



Sports Nutrition *for* **COACHES**

TOPICS INCLUDED IN THIS BOOKLET

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PART 1. Hydration / Fluids

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How to Use This Resource

This booklet provides background information for coaches on the following topics:

PART 1. Hydration / Fluids

PART 2. Eating - Before, During and After Competition

PART 3. Weight Management Issues (*including eating disorders*)

PART 4. Supplements, Vitamins and Minerals

PART 5. Parent Helps - Get Them on Your Team!

Each section has corresponding handouts to reproduce for students. Encourage student athletes to take these handouts home to give parents help on choosing healthy foods or share the information with a Parent Booster Club; they may wish to reproduce the handouts as a project.

Coach's Talking Points

Included in each section are several summary points that you may want to bring up as you distribute the student handouts.

References

Scientific references are given for the information presented in this kit; they are included at the end of this booklet. If students or parents wish to have more information, please reproduce the reference pages for them.

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Introduction to Sports Nutrition for Coaches

Good nutrition and optimal training spell success in athletic competition. Athletes who eat a healthy diet have the energy to perform their best. Good nutrition has academic benefits too.^{1,2,3} Being well nourished and hydrated are prerequisites for cognitive development and the ability to learn.² So before the competitive part of the season begins, encourage your athletes to eat well. Emphasize that the foods they eat most of the time from day to day can help replenish their muscle glycogen to delay the onset of fatigue.^{4,7} Begin giving your athletes nutrition training as soon as possible. This kit will help you educate your athletes about nutrition for sports performance.

▲ What is the best diet for athletes?

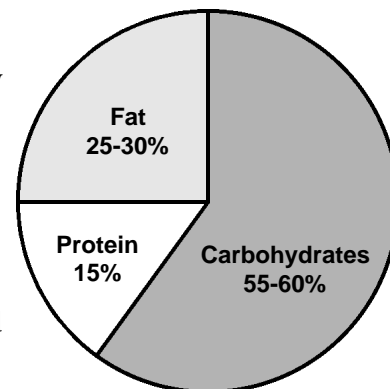
The best diet for athletes is a mixture of carbohydrate, protein and fat. These are the fuels used by the body. Carbohydrate is stored in the liver and muscles as glycogen. Muscle glycogen is critical to directly fueling muscle performance. When muscle glycogen is depleted, the muscles become fatigued and athletes can't perform their best. During exercise, the liver releases glycogen into the bloodstream as blood glucose. The muscles use blood glucose to fuel activity too.

▲ Carbohydrate 55-60% of calories (energy)

Eating high carbohydrate foods before, during and after exercise will delay the onset of fatigue and allow the athlete to exercise for a longer period of time.

▲ Protein 15% of calories (energy)

Protein is needed for building and repairing muscle tissue. How much protein do athletes need? That depends on body size, age, intensity of the sport and calorie intake. An athlete's normal protein intake (15% of total calories) is generally adequate as long as enough calories are being eaten.^{8,9} Some young athletes (such as cross country runners, wrestlers, and swimmers) do not eat enough calories and thus don't get the recommended⁸ .5 to .75 grams of protein per pound of body weight per day. These athletes may need a more protein-dense diet.



▲ Fat 25-30% of calories (energy)

Athletes need fat in their diet. Fat is a source of energy during exercise. Fat's function in food is a carrier of fat-soluble vitamins. Fat spares protein as an energy source, so protein is available to build and repair muscle and tissue. Many female athletes have become obsessed with fat. As a result, they avoid foods from the meat and dairy groups. Coaches need to provide healthy messages about eating a variety of foods including high protein foods which naturally contain some fat.

▲ BECOME A FOOD COACH. Send the drug-free message to your athletes: food fuels performance.

What should you expect by adding the title Food Coach to your resume? You may be rewarded by your athletes.

