the bladder before the start of the event.
3. Five or ten minutes before the start of the event, drink 1 – 2 cups of water. This will be ready to replace sweat losses.

## **During Hard Exercise**

1. Drink as much as possible, ideally 8 – 10 ounces every 20 minutes. You may still have a fluid deficit as you are sweating off three times as much fluid.
2. Prevent dehydration by taking adequate fluids (water, sports drinks, or diluted juice) early in the event. Drink before you are thirsty! By the time your brain signals thirst, you will have lost 1% of your body weight. By 2% dehydration, you may have reduced your work capacity by 10 – 15%.

### **After Exercise**

1. Drink to quench your thirst, and then drink even more. Since the thirst mechanism inadequately indicates whether or not you've taken in enough fluids, monitor your urine. If several hours pass without urination, you are still dehydrated. Keep Drinking!
2. Juice (especially orange or banana/orange blend) replaces not only fluids, but also carbohydrates and potassium. Two or three cups within one hour post-exercise can help you better recover from a tough workout.

### **WATER vs. SPORTS DRINKS**

For the recreational athlete, water is always appropriate. Water is what your body needs and absorbs quickly. For endurance athletes or those expending large amounts of energy for more than ninety minutes, a sport drink, dilute juice, or soft drink that contains 60 – 100 calories per 8 ounces can provide an advantage during exercise. It may keep you energized and focused. Experiment during training to determine what works best for you.

### **ELECTROLYTE REPLACEMENT**

Sweat contains not only water, but also small amounts of sodium, potassium, and other electrolytes that keep your body in fluid balance. You lose small amounts of these electrolytes when you sweat, but you do not totally deplete yourself, unless possibly under extreme circumstances. You can easily replace the losses after exercise by eating fruit, juices, yogurt, and other wholesome foods. Commercial fluid replacement drinks are generally weak sources of electrolytes compared to natural fruits, juices, and recovery foods. Water plus wholesome carbohydrates do the best job!

## SPORTS NUTRITION TIPS

Without a doubt, what you eat and when you eat affects your athletic performance. A wisely selected sports diet helps you feel stronger, train harder, and compete better. The following sports nutrition tips can help you eat to win.

### FUEL

The best muscle fuels are carbohydrates; either simple sugars (such as the naturally occurring sugars in fruits and juices) or complex carbohydrates (the starches in whole wheat bread, brown rice, bran cereal, oatmeal, and other grains). These carbohydrates provide not only energy, but also important vitamins and minerals. Refined sugars (i.e. soft drinks and candy) also fuel muscles, but they lack the “spark plugs” that help your engine run smoothly.

You store only carbohydrates, not protein or fats, in muscles in the form of glycogen. During hard exercise, you burn this glycogen for energy. When you deplete your glycogen stores (as can happen during repeated days of hard training and low carbohydrate diet), you feel overwhelmingly exhausted. Eating high carbohydrate foods (cereal, pancakes, bread, fruit, vegetables, potato, and pasta) on a daily basis can help you train harder and compete better.

Top ten carbohydrate sources with less than five-percent fat and more than 70 percent carbohydrates:

brown rice	wild rice
whole barley	whole corn
whole buckwheat	pearl millet
whole rye	whole wheat
foxtail millet	rolled oats

### QUICK ENERGY

Eating lots of sweets and sugary foods for “quick energy” before you exercise may hurt your performance. Here’s why: after you eat any kind of concentrated sugar (i.e. dried fruit, juices, soft drinks, jelly beans, etc.), your body secretes insulin, a hormone that carries sugar from your blood into the muscles. Exercise, like insulin, also helps carry sugar into the muscles. The combined effect of insulin with exercise can cause your blood sugar to drop abnormally low. You may experience hypoglycemia (low blood sugar) and feel light-headed, shaky, tired, and uncoordinated.

If you are hungry, droopy, and craving a quick energy boost prior to exercise, you do not have to eat sugar for energy. A simple snack of crackers, fruit, or bread can perk you up without risking negative hypoglycemic effects. Better yet, prevent the need for an energy boost! Simply eat a hearty breakfast and/or lunch that fuels you up earlier in the day so that you will not be running on fumes in the afternoon. These meals will be digested in plenty of time for the afternoon or evening workout. You will be ready for action, rather than hungry and tired.

### FLUIDS

Whereas lack of carbohydrates can hurt your performance, lack of fluids can endanger both performance and health. To prevent yourself from becoming dehydrated, drink lots of liquids before, during, and after strenuous exercise. Water is always safe before exercise; water and/or sports drinks during exercise; and water, sports drinks, or juices after exercise. To tell if you have had adequate fluids, simply monitor your urine. It should be clear in color and voluminous, not dark and concentrated.

## **PRE-COMPETITION MEALS**

Whenever possible, you should eat carbohydrate-rich meals the day before the competition. This allows plenty of time to digest the carbohydrates and store the energy in your muscles as glycogen. Before a strenuous morning event (such as competing in a 9 am road-race), you should also eat a light breakfast or small snack 1 – 3 hours prior to competing. This will boost your blood sugar and enhance stamina and endurance. Before an afternoon or evening competition, eat a hearty breakfast (cereal, pancakes, waffles, and bagels), a lighter lunch (soup, sandwich), and a dinner or snack as tolerated. Since each athlete has different tolerances to pre-exercise food, you need to experiment during training to determine the quantity and type of food that works best for you.

Although many athletes believe they should exercise on an empty stomach, current research suggests that a pre-exercise snack actually enhances stamina and endurance. Some popular choices include cereal with low fat milk, 1 – 2 slices of toast, or some plain crackers. Avoid large fatty meals (the traditional steak and eggs breakfast) that tend to sit heavily in the stomach.

