

Winning with Nutrition

4-H Sports Nutrition Program



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The University Scholastic League (UIL) offers 23 athletic activities in which more than 1 million student athletes participate. Yet, 16.3 percent of children and adolescents (ages 2 to 19) are obese (Centers for Disease Control and Prevention, 2003-2006).

According to the 2007 Youth Risk Behavior Survey, conducted by the Centers for Disease Control and Prevention, 45.23 percent of young people were trying to lose weight. Almost 12 percent reported that during the 30 days before the survey, they had gone without eating for 24 hours or more to lose weight or to keep from gaining weight. More than 4 percent reported taking laxatives to lose weight or keep from gaining it.

The purpose of the *Winning with Nutrition* program is to engage youth athletes in learning the importance of proper nutrition and hydration for maximum athletic performance and for general health and well-being.

The curriculum contains five lessons for students:

- Eating for Excellence
- Hydration Station
- Game Day Dining
- Performance Robbers
- Fads and Facts

There is also background information for teachers.

The curriculum targets 7th, 8th and 9th graders. It is best presented in a classroom setting, such as Health class. However, it may also be used in Physical Education class.

The development team included the following county Extension agents:

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Susan Ballabina, East Region Program Director – FCS
Courtney Dodd, Extension Program Specialist – 4-H

IMPLEMENTING THIS PROGRAM:

Instructions for County Extension Agents

Meet with teachers to introduce the curriculum and discuss an implementation plan.

Print the curriculum and give one to each teacher in a three-ring binder, along with the evaluation instrument, feedback form, and 4-H group enrollment form.

Train teachers who will be using this curriculum in their classrooms. Explain that when the program has been completed they should:

- Have students complete the evaluation instrument.
- Complete the 4-H group enrollment form.
- Complete a feedback form.

The teacher turns these documents in to the county agent.

Make sure teachers know where to find the curriculum online (<http://agrillifebookstore.org>) so they can print copies of activity sheets and handouts for their students.

Give teachers additional resources to enhance the program. Possibilities include:

- MyPlate graphic—large print-out (www.choosemyplate.gov)
- Faux foods (www.healthedco.com)
- *Nutrient Needs at a Glance* (E-589, <http://agrillifebookstore.org>)
- A Healthy Habit: Reading Food Labels (poster available from www.healthedco.com)
- Avoid Portion Distortion (handout) (<http://food.unl.edu>; search for "portion distortion")
- Food Label Poster (make your own or purchase from www.healthedco.com)
- Clever Catch Ball: Drugs & Alcohol (from Health Edco, www.healthedco.com)
- The Portion Plate with examples (baseball, computer mouse, deck of cards, etc.)
 - Poster available at www.healthedco.com
 - Can create your own with items available in the classroom or at home

Optional supplies to provide to teachers for the lesson activities:

- Straws and balloons
- Rulers

- Pens for students
- Markers and table-top paper pads
- Cups
- Measuring cups/spoons
- Spoon/spatula
- Blender
- Pitcher
- Magazines
- Scissors
- Food labels from various food packages

IMPLEMENTING THIS PROGRAM:

Instructions for Teachers

Meet with your county Extension agent to discuss the curriculum and implementation timeline.

Participate in training to learn more about curriculum content, activities and implementation strategies. Lessons can be scheduled a variety of ways:

- One lesson per day for 1 to 2 weeks
- One lesson per week for 5 weeks
- One lesson every other week for 3 months

Review and prepare for each lesson.

When you have completed the curriculum:

- Have students complete the evaluation instrument. Return them to the county Extension agent.
- Complete a 4-H group enrollment form and a curriculum feedback form and return them to the county Extension agent.

You will find this curriculum online at the Texas AgriLife Extension Bookstore (<http://agrilifebookstore.org>). You may download it and print activity pages and handouts.

A media presentation is also available to support each lesson.

The presentations are available online (<http://texas4-h.tamu.edu/publications/enrichment/>).

WINNING WITH NUTRITION

Key Terms

Activity – The state or quality of being active.

Caffeine – A compound found in coffee, tea, cacao and kola nuts and used medicinally as a stimulant and diuretic.

Calcium – A mineral that is vital in building strong bones and teeth and that plays a role in muscle contraction, blood vessel contraction and expansion, the secretion of hormones and enzymes, and the sending of messages through the nervous system.

Carbohydrate – A macronutrient that supplies energy for the body. Includes sugars, fibers and starches.

Carbohydrate loading – A diet and training program that allows for the maximum storage of glycogen. This is accomplished by consuming carbohydrate foods and reducing exercise in the last 24 hours before an athletic event.

Collagen – The fibrous protein constituent of bone, cartilage, tendon and other connective tissue.

Dehydration – An abnormal depletion of bodily fluids.

Dietary supplement – A product taken by mouth that contains a dietary ingredient intended to supplement the diet.

Diuretic – Substance taken to increase the amount of urine excreted from the body.

Dizziness – Having a sensation of whirling and a tendency to fall.

Endurance sport – Activity lasting more than 1 hour, thus requiring more energy. Examples include cross-country, marathon running, and distance bicycling.

Fad diet – Diets that claim to help you lose a lot of weight in a short time.

Fasting – Going without food and, in some cases, beverages.

Fat – A macronutrient that supplies energy, plays a role in body functions such as transporting other nutrients, and insulates the body's organs.

Fatigue – Tiredness from physical or mental exertion.

Food and Drug Administration – The government agency that ensures that the food we eat is safe and wholesome, that the cosmetics we use will not harm us, and that medicines and medical services are safe and effective.