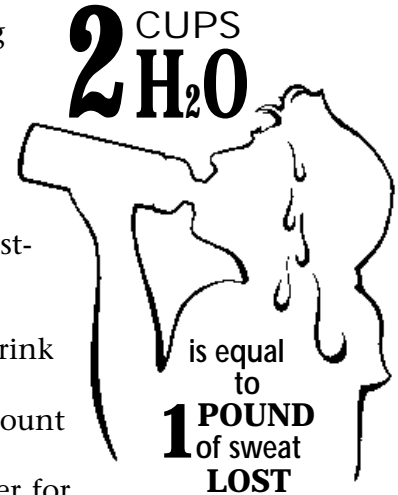
- staying healthier during the season
- healing better after injury
- maintaining a higher level of academic and athletic performance year after year.

PART 1: Hydration / Fluids

Water is the single most important nutrient for the body.

It promotes the health, safety and optimal physical performance of the high school athlete. The American College of Sports Medicine (ACSM) recommends:¹⁰

1. Eat a nutritionally balanced diet and drink adequate fluids during the 24 hour period before an event.
2. Drink 2 cups of fluid 2 hours before exercise.
3. During exercise, drink early and at regular intervals in an attempt to replace all of the water lost through sweat.
4. Drink cool fluids in large enough containers that allow adequate volumes to be ingested with ease. Cool water is best for activity lasting less than one hour.
5. For exercise events lasting longer than one hour:
 - consume 1/2 cup to 1 cup of a 4% to 8% carbohydrate sports drink every 15 minutes in order to delay fatigue
 - or drink 1/2 cup to 1 cup of fruit juice diluted with an equal amount of cool water every 15 minutes to delay fatigue.
6. Weigh before and after exercise. Drink two 8 ounce cups of water for every pound lost during exercise.



STUDENT HANDOUTS:

Use the reproducible master **1.1 Hydration/Fluids** so the process of becoming hydrated and replacing body water losses becomes easy for your athletes.

COACHES TALKING POINTS:

- Read the six American College of Sports Medicine (ACSM) recommendations above to your team when you give them 1.1 Hydration/Fluids.
- Remind them that muscle cramps are one sign of dehydration.
- Heat injury is 100% avoidable ²²

PART 2: Eating - Before, during and after competition

Time to eat is constantly being squeezed out of a high school athlete's busy day.

- *School starts too early to suit many adolescents.*
- *Student-athletes who are serious about homework are often studying past midnight.*
- *When the alarm rings at home, there is just enough time to shower, dress and bolt for the door.*
- *After a morning of classes, the lunch line is so long, there may be only seven minutes left to eat the food they bought.*
- *An afternoon of classes is followed by practice.*

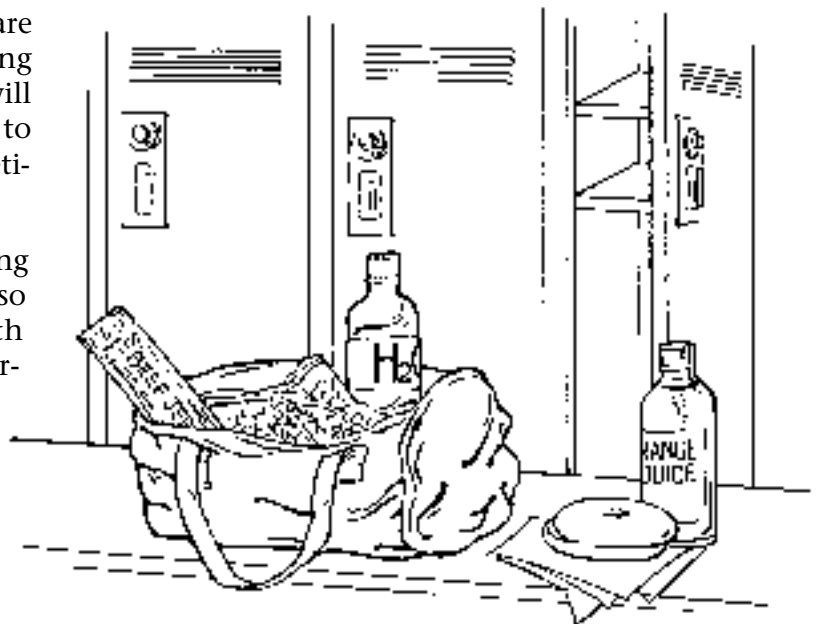
A sip of water from the fountain gives your athletes one ounce of water before a long stretch of practice or weight training. A bagel for lunch is all the athlete had time to eat. Welcome to every day high school nutrition issues. Inadequate total energy and fluid intake is common among many growing, young athletes.