## **BENEFITS OF PRE-EXERCISE EATING**

Proper fuel before training and competition will:

- Finish filling muscle glycogen stores
- Top off liver glycogen stores
- Minimize risk of developing hypoglycemia stores
- Provide fuel during the early part of exercise
- Settle your stomach and prevent hunger pains
- Provide a psychological edge
- Keep you well hydrated.

## **SAMPLE PRE-COMPETITION MEALS**

### Meal Providing 150 grams of Carbohydrates and 750 Calories

2 slices bread  
1 cup of yogurt with fruit  
1 large banana  
2 tbsp. jelly  
4 ounces fruit juice

or

3 cups concentrated carbohydrate beverage

### Meal Providing 300 grams of Carbohydrate and 1400 Calories

2 cups cooked cereal  
12 ounces skim milk  
1 large banana  
4 tbsp. raisin  
2 slices toast  
4 tbsp. jelly

1 cup yogurt with fruit  
8 ounces of juice

or

6 – 7 cups concentrated carbohydrate beverage or liquid replacement meal

## HOW TO EAT BEFORE TRAINING AND COMPETITION

Timing	Carbohydrate/Food Recommendations	Sample Foods	Start Times	Types of Events
Night before	High carbo meal	Pasta dishes Rice dishes	Essential for early start time	Endurance events
	300 grams carbs	Lean protein Easy on fat	Helpful for any start time	Intermediate distance
	Low in fiber Plenty of fluid	Cooked vegetables		Short duration events
3 to 4 hours prior	Carbohydrates: 1.5 – 2 grams per pound body weight (3 – 4 grams/kg)	150 lb. athlete: 225 – 300 grams of carbohydrates	For mid-morning starts: Eat at 7 am for 10 am start	Endurance events Intermediate distance
	Low fat protein Low fat and fiber	Cereals, breads, milk, crackers, yogurt, fruit, juices, jelly, muffins, bagels	Mid-afternoon starts: Eat at 10 am for 2 pm start	
2 hours prior	Carbohydrates: Up to 1 gram per pound of body weight (2 g/kg)	150 lb. athlete: 130 – 150 grams carbohydrate	For mid-morning starts: Eat at 8 am for 10 am start	Short duration events Intermediate distance
	Minimal low fat protein Low fat and fiber Plenty of fluids Carbohydrates: 0.5 grams per pound body weight (1 g/kg)	Cereals, bread, milk, yogurt, fruit, juices, jelly, crackers	Mid-afternoon start: Eat at noon for 2 pm start after a large morning breakfast	Endurance events
			For late starts: Eat at 6 pm for 8 pm start after adequate carbohydrate meals throughout the day	Multiple events
1 hour prior	Emphasize liquids Easy to digest carbohydrates Avoid protein, fat, and fiber	Sports drinks	For early starts: Eat at 6 am for 8 am start	Short-duration events
		Concentrated carbohydrate supplements	For mid-morning starts: Eat at 10 am start, have a snack/ Liquid at 9 am. In addition to 6:30 – 7am meal	Intermediate-length events
		Sports bars		Endurance events
		Tolerated fruits		Multiple events
	Water			
Immediately prior	Carbohydrates	Sports drink  Energy bars if exercise starts at moderate intensity for at least 30 minutes	For any start time	Any event requiring carbs and hydration



## RECOVERY FOODS

You should consume carbohydrate-rich foods and fluids as soon as tolerable (at least within 45 minutes to an hour after hard exercise) to replace the glycogen that you burned off. Muscles are most receptive to refueling at this time. A simple post-exercise example might be fruit juice, a rich source of not only fluids and carbohydrates, but also potassium and vitamins.

Remember that only carbohydrates quickly refuel your muscles and prepare you for tomorrow's workout. Hence, resist the greasy burger with french fries for your recovery feast; choose instead carbohydrate-rich, thick-crust pizza with single cheese and vegetable toppings, or a dinner that focuses on potato, bread, vegetables, juices and other carbohydrates.

## POST-EXERCISE RECOVERY GUIDELINES

Carbohydrate Requirements (grams/lb body weight)	Goals and Guidelines of Carbohydrate Intake	Carbohydrate for 125 lb. Athlete	Carbohydrate for 165 lb. Athlete	Food Choice
0.5 – 0.7 grams per body weight	Within 30 min. post-exercise	63 – 88 g	88 – 115 g	Concentrated carbohydrate drinks
	Two hours post-exercise			Energy bars
	Emphasize Fluids			Cereals
	Emphasize high glycemic index foods			Bagel

## **CARBOHYDRATE LOADING: TIPS FOR ENDURANCE ATHLETES**

For two to three days prior to a marathon, triathlon or other form of endurance exercise that lasts more than ninety minutes of strenuous effort, you should super-fuel your muscles by eating a hearty amount of carbohydrate-rich foods. About 60 – 70% of your calories should come from breads, pasta, cereal, potatoes, fruits, juices, and other high carbohydrate choices. To slightly overeat carbohydrates is wiser than to under eat carbohydrates.

In addition to eating a high carbohydrate diet, you should exercise less to rest your muscles and allow them the opportunity to stock-up on carbohydrates. The week prior to the event, gradually taper off your exercise so that you are training only 20 minutes two and three days prior to the event; nothing the day before. Eliminate any last-minute hard training; you'll simply fatigue yourself at a time when rest would be more beneficial.

