

NUTRITIONAL NEEDS OF INDIVIDUALS AND FAMILIES ACROSS THE LIFESPAN

Nutrition Issues and Adolescents

Lesson Grade Levels: 9-12

Concept: Sports Nutrition

Comprehensive Standard: 6.2 Evaluate the nutritional needs of individual and families in relation to health and wellness across the lifespan

Technical Standard: 6.2.1 Analyze the effect of nutrients on health, appearance, job performance, and personal/family life
6.2.2 Examine the relationship of nutrition and wellness to individual and family health throughout the life span

LESSON COMPETENCIES:

- Explore the role of nutrition in athletic performance
- Define carbohydrate-loading
- Assess the role of sports drinks versus water
- Plan nutritionally adequate training diets
- Discuss the effects of performance enhancement supplements

Anticipated Behavioral Outcomes:

- Athletes choose foods from *MyPyramid* in planning pre- and post-competition meals.
- Athletes avoid questionable substances to enhance athletic performance.

Resources Needed:

- Copies of handouts for all students
- Internet access for all students

References for teachers and students **NEW** websites added:

West, D. (2006). *Nutrition and Fitness: Lifestyle Choices for Wellness*. Goodheart-Wilcox Publishing, www.g-w.com or phone at 1-800-323-0440
Chapter 16, *Eating for Sports Performance*, pp. 274-284.

NEW The [President's Council on Physical Fitness](http://www.fitness.gov/fastfacts.htm) has a fact sheet entitled, "Fast Facts About Sports Nutrition", <http://www.fitness.gov/fastfacts.htm>.

Sports & Nutrition - the winning connection, an educational web site at www.urbanext.uiuc.edu/hsnut/index.html **NOTE to TEACHER:** this site has not been updated to address *MyPyramid*.

NEW The *Mayo Clinic* (www.mayoclinic.com) has several articles on sports nutrition; a good reference is "Eating and Exercise: Time to Maximize Your Workout" (http://www.mayoclinic.com/health/exercise/HQ00594_D). There are also articles on carbohydrate loading and the dangers of performance enhancing drugs. See a list of all the articles at <http://www.mayoclinic.com/health/sports-nutrition/SM00107>.

A position paper on “Nutrition and Athletic Performance” (http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_adap1200_ENU_HTML.htm) from the *American Dietetic Association* is available but will be updated later in 2006.

The *University of Arizona* has info on Nutrition, Exercise and Wellness at http://nutrition.arizona.edu/new/coop_extension_pubs.phtml. Look under the topic of “Sports and Nutrition”. Titles of fact sheets include:

- Calorie Needs Estimation
http://nutrition.arizona.edu/new/files/01Calorie_Need_Estimates.pdf
- Protein Needs http://nutrition.arizona.edu/new/files/02Protein_Needs.pdf
- Carbohydrate Needs http://nutrition.arizona.edu/new/files/03Carbohydrate_Needs.pdf
- Serving Sizes - What Do They Look Like?
<http://nutrition.arizona.edu/new/files/11WhatSportFoodSwapServingSizesLookLike.pdf>
- Fluid Tips for Training and Competition <http://cals.arizona.edu/pubs/health/az1387.pdf>
- Food Tips for Training and Competition <http://cals.arizona.edu/pubs/health/az1386.pdf>
- Weight Gain Tips for Athletes
http://nutrition.arizona.edu/new/files/17Weight_Gain_Tips_for_Athletes.pdf
- Weight Loss Tips for Athletes
http://nutrition.arizona.edu/new/files/18Weight_Loss_Tips_for_Athletes.pdf
- How to Evaluate Ergogenic Aid Claims
http://nutrition.arizona.edu/new/files/19How_to_Evaluate_Ergogenic_Aid_Claims.pdf

The *Kids Health/Teen Health* (www.kidshealth.org/) website sponsored by *Nemours Foundation* has several articles on topics of dehydration, the female athlete triad, a guide to eating for sports, as well as other resources appropriate for this topic; it is located at http://kidshealth.org/teen/food_fitness/. Includes information on sports supplements including creatine.

NEW The *Palo Alto Medical Center* has several references on sports nutrition at <http://www.pamf.org/teen/health/nutrition/sportnutrition.html>. Also includes information on supplements.