When the sports medicine professionals arranged with coaches of Olympic hopefuls to test eating every 2.5 hours, the coaches were to make significant changes. The coaches had to stop practice and make sure the athletes ate before practice resumed. But the coaches saw immediate performance benefits. At USA Gymnastics, it became policy that the athletes ate every 2.5 hours. They cited the athlete's ability to maintain maximal power indicating "better fueled" muscles as the reason for accommodating frequent breaks to eat.¹¹

What does this mean for your high school athletes?

Skipping breakfast and eating little for lunch does not fuel muscles for long hours of practice. Encourage your athletes to eat breakfast, lunch and a high carbohydrate snack before and after practice to fuel muscle glycogen stores. Watch if they eat. If your athletes are doing radical things such as skipping meals or eliminating food groups they will hurt performance. You may be able to help them change before intense competition begins.

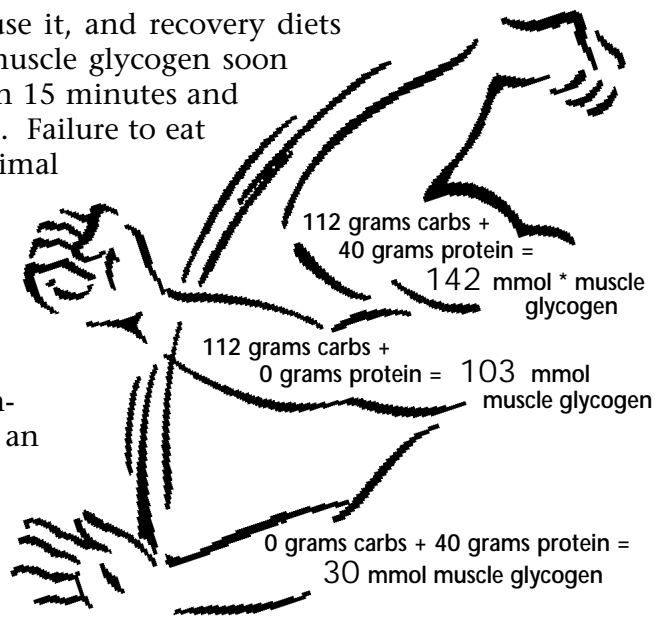
Food to help athletes recover after long hours of training or competition is also important. It's important in both endurance exercise and resistance exercise. Protein (*even if it must come from body protein or muscle*) will be used for energy when any person does not eat enough calories, carbohydrate or protein.



Recovery Diets Work!

If coaches see something that works, they will use it, and recovery diets work! Muscles are most receptive to replacing muscle glycogen soon after a hard workout.⁴ Athletes should eat within 15 minutes and again within 2 hours of training and competition. Failure to eat after practice and competition may hinder optimal glycogen recovery and endurance.⁶

"Don't avoid protein in your recovery diet. In fact, some protein can actually enhance glycogen replacement in the initial hours after hard exercise," says Nancy Clark in her Sports Nutrition Guidebook.^{7,12} How much food does a young athlete need after practice or competition? Here is an example: one 16-ounce bottle of orange juice, 4 ounces of lean beef on a bagel and a plum! Those are pretty tasty and convenient foods if you have morning or summer workouts. However, if the foods are kept from morning until after-school, you may need a little refrigerator space or an ice pack to keep the foods at the right temperature.