To avoid gaining weight due to the reduced amount of exercise, you may want to eat slightly fewer total calories; exercising less should decrease your appetite. The calories that you do eat should be primarily carbohydrates with small amounts of lean protein (to protect your muscles) and minimal amounts of fat.

You will know if you have carbo-loaded correctly if the scale goes up – that is water weight, not fat weight! For every gram of carbohydrate that you store in your muscles as glycogen, you also store three grams of water. This water becomes available to you during exercise and helps prevent dehydration.

When selecting your diet, be careful to choose high carbohydrate foods – not high fat foods. The two often come together such as butter on a potato, cream cheese on a bagel, and cream in ice cream.

### **HIGHEST CARBOHYDRATES CHOICES**

Spaghetti, noodles, macaroni with tomato  
Rice, potato, yams, stuffing without butter, gravy  
Lentils, Chile beans, split peas  
Bread, muffins, bagels – plain or with jam  
French toast, pancakes, cereal  
Jam, jelly, honey, syrup  
Bananas, pineapple, raisins, figs  
Apple crisp, date squares, fig newton's  
Juices – apple, grape, apricot, orange  
Blender fruit and juice drinks  
Sherbet, ice milk, yogurt

### **LOWER CARBOHYDRATE CHOICES**

Pizza, lasagna with lots of meat, cheese  
French fries, fried rice, buttery potato  
Casseroles with rich sauces and gravies  
Donuts, croissants, Danish pastry  
Eggs and breakfast meats  
Butter, margarine, cream cheese  
Cookies, cakes, baked snacks  
Pastries made with lots of butter  
Beer, wine, alcohol (dehydrating effect)  
Milk shakes, frappes  
Ice cream – especially gourmet brands

The food you eat the days before the event will fuel your muscles. The food you eat the morning of the event will help maintain a normal blood sugar level and thereby feed your brain and help you think clearly. Eat a small (<500 calories) meal 2 – 4 hours prior; examples are 1 – 2 slices of toast, a small bowl of hot or cold cereal, or whatever you normally eat prior to your training runs. Don't try any new foods! Stay with the tried and true meals.

You are unlikely to starve to death during endurance exercise, but you can seriously hurt yourself if you become dehydrated. Prevent dehydration by drinking extra water and juice when you carbo-load. Pre-event, you should have to urinate frequently.

For fluids the morning of the event:

- Drink at least three glasses of water up to two hours before the start. (The kidneys will process this liquid in about 90 minutes allowing time to empty the bladder pre-event.)
- Drink one to two glasses of water 5 – 10 minutes before the start.
- Drink whenever possible during the event. Try to consume at least one-half cup every 20 minutes.

After the event, drink plenty of caffeine free fluids until your urine is a clear color. Eat wholesome, high carbohydrate foods to replace muscle glycogen, potassium, and electrolytes. Oranges, bananas, yogurt, fig newton's, potatoes, banana bread, pretzels, and juices are some appropriate "recovery foods". Enjoy the victory dinner keeping in mind that your muscles are craving carbohydrates; feed them lots of potatoes rolls, vegetables, fruits, and other carbohydrates just as you did prior to the event. Add salt if you crave it.

### DAILY CARBOHYDRATE REQUIREMENTS

Daily Carbohydrate Requirements (grams/lb. body wt.)	Training Regimen	Goals	125 lb. Athlete	165 lb. Athlete
4.5 – 5.5 grams/lb.	Very prolonged	Daily muscle glycogen recovery during exercise	563 – 690 g	742 – 907 g
	Moderate-high Intensity			
	Daily	Meeting high energy needs		
	Greater than 5 to 6 hours			
3.0 – 4.5 grams/lb.	Prolonged	Daily muscle glycogen recovery	375 – 562 g	495 – 742 g
	Moderate-high intensity			
	Daily	"Load muscle" prior exercise		
	Greater 90 Minutes	Refueling during exercise		
2.5 – 3.0 grams/lb.	Moderate duration	Daily muscle glycogen recovery	280 – 375 g	370 – 495 g
	Moderate intensity under one hour			
	Low intensity several hours			

## HOW TO LOSE WEIGHT AND MAINTAIN ENERGY

There are occasions when an athlete needs to lose weight, for various reasons. With real health risks of obesity and poor nutrition, many athletes are exposed to unrealistic beauty idealized in the media. The result is, an athlete may feel the pressure to be thinner for good health, and may try to accomplish this goal through poor and sometimes treacherous nutritional selections. Weight dissatisfaction is common in athletes, and behaviors to control weight are very common and exist from healthy to the potentially dangerous. It is important to realize, there is a very real difference between “healthy weight” and “cosmetic weight”.

If you continually go “on a diet” and then “off a diet”, you need to acknowledge that diets don’t work! In order to lose weight, healthfully, and to keep it off, you should look at your eating habits. After all, it is your eating habits and inactivity that can lead to weight problems...particularly the overeating that commonly occurs after blowing a strict diet.

Strict diets teach you to have will power and how to deny yourself food, but also vitamins, minerals, proteins, and carbohydrates; the nutrients you need to perform at your best. Strict diets leave you feeling deprived of one of life’s pleasures – food. Rather than “diet”, you should learn how to healthfully eat “diet portions” of any food that you currently enjoy and would like to eat for the rest of your life. Healthful eating offers more long-term success than crash dieting.