NEW The *Iowa State University Extension Sport Nutrition* website, “Eat to Compete” (<http://www.extension.iastate.edu/nutrition/sport/>) has been designed to provide up-to-date information on the role of nutrition in physical performance. Many of the recommendations that optimize physical performance for the athlete are appropriate for optimizing overall health as well. The information on this website can be used by the recreational athlete, competitive athlete, coaches, trainers or anyone interested in improving their overall health through nutrition and exercise. The site also includes a “Carb-O-Meter” and an interactive game called “the H2O Race”

NEW – the *Iowa Beef Organization Council* also has a downloadable curriculum on Sports Nutrition available at <http://www.iabeef.org/Content/educators.aspx>

NEW The *USDA* information site has a list of links to reliable sources of information on sports nutrition at <http://www.nal.usda.gov/fnic/etext/000054.html>

Includes links to sites with information on nutrition and physical exercise; also on supplements and interactive calculators.

Background Information:

Athletes have greater need for energy, fluid and some nutrients than nonathletes. The drive for peak performance has led to an emphasis on diet and dietary supplements as one way to improve performance.

The *American Dietetic Association* (www.eatright.org/), *Dietitians of Canada* and the *American College of Sports Medicine* state in their position paper on “Nutrition and Athletic Performance”

(http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_adap1200_ENU_HTML.htm) that physical activity, athletic performance and recovery from exercise are enhanced by optimal nutrition. The following key points summarize the current energy, nutrient and fluid recommendations for active adults and competitive athletes from the position paper:

- During times of high-intensity training, adequate energy needs to be consumed to maintain body weight, maximize the training effects and maintain health. Low-energy intakes can result in loss of muscle mass, menstrual dysfunction, loss or failure to gain bone density and increased risk of fatigue, injury and illness
- Body weight and composition can affect exercise performance but should not be used as the sole criterion for participation in sports; daily weigh-ins are discouraged. Optimal body-fat levels vary depending upon sex, age and heredity of the athlete, as well as the sport itself.

Learning Activities:

Middle School Level/High School Level

- Ask students to list all of the organized sports they are involved with or are aware of. Ask:
 - Do athletes have different nutritional needs than nonathletes? Why or why not?
 - Does the type of sport the athlete is involved in impact nutritional needs?
- Ask students to write out questions they have about nutrition and athletic performance by writing statements on strip of paper. Ask students to place the strips of paper in a basket. Address these questions after the students have completed the scavenger hunt.
- Complete the web-based [Sport Nutrition Scavenger Hunt \(Updated\)](#)
NOTE TO TEACHER: You may want to put this activity on a disk, CD or post on the web for students and create hyperlinks to each of the web pages listed.
- After students have completed the [Sport Nutrition Scavenger Hunt](#), draw out the questions that students had about athletes and nutrition. Ask if they are now able to answer the question and discuss responses. Clarify any misinformation

- Complete the activity, [Jason's Training Menu](#). Students apply knowledge of *MyPyramid* by assisting in meal planning for a student athlete.
- Research a sports related topic to present information to others in an appropriate information format (brochure, display, fact sheet, PowerPoint, news release, etc). Present these topics to the class and/or as part of a "Nutrition and the Athlete Forum" (see Extended Learning Activities). Possible topics include:
 - the benefits of water versus sports drinks
 - the dangers of dehydration and how to prevent it
 - creatine and other supplements
 - energy bars
 - carbohydrate loading
 - the vegetarian athlete
 - ergogenic products

Extended Learning Activities

- **Locker Room "Pop-Ups"** – Create "pop-ups" with nutrition information related to nutrition and the athlete and place on lockers, bulletin boards and walls in the school and visitor's locker rooms.
- **Nutrition and the Athlete Forum** – Host a forum to discuss nutrition and the athlete at the beginning of the school year for all athletes, parents and coaches. Invite health professionals (doctors, registered dietitians, etc.) from the area to address related topics. Create displays, posters and fact sheets to present to those in attendance.

Academic Connections – **NEW**

- ✓ **Mathematics** - Use the following fact sheets to calculate the calorie, protein and carbohydrate needs of athletes:

Calorie Needs Estimation

http://nutrition.arizona.edu/new/files/01Calorie_Need_Estimates.pdf

Protein Needs http://nutrition.arizona.edu/new/files/02Protein_Needs.pdf

Carbohydrate Needs

http://nutrition.arizona.edu/new/files/03Carbohydrate_Needs.pdf

- ✓ **Physical Education/Health** The *New York Times* has an archive of lesson plans with related news articles. Check out this lesson plans for use in this area:

Foul Ball <http://www.nytimes.com/learning/teachers/lessons/20050318friday.html>

Educating Youth on the Dangers of Performance-Enhancing Drugs in Sports

In this lesson, students will consider what they already know about performance-enhancing drugs and examine the ideas at the heart of the congressional hearings regarding Major League Baseball and these drugs. They then create public service announcements warning teens against using these drugs, and write response papers about this topic. (March 18, 2005)



Sports Nutrition Scavenger Hunt

Instructions:

Use the Internet links below to learn more about sports nutrition. Each resource link will be used to answer at least one question. Be sure to write your answers on a separate sheet of paper.