*mmol = micromoles of muscle glycogen per gram of protein

STUDENT HANDOUTS:

Use the following reproducible masters as a packet or just photocopy them back-to-back and hand out one page per week for three weeks to provide student-athletes with practical ideas on what to eat before, during and after practice and competition for optimal performance.

- 2.1 Eat breakfast
- 2.2 Eat after morning practice
- 2.3 Eat lunch
- 2.4 Eat before and after practice
- 2.5 Eat after practice for better recovery
- 2.6 Travel food/ Fast food

COACH'S TALKING POINTS:

- Take time to eat.
- Don't skip meals.
- Eat great snacks if you miss a meal.
- Build your muscle energy reserves. Use some of the ideas on these handouts.
- Show the handouts to your parents so they grocery shop for the food you need for energy. Hang them on the refrigerator door as a reminder.



PART 3: Weight Management Issues

Many athletes competing in sports that require wearing a swimsuit, shorts, singlet or leotard are very concerned about their appearance. When your young athletes look and feel great, then they will go out and perform at their best. Your school and parents want energetic, healthy kids to promote the school spirit. The kids look to their coach to help them compete at their best level. Using the reproducible handouts from this kit will help you teach them how nutrition and sports research can be used to their advantage!

Weight gain

Student athletes may come to you with weight gain requests and an interest in getting muscular. Use the handout **3.1 Weight Gain** for the team members who want to gain weight, increase lean body mass and evaluate her or his protein level.

Athletes can add muscle tissue by putting a demand on muscles and making them work harder. Muscle will grow when it is challenged to lift more weight. Proper strength training and genetic endowment are the primary keys to a muscular look, but nutrition can contribute. Adding lean body mass or fat free mass with little increase in body fat takes planning and calories.^{8,9}

Plan on recommending a balanced diet. Athletes should be encouraged to eat fruits, vegetables, whole grains, meat and drink milk.¹³ Once a well-balanced diet is achieved, the athlete can focus on adding 400 more calories per day from a variety of foods.¹²

Being leaner

High school athletes are interested in achieving a "buff" appearance through trying to increase muscle and reduce body fat. In sports where athletes have to produce a tremendous amount of speed or elevation through the air, keeping their body fat low may be an advantage. Judges and other athletes expect to see bodies that flow through the moves of the sport.

Positive eating and exercise

A task oriented environment works best to encourage positive eating and exercise for the leaner, more muscular look. Here are three examples of **tasks**:

1. fill a water bottle at the start of practice and drink from it throughout practice.
2. come to practice with a high carbohydrate snack or have the money to buy juice and a snack from the vending machine.
3. go to the weight room for resistance training a couple days every week and do aerobic exercise every day.

These tasks are very different from weigh-ins. Daily weigh-ins are **outcome**: what the body weighs at that time. There are many variables affecting an individual's weight on a given day: whether or not a meal was eaten, fluid status, menstrual cycle, or the effect of medicine. An individual athlete may want to weigh him or herself before and after exercise to monitor fluid status and drink 2 cups of water for every pound lost, but a coach should not use the scale to overemphasize weight loss.

Avoiding weigh-ins can help reduce the incidence of disordered eating¹¹.

Unnecessary weigh-ins can keep a growing athlete from eating that high-carbohydrate, nutrient dense snack needed for muscle glycogen. Some athletes expecting to be weighed skip meals and have low energy levels at morning practice and again after school. Low calorie intakes can have far reaching effects. When coaches for one team banned weigh-ins in the gym, the girls started

having normal menstrual function. When a girl's period stops for three months or more, it is not just a body fat issue, it is also an issue of psychological stress, low calorie intake, and low iron intake. In girls track and field, amenorrhea (periods cease), and stress fractures are common. To speed the development of bone density so that it matches muscle mass increase, and so that normal menses occur, encourage athletes to eat.^{11, 14-16}

Eating disorder risk

Sometimes the student athlete who seems most in control of her or his life, who focuses constantly on improving, and who strives for perfection is the person who is most at risk for an eating disorder.