### 9 STEPS FOR SUCCESSFUL WEIGHT REDUCTION

1. Write down what you typically eat in a day, then evaluate your meal patterns. Do you nibble all day? Have humongous dinners? Munch-out at night? Overeat because you are too hungry? Tired? Nervous? Bored? Stressed? Think about moods. If there are times when a hug and human comfort would nourish you better than food, do not even start eating; no amount of food will satisfy you. Food is only fuel.
2. Become aware of meal timing. Many athletes tend to be “good” during the day and “bad” at night. If this describes you, try eating a bigger breakfast, lunch, a planned afternoon snack, and then a lighter dinner. By giving yourself permission to eat more calories during the day, you will not only burn off those calories, but you will also prevent yourself from getting ravenous at night. Generally speaking, once you are ravenous, you do not care about what you eat – or how much – you just simply eat.
3. To very roughly estimate the number of calories needed to maintain your current weight:
  - Multiply your desired weight by 10. This is your resting metabolic rate (the amount of calories you need to lie in bed all day and breathe.) For example: if your target weight is 120 lbs., your resting metabolic rate is 1200 calories. These are calories you burn even if you are injured or taking a day from exercise.
  - Add another third to half of that number for your general daily activity – excluding your specific training or exercise program. If you are active during the day (i.e., going up and down stairs, walking around, doing errands), you will burn off more calories than if you are sitting, studying, reading, or working at a desk. For example: a 120 lb. mother with three children is quite active and will need about 1200 calories (resting metabolism) plus 600 calories (general daily activity), bringing her daily needs to 1800 calories.
  - Next, add on calories that you burn off during your training/exercise program. Here’s the caloric expenditure for some popular sports based on weight and calories burned per minute of activity:

<u>Activity</u>	<u>110</u>	<u>130</u>	<u>150</u>	<u>170</u>	(Body Weight in lbs.)
Bike, 13 mph	8.5	10.0	11.5	13	calories/minute

Running, 8 min/mile	10.8	12.5	14.2	16
Squash	10.6	13.1	14.4	17
Swimming, hard	7.8	9.2	10.6	12
Walking, normal pace	4.0	4.7	5.4	6.2

From: Nutrition, Weight Control and Exercise. F. Katch & W. McArdle, Lea & Febiger, 1988.

Note: This is a rough estimate of your calorie needs. You may burn more calories or fewer calories, depending on many factors unique to your body. For example: if you tend to eat more than your peers, you probably have a high than average metabolic rate. If you generally eat less than your peers, you may be energy efficient and require fewer calories. A registered dietician can help you more accurately determine your actual energy needs.

4. Subtract 500 – 1000 calories per day from the total to estimate the number of calories you should eat for weight loss. Small athletes (i.e., skaters, gymnasts, dancers) should subtract fewer calories than larger athletes (football players, body builders). Otherwise, they will cut back too much, could become ravenously hungry and be at high risk for “blowing” the diet again.
5. Organize your eating into a realist plan. For example: if you maintain your weight on about 2200 calories you should plan to lose weight on about 1700 calories. Divide those 1700 calories into three meals plus snacks such as 500 calories for breakfast, 500 calories for lunch, 200 calories for an afternoon snack, and 500 calories for dinner. Try to eat the majority of the calories during the day so that you will have the energy to exercise at your best. By eating during the day, you will also be able to easily eat less at night because you won’t be over-hungry. Remember: you won’t gain weight by eating a substantial breakfast or lunch. You will gain weight, however, if you skimp on those meals, get too hungry, and then overeat during the evening!
6. Eat slowly. At meals, put down your fork from time to time. You don’t have to eat non-stop. Overweight people tend to eat faster than their normal weight counterparts. Since your brain needs about 20 minutes to receive the signal that you have eaten your fill; try to pace your eating. No matter how much you consume during these twenty minutes, the satiety signal won’t move any faster.
7. Once a week, give yourself permission to have a treat such as a piece of birthday cake or a special Sunday breakfast. This will give you incentive to be “good” when tempted at other times. When enjoying this treat, don’t quickly stuff it into your mouth. Rather, eat is slowly to fully enjoy the taste. After all, the best part about food is the taste.
8. Keep away from food sources that tempt you. For example: read the newspaper in the living room rather than the kitchen. Avoid jogging past the baker. Stand away from the buffet table at a party. By keeping the food out of sight, you are ore likely to keep it out of mind – and out of your mouth!
9. If you tend to eat because you are bored, stressed, tired, or lonely, make a list of ten non-food activities you can do instead of eating: water the plants, take a bath, call a friend, write letters, go for a walk, go to sleep, etc. If you are stressed, take steps to resolve the real problem... and recognize that no amount of food will resolve the stress. Learn how to handle stress and anxiety without overeating.

## HOW TO GAIN WEIGHT HEALTHFULLY

In order to gain weight, you have to consume more calories than you burn off. Theoretically, this means eating an additional 500 calories per day to gain one pound per week. Some thin people, however, have difficulty gaining weight and have to consume more calories than that. To take in the extra calories, you can eat:

- An extra snack such as a bedtime peanut butter sandwich with a glass of milk.
- Larger than normal portions at mealtime.
- Higher calorie foods.

Many people who try to gain weight think that a high protein diet will help them to bulk up. *This is false.* Although you may need a little extra protein to build muscle, your normal diet undoubtedly offers more than enough protein. The average American easily eats two to three times the recommended amounts of protein. Hence, you do not need to spend money on protein powders, pills and special supplements. Instead, spend your money on wholesome, high calorie foods.

When you make your food selections, keep in mind that fats are the most concentrated forms of calories. One teaspoon of fat (butter, oil, margarine, or mayonnaise) has 36 calories, whereas the same amount of carbohydrate or protein has only 16 calories. Since most protein foods generally contain fat (such as the cream that is in cheese, grease in hamburger, or oil in peanut butter), these foods tend to be high in calories. However, some fats can also be bad for your health – such as the saturated fat that is in cheese, beef, chicken skin, butter, and bacon. You should try to reduce your intake of these fats and focus instead on the more heart-healthy fats such as corn oil margarine, olive oil, old-fashioned peanut butter, and oily fish such as salmon and mackerel.