Questions:

1. What are five quick facts important to the nutritional well-being of an athlete?
2. What types of food are the best fuel sources for athletes? They should provide what percentage of an athlete's energy requirements? Why?
3. What are dietary supplements? Why should they be avoided in most cases?
4. What are two supplements that may be needed? Why?
5. Do teen athletes need extra amounts of protein from foods or amino acid supplements? What are some risks associated with getting too much protein?
6. What are 8 signs and symptoms of inadequate hydration?
7. Why is water a better beverage for athletes than coffee, tea or soda pop?
8. Does the time of day impact nutrient and calorie intake? Explain your answer.
9. Identify 4 ways that an improper pre-event/pre-competition meal can impact an athlete?
10. What are the six key components of a good pre-event/pre-game meal?

Resources:

Nutrition for the Athlete www.ext.colostate.edu/pubs/foodnut/09362.html

Eat to Compete: What You Should Know about Dietary Supplements
<http://www.extension.iastate.edu/nutrition/sport/supplements.html>

Eating Before & Between Athletic Events
<http://www.aces.edu/pubs/docs/H/HE-0750/HE-0750.pdf>

Dehydration and Heat Injury
<http://www.rice.edu/~jenky/sports/dehydration.html>

Fast Facts About Sports Nutrition
<http://www.fitness.gov/fastfacts.htm>

Sports and the Winning Connection
<http://www.urbanext.uiuc.edu/hsnut/index.html>

The “BIG” Question

Look over all of the answers to the questions that you answered on this scavenger hunt. Answer the following question: “What are the most important things for teen athletes to consider when thinking about their nutritional needs?”



Sports Nutrition Scavenger Hunt - Answer Key

Note to teacher: The answers are provided to assist you but it is recommended that you familiarize yourself with each of the websites before assigning this activity.

1. What are five quick facts important to the nutritional well-being of an athlete? *Quick Facts...*

- *Athletes achieve peak performance by training and eating a variety of foods.*
- *Athletes gain most from the amount of carbohydrates stored in the body.*
- *Fat also provides body fuel; use of fat as fuel depends on the duration of the exercise and the condition of the athlete.*
- *Exercise may increase the athlete's need for protein.*
- *Water is a critical nutrient for athletes. Dehydration can cause muscle cramping and fatigue.*

From: Nutrition for the Athlete www.ext.colostate.edu/pubs/foodnut/09362.html

2. What types of food are the best fuel sources for athletes? They should provide what percentage of an athlete's energy requirements? Why? *Athletes gain most from the amount of carbohydrates stored in the body. In the early stages of moderate exercise, carbohydrates provide 40 to 50 percent of the energy requirement. Carbohydrates yield more energy per unit of oxygen consumed than fats.*

From: Nutrition for the Athlete www.ext.colostate.edu/pubs/foodnut/09362.html

3. What are dietary supplements? Why should they be avoided in most cases?

Prior to 1994, the term "dietary supplement" referred to products made of one or more of the essential nutrients, such as vitamins, minerals, and protein. Congress passed the Dietary Supplement Health and Education Act (DSHEA) in 1994, which expanded the definition so that dietary supplements now include herbs, or other botanicals (except tobacco), and any dietary substance that can be used to supplement the diet. Why? Because of the lack of regulation with dietary supplements, athletes run the risk of consuming a dietary supplement that is contaminated. Steroid contamination, has been documented. An athlete WILL test positive for drug use if they consume a dietary supplement containing banned substances such as anandrolone & testosterone. Some substances that could be in the supplements are banned by the NCAA ([list of banned drug classes](#)). Consuming them will jeopardize your eligibility.

From: Eat to Compete: What You Should Know about Dietary Supplements
<http://www.extension.iastate.edu/nutrition/sport/supplements.html>

4. What are two supplements that may be needed? Why?

Many contain vitamins and minerals to supplement the amounts of these nutrients we get from the foods we eat.

From: Eat to Compete: What You Should Know about Dietary Supplements
<http://www.extension.iastate.edu/nutrition/sport/supplements.html>

5. Do teen athletes need extra amounts of protein from foods or amino acid supplements? What are some risks associated with getting too much protein?

Exercise may increase an athlete's need for protein, depending on the type and frequency of exercise. Extra protein is stored as fat. In the fully grown athlete, it is training that builds muscle, not protein per se. The ADA reports that a protein intake of 10 to 12 percent of total calories is sufficient. Most authorities recommend that athletes eat 1 to 1.5 grams protein per kg of body weight per day. (A kilogram equals 2.2 pounds.)