Watch for preoccupation with food, calories and weight through these red flags of eating disorders:²⁸

1. Athletes who never eat because they are too busy, forgot, have too many classes, but say they feel in control when they are empty.
2. Female athletes who stop menstruating.³¹
3. Athletes who lose a large amount of weight in a short period of time.
4. Athletes who avoid food-related activities such as team meals, post-exercise snacks and team banquets. Parents may report their child never eats with the family anymore.
5. Athletes who criticize their own body.
6. Athletes who use diuretics or laxatives.
7. Athletes who make frequent trips to the bathroom after eating.
8. Athletes who withdraw and have low self-esteem.
9. Athletes with declining performance and practice levels.
10. Athletes who limit a whole category of food they will eat.⁴⁷ **For example**, research by Liskov, et. al. concludes that vegetarian diets, a socially acceptable reason for limiting food intake, masked an eating disorder in nine of the 22 eating disordered adults studied. The research method was a survey mailed to 108 graduates of the past 10 classes of the Yale dietetic internships. 79 graduates responded. 22 identified themselves as having an eating disorder. Nine of those with eating disorders were vegetarians. Only 11 of the 57 non-eating disordered responders were vegetarians. The researchers concluded that vegetarianism among dietetic interns may be an indicator of an eating disorder in some instances.¹⁷

Emphasize

Emphasize what really counts for your sport: healthful eating, skill development, practice sessions, training, effort and attitude. Student handout **3.2 Weight Loss** may be given to selected athletes. Good candidates might be those student-athletes who approach you because they want to lose weight. Reproduce handout **3.3 Bare Necessities** on the back of **3.2**. This guide will help insure that students eat a **minimal** amount of food from each of the food groups. Remember, a student might burn 600 calories at one of your practices. This plan is not for weight maintenance; it's for weight loss. The off-season is best for working on weight loss.

Any handouts on sports nutrition will raise the nutrition awareness of student athletes and may lead to questions about weight, body composition and eating habits. The pace of change in sports nutrition may be slow, but it can be rewarding when a student athlete makes the commitment to eat better. He or she may feel better, miss fewer practices and perform better. Athletes performing well serve as role models, influencing other teammates and friends to eat well.

STUDENT HANDOUTS:

3.1 Weight Gain

3.2 Weight Loss

COACH'S TALKING POINTS:

- Talk with an athlete one-to-one when body weight is the subject.
- Copy this section for the school nurse, counselor and parents if you suspect an eating disorder in one of your student-athletes.

PART 4: Supplements, Vitamins and Minerals

Do vitamin and mineral supplements give athletes a competitive edge?

Vitamin and mineral supplements do not improve athletic performance when the diet is adequate. Only through foods can an athlete get the energy nutrients: carbohydrate, protein and fat. The vitamins that help convert food into energy can be obtained in food.

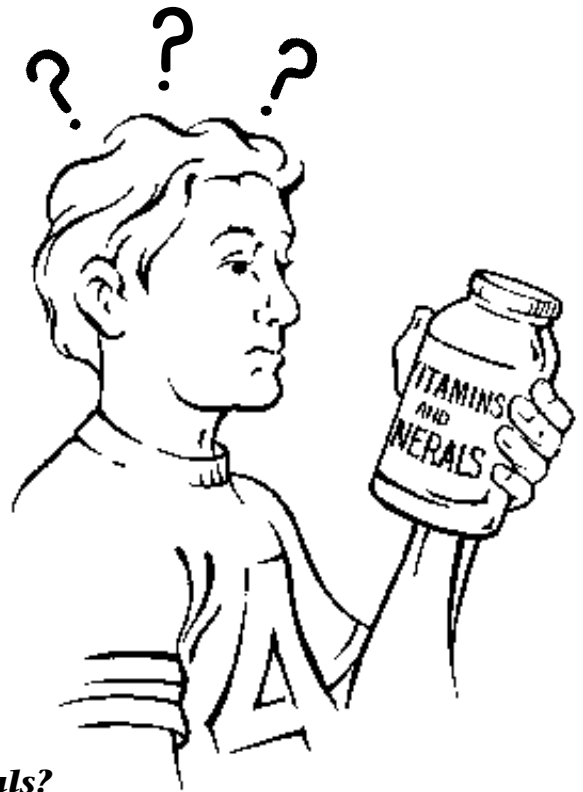
Give the **4.1 Eat Food for Vitamins and Minerals** handout and photocopy **4.2 Vitamins and Mineral Supplements** on the back for all of your athletes.