The following are suggestions to boost your calorie intake:

**JUICE:** Apple, cranberry, grape, pineapple, and apricot have more calories than grapefruit, orange, and tomato juice. To increase the calories in frozen orange juice, add less water than the directions suggest.

**FRUIT:** Bananas, pineapple, raisins, dates, dried apricots and other dried fruits have more calories than watery fruits such as grapefruit, plums, and peaches.

**MILK:** To boost the calorie value of milk, add ¼ cup powdered milk to one cup of whole milk. You can also add malt powder, Ovaltine, Carnation's Instant Breakfast, Nestle's Quick or other flavorings. If you mix these up by the quart, they will be ready and waiting for you in the refrigerator. You can also make blender drinks such as milk shakes, fruit smoothies, and frappes.

**HOT CEREAL:** By cooking hot cereal with milk, instead of water, you will add both calories and nutritional value. Add lots of mix-ins such as powdered milk, margarine, peanut butter, walnuts, sunflower seeds, wheat germ, and dried fruit.

**COLD CEREAL:** Choose dense cereals (as opposed to flake and puffed types) such as granola, muesli, Grape-nuts, and Wheat Chex; top with raisins, bananas, and other fruit.

**TOAST:** Spread with generous amounts of peanut butter, butter, and jam.

**SANDWICHES:** Select hearty, dense breads (as opposed to fluffy types) such as sprouted wheat, honey bran, rye, and pumpernickel – the thicker the slices the better! Spread with generous amounts of margarine or mayonnaise. Generously stuff with tuna, chicken, and other sandwich fillings. Good old peanut butter and jelly is an inexpensive, healthful, and high calorie choice.

**SOUPS:** Hearty lentil, split pea, minestrone, and barley soups have more calories than broth (chicken and beef types) – unless they are chock-full of veggies and meat. To make canned soups (such as tomato or chowder) more substantial, add evaporated milk in place of water or milk or add extra powdered milk. Garnish with margarine Parmesan cheese, and croutons.

**MEATS:** Although beef, pork, and lamb tend to have more calories than chicken or fish, they also tend to have more saturated fat. You should eat them in moderation, taking care to select the leaner cuts. You can boost the calorie value of lean meat by sautéing them in safflower, corn or olive oil, or margarine; wine sauce and breadcrumb toppings can also be added.

**BEANS, LEGUMES:** Lentils, split pea soup, chili with beans, limas and other dried beans are not only high in calories but also excellent sources of proteins and carbohydrates.

**VEGETABLES:** Peas, corn, carrots, winter squash, and beets have more calories than green beans, broccoli, summer squash, and other watery vegetables. Add generous amounts of margarine, slivered almonds, grated cheese or sauces.

**SALADS:** What may start out being low calorie lettuce can be quickly converted into a substantial meal by adding cottage cheese, garbanzo beans (chick peas), sunflower seeds, assorted vegetables, chopped walnuts, raisins, tuna fish, lean meats, croutons, and a liberal dousing of salad dressing (preferably olive oil based).

**POTATOES:** Add generous amounts of margarine and extra powdered milk to mashed potatoes. Use sour cream and gravy sparingly. Each adds significant calories, but they also add heart unhealthy saturated fat.

**DESSERTS:** By selecting desserts with nutritional value, you can enjoy a treat as well as nourish your body. Try oatmeal raisin cookies, fig newton's, rice pudding, chocolate pudding, stewed fruit compote, pumpkin pie, and carrot cake. Even blueberry muffins, corn bread with honey, banana bread, and other sweet breads can double as a dessert.

**SNACKS:** A substantial afternoon and/or evening snack is an excellent way to boost your calorie intake. If you don't feel hungry, just think of the food as a "weight gain medicine" that you have to take. Some healthful snack choices include: fruit yogurt, cheese and crackers, peanuts, sunflower seeds, almonds, granola, pretzels, English muffins, bagels, bran muffins, pizza, peanut butter crackers, milk shakes, instant breakfast drinks (Slim Fast), hot cocoa, bananas, dried fruits, and sandwiches.

By adding the additional 500 calories per day, you should see some weight gain. Be sure to include moderate amounts of exercise in order to promote muscular growth rather than just fat deposits. If you don't gain weight after two weeks of consistent higher calorie eating (three meals/day plus snacks), look to your family members to see if you inherited a naturally trim physique. Also keep in mind that most thin people gain some weight as they get older. Your turn will come! Enjoy being thin while you can.

## HOW TO BOOST YOUR IRON INTAKE

Iron is an important part of the red blood cell that helps transport oxygen from the lungs to the muscles. If you have a diet that is low in iron, you may develop iron deficiency anemia. The symptoms are weakness and rapid fatigue upon exertion. The Recommended Daily Allowance (RDA) for iron is 10 milligrams for men and 18 milligrams for women. Women require more iron because of loss through menstrual bleeding. The average woman consumes less than the RDA for iron.

You can absorb the iron in meat and animal products twice as efficiently as that in vegetables. For example, although spinach is a relatively iron-rich vegetable, you can only absorb 3% of that iron. Animal proteins enhance the absorption of the iron from vegetables when the two foods are eaten together. If you were to eat spinach along with some chicken, meat, or fish, the animal protein would help you to better absorb the vegetable-iron. Similarly, if you add lean hamburger to chili, the meat will help you to better absorb the iron in the chili beans.