Excess protein can deprive the athlete of more efficient fuel and can lead to dehydration. High-protein diets increase the water requirement necessary to eliminate the nitrogen through the urine. Also, an increase in metabolic rate can occur and, therefore, increased oxygen consumption. Protein supplements are unnecessary and not recommended.

From: Nutrition for the Athlete www.ext.colostate.edu/pubs/foodnut/09362.html

6. What are 8 signs and symptoms of inadequate hydration?

- *Cramps- muscle spasms in legs, arms and abdomen*
- *Weakness*
- *Headache*
- *Dizziness*
- *Low blood pressure*
- *Elevated pulse*
- *Temperature elevation*
- *heatstroke*

From: Dehydration and Heat Injury
<http://www.rice.edu/~jenky/sports/dehydration.html>

7. Why is water a better beverage for athletes than coffee, tea or soda pop?

Consumption of carbonated beverages should be minimized in the pre-event time because these types of beverages may result in excessive belching and stomach discomfort before exercise. Beverages containing caffeine such as coffee, tea or colas should be avoided because caffeine has a diuretic action that can increase

urine output and possibly contribute to dehydration.

From: Eating Before & Between Athletic Events

<http://www.aces.edu/pubs/docs/H/HE-0750/HE-0750.pdf>

8. Does the time of day impact nutrient and calorie intake? Explain your answer.

All food should be cleared from the gastrointestinal tract prior to exercise so pre-event meals should be consumed 2-4 hours before exercise so that there is ample time for food to be digested and absorbed. This can actually hurt performance.

If the meal is consumed longer than 4 hours before the event, the athlete may become hungry.

From: Eating Before & Between Athletic Events

<http://www.aces.edu/pubs/docs/H/HE-0750/HE-0750.pdf>

9. Identify 4 ways that an improper pre-event/pre-competition meal can impact an athlete?

Adverse symptoms of an improper pre-event meal include the following:

- *Nausea*
- *Intestinal cramps*
- *Belching*
- *Vomiting*
- *Low blood sugar*
- *Flatulence (gas)*
- *Diarrhea*
- *Dehydration*

From: Eating Before & Between Athletic Events

<http://www.aces.edu/pubs/docs/H/HE-0750/HE-0750.pdf>

10. What are the six key components of a good pre-event/pre-game meal?

- *Consumed 2-4 hours before the event*
- *High in carbohydrate content with small amounts of protein and fat*
- *Foods that are somewhat bland*
- *Low in dietary fiber*
- *Small in size – less than 1,000 calories*
- *Dilute, non-caffeinated drink*

From: Eating Before & Between Athletic Events

<http://www.aces.edu/pubs/docs/H/HE-0750/HE-0750.pdf>

Jason's Training Menu

Name _____

Directions: Read the following scenario and using the resources listed, assist Jason in planning an appropriate training menu by making changes in this meal plan. Underline the item you would change and list an appropriate alternative. Be sure to include your reason for making the change.

Resources: *Your Training Table Guide* at www.urbanext.uiuc.edu/hsnut/hsath3a.html
Foods to Avoid at www.urbanext.uiuc.edu/hsnut/hsath2e.html

Breakfast

Reason for Change

2 Carmel Rolls

1 cup Coffee

3/4 cup Orange Juice

Lunch

1 4-oz. Hamburger on a Whole Wheat Bun

2 cups Lettuce Salad with 3 tbs. Thousand Island Dressing

1/4 Cantaloupe

8-oz. Lowfat Milk

Dinner

6-oz. Fried Chicken

2 cups Rice

1 cup Broccoli

1 Baked Apple

20 oz. Diet Soda

Snacks

Candy Bar

Chocolate Milkshake

Santa Fe Pizza

(A vegetarian recipe from the American Dietetic Association)

- 1 12-inch pre-baked pizza crust
- 2 tablespoons yellow cornmeal
- 2 meat-free, soy-based burgers
- 1/2 teaspoon cumin
- 1/2 cup taco sauce
- 3 tablespoons fresh cilantro
- 1/2 cup canned black beans, rinsed and drained
- 1/4 cup diced green chili peppers
- 6 ounces shredded Mozzarella cheese

Spray pizza pan with nonstick cooking spray, then dust the pan with cornmeal. Fry soy-based burgers in a nonstick skillet over low heat, chopping the burgers into bits with a spatula. Stir in cumin. Spread taco sauce over pizza crust and sprinkle with warm burger and remaining toppings. Bake at 400 degrees F for 15 minutes or until cheese is bubbly and begins to brown. Cut into 8 slices.

Calories per slice:	300
Protein:	15 grams
Fat:	5 grams
Carbohydrate:	47 grams
Sodium:	590 milligrams
Cholesterol:	12 milligrams