When is taking a supplement justified?

Vegetarians and athletes on low calorie diets may choose to take a vitamin/ mineral supplement of 100% of the RDA once per day. The only thing the supplement will help is if there is a deficiency of a particular vitamin or mineral.

How do you know what's in a supplement?

FDA has approved rules for "Supplement Facts" labels; they should be appearing on supplements in the near future. Similar to the Nutrition Facts label on foods, the Supplement Facts panel will provide consumers with information on 14 nutrients, when present at significant levels, and other vitamins and dietary ingredients for which no Dietary Reference Intakes have been established, among other information.



Is it effective to take single vitamins or minerals?

If a physician diagnosed a deficiency after seeing the student's lab work or a Registered Dietitian did a nutrition assessment and a specific supplement was advised, follow advice. However, doses of some vitamins just 5 times the RDA can be toxic. Taking a large dose of one vitamin or mineral can interfere with the absorption of other vitamins and minerals.

Three Minerals of particular importance to teens

"Minerals have the potential to influence physical performance. Studies report suboptimal intakes of minerals, particularly among athletes who are actively attempting to lose weight to meet standards for competition." H. Lukaski, Human Nutrition Research Center ¹⁸

- **Calcium**

Calcium is used for muscle contractions, bone formation and for nerve transmission.

The **Calcium** fact sheet will give your student-athletes strategies and guidelines for practical ways to improve their calcium intake and maximize the unique contributions of specific foods.

- **Iron**

Iron is critical to oxygen use. If you coach athletes performing endurance-aerobic work, you want an adequate intake of iron rich food. ¹⁹ Iron deficiency is the most common nutrient deficiency in the USA. **Teens and females are the highest risk group.** ²⁰ Endurance athletes lose iron in sweat, urine, feces and gastrointestinal bleeding.

- **Zinc**

Zinc is important for healing injuries, oxygen activation, growth and electron transport.²¹ Zinc helps immune function and healing after an injury. Insulin needs zinc and every cell uses zinc to help produce CO₂ and dispose of CO₂.

Zinc is part of more than 70 enzymes involved in the metabolism of protein, carbohydrate and fat. Zinc has a role in sexual maturation, appetite and normal taste sensitivity. The best food sources are meat protein because high fiber grains have phytic acid, which binds zinc, making it less available for absorption. Like iron, zinc from animal foods is more bioavailable than from plants. Meat provides about 70% of the zinc consumed in the United States.¹

Eating moderate amounts of lean meat along with healthier food choices in other food groups may be necessary to meet current dietary recommendations¹³ of iron and zinc according to the Bogalusa Heart Study. Vegetarian athletes eliminate the most biologically active and best absorbed form of iron and zinc³³ when they eliminate meat intake.¹³ Plan to give the **Iron** handout to all female athletes and males losing weight or eating little meat. Give the whole team the **Zinc** handout.

Supplements

Ergogenic aids are supposed to improve athletic performance. Some supplements simply don't work. Help your athletes use safe, effective performance enhancers with information from handouts 4.6 and 4.7.