Vitamin C also enhances iron absorption. Try to eat vitamin C rich foods along with meals. This includes orange juice with breakfast cereal, sliced tomato on a tuna sandwich, and broccoli with fish. Some fruits rich in vitamin C include oranges, grapefruit, cantaloupe, kiwi, and strawberries. Vitamin C rich vegetables include broccoli, spinach, peppers, tomato, and potato.

Bread, cereal, and other wholesome carbohydrates are good sources of iron if the words “enriched” or “fortified” are on the food label. In general, grain products offer very little iron, and it is poorly absorbed. The iron in fortified grains supplements the little bit that occurs naturally. You can significantly boost absorption of this iron by eating a source of vitamin C with grains. For example: by having a glass of orange juice with a breakfast cereal, you will absorb 2.5 times more iron.

When cooking, use cast iron skillets and pots. They offer more nutritional value than stainless steel! For instance, the iron content of spaghetti sauce increases from 3 to 88 mg/half-cup sauce when simmered in an iron pot for 3 hours.

Milk and dairy products are poor sources of iron. If you primarily rely on cheese, yogurt, milk, and other dairy products for protein, remember that you also need to include some other iron-rich foods in your diet. Vegetarians who avoid red meat have a much higher risk of becoming anemic.

If you are not eating lean red meats, iron-enriched breakfast cereals and grains, and do not use cast iron cookware, you may want to take a simple iron supplement such as is found in a multi-vitamin and mineral pill. Taking the RDA may help protect you from becoming anemic, but remember that the iron in meats and animal foods is better absorbed.

If you are an avid runner, you should pay particular attention to your iron intake since runners are more prone to becoming anemic than other athletes; perhaps because the pounding damages blood cells.

The following list indicates the iron content of popular foods. To help determine if you meet the RDA, add up the milligrams of iron that you consume in a day.



<b>FOOD</b>	<b>IRON (mg)</b>	<b>FOOD</b>	<b>IRON (mg)</b>
Liver, 4 oz., cooked	10*	Baked beans, ½ cup	2
Beef, 4 oz., roasted	6*	Kidney beans, ½ cup	2
Pork, 4 oz., roasted	5*	Bean curd (tofu), ¼ cake	2
Turkey, 4 oz., roasted (dark)	3*	Cereal, 100% fortified	18
Tuna, 6.5 oz., canned light	2*	(Total, Just Right) ¾ cup	
Chicken breast, 4 oz., roasted	1*	Kellogg's Raisin Bran, ½ cup	18
Fish, 4 oz., broiled haddock	1*	Cream of Wheat, ½ cup	9
Egg, 1 large	1	Wheat Chex, 2/3 cup	4.5
Prune juice, 8 oz.	3	Spaghetti, enriched, cooked,	1
Apricots, 12 halves, dried	2	½ cup	
Dates, 10 dried	1	Bread, 1 slice, enriched	1
Raisins, 1/3 cup	1	Molasses, 1 Tbsp., Blackstrap	2
Spinach, cooked, ½ cup	2	Brewer's yeast, 1 Tbsp.	2
Green peas, cooked, ½ cup	1	Wheat germ, ¼ cup	2
Broccoli, chopped, ½ cup	1		

\* This iron is best absorbed.

MAXIMUM RECOMMENDED AMOUNT – 1.0 grams

Fiber is not an energy source for the body, but it does have an important roll in digestion effectiveness. High fiber diets fill you up thus helping maintain a lower calorie diet. We should eat 40 – 60 grams of fiber a day. Each group listed below averages 10 grams of dietary fiber

### GRAINS

½ cup All Bran cereal  
 1 cup rolled oats  
 1 cup whole-grain cereal  
 2 ears sweet corn  
 3 slices whole rye bread  
 3 cups Puffed Wheat cereal  
 4 slices whole wheat bread  
 4 squares Shredded Wheat cereal  
 4 oz. popcorn

### VEGETABLES

½ cup mixed beans  
 ½ cup peas  
 ½ cup lentils  
 1 cup peanuts  
 2 cups soybeans  
 3 cups steamed vegetables  
 4 large carrots  
 4 cups sunflower seeds  
 5 cups raw cauliflower

### FRUITS

3 pears  
 3 bananas  
 4 peaches  
 4 oz. Blackberries  
 5 apples  
 6 oranges  
 6 dried pear halves  
 10 dried figs  
 20 prunes

## TOP SPORTS FOODS: SOME HEALTHFUL CHOICES

When you are training hard, juggling school, work, exercise, and social activities plus trying to eat healthfully, you may feel frustrated that you have no time to eat the proverbial “three square meals” every day. Never the less, you can maintain a healthful diet. The trick is to eat a variety of nutrient-dense, low fat snacks and meals on the run.

The following list includes foods that you can easily find in a convenience store, sandwich shop, salad bar, or can keep stocked at home. These nourishing choices invest in your health within a moderate to low calorie price. Since none are nutritionally complete, you need to choose a variety of foods in order to get a balance of the vitamins, minerals, carbohydrates, and proteins necessary for top performance and good health.