STUDENT HANDOUTS:

- 4.1 Eat Food for Vitamins and Minerals
- 4.2 Vitamin and Mineral Supplements
- 4.3 Calcium
- 4.4 Zinc
- 4.5 Iron
- 4.6 Supplements for Muscle Gain
- 4.7 Creatine, a supplement with mixed results

COACH'S TALKING POINTS:

- **The only time a vitamin/ mineral supplement will help improve athletic performance or endurance is when there is a deficiency of a particular vitamin or mineral.** Look over handout 4.1 and 4.2 early in the season and make improvements in your food choices to boost your vitamin/ mineral intake.
- **Dietary supplement manufacturers do not have to test their products for safety or effectiveness.** Use handouts 4.3 to 4.7 in a packet for each athlete or hand out one topic on supplements per week to give your athletes a truly competitive edge — knowledge!



PART 5: Parents

Schools with a winning tradition often have an edge: parents who contribute! To encourage your parent support group or athletic club to contribute more to team needs, use the ideas from handouts 5.1 and 5.2. The parents of your student-athletes are invaluable to your sports program. Help them work to raise funds, feed the team and sponsor better nourished athletes.

Glossary

amenorrhea	Absence of menstruation for three months, sometimes observed in female athletes who do not eat enough, are under stress or have a low amount of body fat. Amenorrhea is abnormal and has the undesirable consequence of perhaps bone loss and osteoporosis.
amino acids	Protein's nitrogen containing structural components. Recommended amount of dietary protein intake is 15% of calories. Good dietary sources include lean meat (such as sirloin, round steak), eggs, skinless chicken breast, beans (such as soy, garbanzo, red, black, pinto and lentils), nuts, nut butters, seeds and skim milk.
ATP	(Adenosine triphosphate) Biochemical that is a source of energy available for use by the body.
calorie	A measure of heat energy, abbreviated as kcal for kilocalorie.
carbohydrate	Nutrient starches and sugars which are digested and absorbed, becoming glucose for cellular energy or glycogen for muscular energy or glycogen for storage in the liver. Carbohydrate eaten above energy needs will be stored as body fat. Recommended dietary intake is 55 to 60 percent of calories (energy) from carbohydrate. Good dietary sources are skim milk, fruits, vegetables, whole grain breads and cereals, rice and pasta.
creatine	Creatine is a nitrogen-containing, high energy compound eaten when one eats meat or fish. However, we primarily obtain creatine from our body's ability to make it. Creatine acts as a reservoir of energy for muscle contraction, also called phosphocreatine or creatine monophosphate. During physical performance it transfers energy to make ATP.
ergogenic	Work producing, performance enhancing.
fat	A nutrient that the body will burn for energy or store as body fat. Recommended dietary intake is 25 to 30 percent of calories (energy) from fat. Fat promotes the absorption of fat-soluble vitamins. Fat occurs naturally in nuts, nut butters, seeds, meat, cheese and is often added in food processing and with condiments such as mayonnaise, margarine and salad dressings. Fat eaten above energy needs will be stored as body fat.
fuel	Energy from carbohydrate, protein and fat in food.

glycogen	The storage form of carbohydrate to give direct energy to muscles. When one exercises at high intensity, active muscles use stored fuel first (muscle glycogen). When muscle glycogen is low, one must slow down.
legume	A dry or mature bean with a high protein content (around 3 to 4 grams of protein per 1/3 cup legume eaten). Black-eyed peas, chick peas, lima beans, kidney beans, baked beans and chili beans are just a few examples.
minerals	Nutrients critical to growth and development found in food. Examples include calcium, iron, copper and zinc.
nutrient dense food	A food with a low number of calories relative to its rich nutrient contribution. Vegetables, skim milk, fruit and lean meat are often used as examples of nutrient dense foods because of low calories and high amounts of vitamins and minerals.
protein	A nutrient made of amino acids used by the body primarily for structure of body tissues including muscle, and for functions such as enzymes and many hormones. Neurotransmitters and antibodies are proteins. Protein maintains acid-base balance, fluid balance and provides energy. Protein eaten above energy needs will be stored as body fat. Sources of protein include meat, soy, milk, nuts, eggs, grains, legumes and vegetables.
RDA	Recommended Dietary Allowances. ¹ Recommended Dietary Allowances are the levels of intake of essential nutrients that the Food and Nutrition Board (on the basis of scientific knowledge), judge to be adequate to meet the known needs of almost all healthy individuals; RDA's are set high enough to provide a margin of safety.
vegan	A person who eats no animal products. Vegans can have an adequate diet if they take a B12 supplement; drink a fortified soy milk; and eat calcium set tofu (calcium has been added to tofu), Chinese mustard greens, kale or broccoli to help ensure adequate calcium nutrition. They must also eat a variety of seeds, nuts, nut butters, vegetables and legumes every day for adequate protein intake. Like other growing teen athletes, vegan student-athletes should eat many fresh and dried fruits and a variety of foods including whole grains.
vegetarian	A person who limits some animal products in their diet.
vitamins	Nutrients needed in small amounts and supplied by food. For example, whole grains and cereals are rich in B vitamins, milk is rich in riboflavin and vitamin D, and leafy green vegetables are rich in folate. Orange juice, melon, berries and vegetables are rich in vitamin C, while deep orange fruits (apricots, cantaloupe), vegetables (sweet potatoes, carrots), and milk are rich in vitamin A.

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Other Sports Nutrition Resources

<u>Title</u>	<u>Source</u>	<u>Comments</u>
<u>Food Power</u> , a coach's guide to improving performance	National Dairy Council, 1995 Cost: \$14.25 Stock # 0140N Call 800-426-8271	Good handouts for athletes
<u>MVE TV-The Channel for Moderation, Variety and Exercise</u> Grades 7-12	National Cattlemen's Beef Association, 1994 Coaches and PE teachers can get a free copy; send request on school stationary to Iowa Beef Industry Council, PO Box 451, Ames, IA 50010	Video, teacher's guide and handouts. A fun fast way to teach variety in food choices and label reading.
<u>Mirror, Mirror.</u> A Resource Guide for Helping Adolescents Develop a Positive Body Image and Maintain a Healthy Weight. Grades 7-12	National Cattlemen's Beef Association, 1992 Coaches and PE teachers can get a free copy; send request on school stationary to Iowa Beef Industry Council, PO Box 451, Ames, IA 50010	A resource packet for school professionals to use with teens who have concerns about body weight, shape and image. Great section for eating disorder references and referrals.
<u>Nancy Clark's Sports Nutrition Guidebook</u>	ISBN 0-87322-730-1 1997. Cost: about \$15.95	Easy to follow, fun to read, very convincing.
<u>Eating for Endurance</u>	Ellen Coleman, 3rd edition, Bull Publishing, 1997. Cost: \$14.95	Straightforward at the college level. Supplements, sports drinks and sports bars are reviewed.
<u>Nutrition and the Female Athlete</u>	Jamie Ruud, MS, RD ISBN: 0-8493-7917-2, 1996 Cost: \$39.95 800-272-7737	Practical advice. Each chapter is "mini-course." Subjects include: body weight and composition, how to achieve healthy competitive weight, more
<u>The Ultimate Sports Nutrition Handbook</u>	Suzanne Steen and Ellen Coleman ISBN: 0-923521-34-8 Cost: \$14.95 Bull Publishing, 1996	Coaches, parents and high school athletes will love the ease of applying this knowledge to their individual sport. Included you'll find nutrition and eating for short duration events, sports without rest periods and everything in-between.
<u>Sports Nutrition for Vegetarians</u>	Fact sheet by American Dietetic Association's Vegetarian Nutrition practice group Cost: less than \$5	Call 410-366-8343
<u>To find a sports nutritionist</u>	Sports, Cardiovascular and Wellness Nutrition practice group of the ADA	Call 719-475-7751 or E-Mail milfleck@rmi.net



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