FOOD	IMPORTANT NUTRIENTS	COMMENTS
Milk, yogurt (Low fat)	calcium, protein, riboflavin	Plan to eat low fat dairy products 2 – 4 times each day for calcium, a mineral important throughout lifetime to maintain strong bones. Pizza (with low fat mozzarella cheese) is another calcium-rich choice.
Broccoli	vitamins A, C	One stalk (cooked) offers 100% RDA for vitamin C. Frozen and fresh are nutritionally similar since freezing does not destroy the vitamin C.
Spinach	vitamins A, C folic acid	Add to salads for more nutrients than offered by pale lettuce. Keep frozen spinach stocked at home for a quick dinner vegetable.
Green peppers	vitamin C	Half a pepper offers 100% RDA for vitamin C. Add to salads, pizza; munch on a raw pepper for a low calorie snack.
Tomatoes	vitamins A, C potassium	Boost intake by adding sliced tomatoes to sandwiches; choose foods with tomato sauce (pizza, pasta); drink tomato juice.
V-8 Juice	vitamins A, C potassium	An easy, cook-free way to get nutrients from eight vegetables. Keep small cans stocked for a snack or lunch time beverage.
Baked potato	potassium, vitamin C, carbohydrate	Be sure to eat the skin; it contains 75% of the vitamin C. For a low calorie topping, add yogurt. Or mash the baked potato with milk to add moistness without the fat and calories of butter or sour cream.
Orange juice, oranges	vitamin C, potassium, folic acid, carbohydrates	Six ounces (fresh or frozen) offers 100% RDA of vitamin C. A great post-exercise “recovery food” for potassium, carbohydrate, and fluids. Orange juice is nutritionally superior to many other fruit juices.
Bananas	potassium, carbohydrates, vitamin C	To prevent over ripening, store bananas in the refrigerator. Their skin may turn black, but the fruit will be fine. Add bananas to cereal; eat with peanut butter and a glass of milk for a balanced meal on the run.
Cantaloupe	vitamins C, A	Half a small melon offers 100% RDA of vitamin C for very few calories. Enjoy with low fat cottage cheese for quick, light lunch or snack.

<b>FOOD</b>	<b>IMPORTANT NUTRIENTS</b>	<b>COMMENTS</b>
Chicken, turkey	protein	Thigh and leg meat has more iron and zinc than breast meat. To reduce fat, calories, and cholesterol, remove the skin.
Lean beef	protein, iron, zinc	Beef is among the best sources of iron and zinc. Avoid fatty Meats; choose a lean roast beef sandwich rather than a greasy hamburger.
Fish, tuna	protein, fish oil	The oil in salmon, albacore tuna, and sardines protects against heart disease. Avoid fried; use low fat mayonnaise with tuna, if possible.
Bran cereal, Enriched	fiber, carbohydrates, iron, B-vitamins	Bran is excellent for fiber (to help prevent constipation). Select “fortified” and “enriched” cereals for the most iron; drink orange juice with cereal to enhance iron absorption.
Muffins, Bran, corn	carbohydrates, B-vitamins, fiber	Preferable to doughnuts or breakfast pastry. Try to buy low fat whole wheat, corn or bran muffins rather than cake-like ones. Top with jelly rather than butter for extra carbohydrates and moistness.
Bread, bagels, whole grain	carbohydrates, B-vitamins, fiber	Dark, whole grain breads (rye, whole wheat, oatmeal, etc.) are preferable to bread made with refined white flour. Breads are not fattening if you limit butter, margarine, cream cheese, and mayonnaise.
Pizza, thick crust	calcium, protein, vitamin A, carbohydrates	Of fast foods, pizza with thick crust, single cheese, vegetable toppings (not pepperoni or sausage) are preferable to burgers. If the pizza is oily, blot off the grease with a napkin.
Popcorn, air-popped	carbohydrates, fiber	A wholesome, low fat snack that is preferable to greasy chips. Be cautious of even “light” commercial brands of popcorn – they can be half fat.

## SUPPLEMENTS

Creatine, chromium, betahydroxy-beta-methyl butyrate (HMB), protein, and amino acids are the most advertised and popular nutritional supplements to enhance muscle mass. These supplements are available everywhere we look; stores, mail order, and Internet. Listed below is the supplement with its advertised effect. The information is not to be perceived as a scare tactic; just the real evidence.

**CREATINE:** Creatine occurs naturally in meat and fish. It is also synthesized in the body from the amino acids glycine and arginine. Creatine combines with phosphate and is used by the body to help generate energy for the body.

Most of the scientific research evaluating creatine has found ingestion of creatine improves repetitive, short term, strenuous exercise performance, but the effectiveness is still debated. Supplementation of creatine (20 – 30 grams/day for 5 days) has been shown to increase muscle mass and body weight by 1 – 3 Kg. Some studies did not find any increase in body weight. An interesting side note is that 20 grams of creatine is found in 5.5 Kg of raw steak. One study found vegetarians had the highest uptake of creatine. This is thought to be from the lack of meat in the diet; thus these individuals began with initial lower creatine levels. Other studies showed that some individuals show large increases in body weight while other studies show little body weight change.

We are unsure as to why some people have an increase in body weight. One thought is that creatine helps in water retention in muscle tissues. There is decreased urine output that would indicate water retention. There seems to be no ill side effects to the ingestion of creatine. However, these studies have been of short-term duration (4 days to 2 months.) We only have anecdotal evidence of possible dangers. They are muscle cramping, muscle spasms, and muscle strains. There have been no long-term studies conducted. The manufacturers recommend 20 grams per day (loading period) for 5 days followed by 2 – 5 grams per day after that (maintenance period). Without long-term research and the unknown effects of how it will react in the teenage body; athletes need to be very careful of its supplemental use.

**CHROMIUM:** It is one of our trace minerals essential for life. It is thought that with an increase in chromium, one could get bigger and stronger because of the glucose and amino acid uptake of insulin. Chromium does help in the increase of muscle mass of animals, but we are unsure about its effect on humans. A report in 1989 suggested that the ingestion of chromium would increase the lean muscle mass of humans; however, four subsequent studies were not able to confirm those findings. The majority of studies show that chromium supplementation is not effective in increasing lean body mass. We need chromium in our diets, but it is best to eat foods that contain it (wheat germ, American cheese, mushrooms) instead of powdered form.

**BETA-HYDORXY-BETA-METHYLBUTYRATE (HMB):** HMB is not an essential nutrient and is not fully understood in the human body. It is reported that it increases muscle mass by preventing protein breakdown with exercise. The problem is that there is not enough data to support or dispute the claims made by the manufacturers. Further studies are needed to determine how or if it works and if it is safe for long term use.

**PROTEIN:** The old saying “to make muscle you need to eat muscle” is what drives the protein supplement manufacturers. The powdered protein or various amino acid combinations are designed to increase muscle mass. It is true that athletes do require more protein than non-

athletes, but only a little extra protein will suffice. Most of the powders require you to consume more than is needed by the body to repair and generate tissue. The excess protein that is consumed is broken down and used as energy and excreted. If you are concerned that you are not getting enough protein in your diet, an inexpensive and good source of protein is dry milk powder (casein). This will provide all of the necessary amino acids and at less than half the cost of the high tech protein supplements marketed to athletes. Some powders use whey protein or “special” enzymes, and they have not been scientifically tested. There is no data to support the claims of muscle gain.

**AMINO ACIDS:** It is claimed that by taking amine acids (arginine, ornithine, histidine, lysine, methionine, and phenylalanine) it gives the user anabolic effects by releasing growth hormone and insulin thus increasing muscle mass. However, manufacturer-recommended doses are not likely to increase growth hormone and alter body weight. Higher levels of amino acids can cause mild to severe stomach cramps and diarrhea. It does not seem as if amino acid supplements will promote gains in muscle mass.

To put it simply, there is not enough research out there to promote the use of any of these products. Why do you want to let your body be a guinea pig for unknown dangers? This paper has shown how you can get all of the nutrients you need by eating food. Food is the cutting edge of strength, speed, and size.

NUTRITIONAL SUPPLEMENT	PROMOTED USE/ CLAIM	RESEARCH AVAILABLE TO SUPPORT CLAIM	RECOMMENDED DIETARY ALLOWANCES (RDA)/ESTIMATED SAFE AND ADEQUATE DAILY DIETARY INTAKE (ESADDI) AND FOOD SOURCES OF SUPPLEMENT
Chromium – a trace mineral that works to potentiate the effects of	Increase muscle, decrease fat, promote weight loss	While there is some data to support the claims, most research has not.	50 – 100 mcg  Food Sources: instant oatmeal (10.3 mcg/oz.) russet potato (3.8 mcg/medium) peas (60 mcg/cup, cooked) American cheese (60 mcg/oz) brewer’s yeast (60 mcg/2T) pineapple slices (16.5 mcg/cup)
Creatine – a substance made by the body at a rate of ~ 1g/day. In the muscle, creatine combines with phosphate to form creatine phosphate that is then involved in generating the primary fuel for the muscle, ATP.	Increase energy and muscular strength, burn fat, promote greater and quicker muscle gains beyond the body’s natural capacities, improve endurance and delay the onset of fatigue.	Some, but not all studies have found that creatine ingestion improved short-term strenuous exercise performance. No long term safety data are available.	There is no dietary requirements for creatine because it is synthesized by the body.  Creatine is found in both meat and fish. A normal mixed diet provides about 1 gram of creatine per day. The usual 20 gram loading dose provides about as much creatine as 10 lbs. of raw steak.
HMB – a metabolite of the branched chain amino acid, leucine.	Increase muscle mass by preventing protein breakdown and speeding the repair process.	The only published study on humans reported that HMB (3 grams/day) increased muscle mass and strength and reduced muscle damage in weight training males.	There is no dietary requirement for HMB because it is synthesized by the body.  HMB is found in low levels in grapefruit, catfish, and some other foods. Three grams of HMB is equivalent to 500 grams of meat (about 4 hefty hamburgers). A 10 day supply of HMB costs approximately \$25 (four-250 mg capsules taken 3 times per day)

NUTRITIONAL SUPPLEMENT	PROMOTED USE/ CLAIM	RESEARCH AVAILABLE TO SUPPORT CLAIM	RECOMMENDED DIETARY ALLOWANCES (RDA)/ESTIMATED SAFE AND ADEQUATE DAILY DIETARY INTAKE (ESADDI) AND FOOD SOURCES OF SUPPLEMENT
<p>Amino Acids – the building blocks for protein. There are 8 “essential amino acids” that must be provided by food and 9 “non-essential amino acids” that the body can synthesize from other components.</p>	<p>Arginine and ornithine, particularly, are touted to increase muscle mass by stimulating growth hormone and insulin.</p>	<p>While there is some data to support the claims, most research has not.</p>	<p>All of the necessary amino acids can be obtained from consuming the RDA for protein (1.4 – 1.8 g/kg with adequate calories for strength training athletes.) The protein in foods, e.g., meats, dairy, beans, dried peas, eggs, grains, are broken down to their fundamental parts (amino acids) during digestion. Compare one cup of a low fat fruited yogurt that contains 10 grams of high quality protein, 18 different amino acids (and 300 mg of arginine), carbohydrates, calcium, magnesium, and potassium to one tasteless 500 mg arginine supplement.</p>

Table created by Katie Fitzgerald, a dietetics student at Easter Illinois University and Julie H. Burns, MS, RD, of SportFuel, Inc.