Fiber – The fibrous tissue that makes up fruits, vegetables and some whole grains.

Glycogen – The form in which sugar (specifically glucose) is stored in the liver and skeletal muscle. This is the body's stored form of carbohydrate.

Healthy – Possessing or enjoying good health (a healthy body) or a sound and vigorous mentality (a healthy mind).

High carbohydrate food – A food that is mainly carbohydrate, such as starches, fruits and other sugars.

Hydration – Supplying with ample amounts of fluid or moisture.

Laxative – Medicine or substance that relieves the symptoms of constipation.

Lipids – Any of a large group of organic compounds that are oily to the touch and insoluble in water. Lipids include fatty acids, oils, waxes, sterols and triglycerides. They are a source of stored energy and are a component of cell membranes.

Macronutrients – Nutrients you need in larger amounts. These include carbohydrates, proteins and fats.

Metabolism – The chemical processes occurring within a living cell or organism that are necessary for the maintenance of life. In metabolism, some substances are broken down to make energy for vital body processes.

Micronutrients – Nutrients you need in smaller amounts. These include vitamins and minerals.

Nutrition – The science of foods and the nutrients and other substances they contain.

Phytochemical – A plant substance considered to have a beneficial effect on human health.

Protein – A macronutrient made up of a combination of amino acids that build, repair and maintain all body tissues.

Replenish – To make full or complete again, as by supplying what is lacking, used up, etc.

Sleep deprivation – Inadequate amount of sleep or a lack of sleep.

Small meal – A small meal or snack made up of high-carbohydrate, moderate-protein, and low-fat foods. The amount depends on what makes the individual feel comfortable.

Sodium – A mineral that helps regulate the movement of body fluids in and out of the body and helps muscles relax. Sodium is found in processed foods, table salt, and foods derived from animal foods.

Thirst – A sensation of dryness in the mouth and throat caused by the need for liquid.

Weakness – The state or quality of being weak; lack of strength, firmness or vigor.

LESSON ONE:

Eating for Excellence

Objectives

1. Students will be able to create a healthy plate of foods and provide examples of each food group.
2. Students will be able to identify the importance and function of carbohydrates, proteins and lipids.
3. Students will be able to calculate the amounts of carbohydrates, protein and lipids needed in a given scenario.
4. Students will be able to identify the main functions of calcium, iron, vitamin C and B vitamins.

Materials needed

MyPlate (print-outs available at www.choosemyplate.gov)

Faux foods

Copies of "Eating for Excellence" (handout)

Supplies for activities

Instruction

MyPlate

Have you ever seen this [hold up a copy of the MyPlate graphic]? MyPlate was designed to remind us to eat healthfully by using a familiar mealtime visual, a place setting. Some of the main MyPlate messages are:

- Enjoy your food, but eat less.
- Avoid oversized portions.
- Make half your plate fruits and vegetables.
- Switch to fat-free or low-fat (1 percent) milk.
- Make at least half your grains whole grains.
- Compare sodium in foods like soup, bread, and frozen meals—and choose foods with lower numbers.
- Drink water instead of sugary drinks.

MyPlate portrays five food groups, each represented by a different color. The plate is divided to show you how much of each food group you should consume at each meal. The ChooseMyPlate website can help you determine your calorie needs based on your age, gender, and activity level.



Orange on MyPlate represents grains. At least half of your grains should be whole grains. Most people consume enough grains, but few are whole grains. Grains are important sources of many nutrients, including dietary fiber, several B vitamins (thiamin, riboflavin, niacin, vitamin B6 and folate) and minerals (iron, magnesium, and selenium). On average, you need about 6 ounces of grains each day, with 3 of those ounces being whole grains. A serving of a grain is 1 ounce. That is about one slice of bread, ½ cup cooked pasta or cereal, or 1 cup of ready-to-eat cereal. Can you name examples of grains?

Green represents vegetables on MyPlate. Always try to fill half of your plate with vegetables and fruit. A minimum of 2 cups of vegetables is needed daily; some people need 2½ to 3 cups every day. Most vegetables are naturally low in fat and calories. None have cholesterol. Vegetables are important sources of many nutrients, including potassium, dietary fiber, folate, vitamin A, vitamin E, and vitamin C. Vegetables may be raw or cooked; fresh, frozen, canned, or dried; whole, cut up, or mashed; or in the form of vegetable juice. What are some examples of vegetables?

Red represents fruits on MyPlate. Remember: Half of your plate should be fruits and vegetables. Each day, you should be getting 1½ to 2 cups of fruit. Fruits are low in fat, sodium, and calories and have no cholesterol. They also are important sources of nutrients such as potassium, dietary fiber, vitamin C, and folate. Name some examples of fruits.

Blue is dairy. Try to pair each meal with a cup of fat-free or low-fat (1 percent) milk. One cup (8 ounces) of milk or yogurt, or 1 ounce of cheese counts as a serving of dairy, and you need at least three servings per day. The most important nutrient in dairy foods is calcium, which helps build bones and teeth and maintain bone mass. Maintaining bone mass reduces the risk of osteoporosis (porous, brittle bones). Can you all name some examples of dairy products? If you don't like milk or are lactose intolerant, what can you eat or drink that has calcium in it? (Examples include soy milk or fat-free or low-fat yogurt).

Purple represents protein on MyPlate. Examples of protein sources include lean beef and pork, poultry, dry beans, tofu, eggs, nuts, and seeds. Twice a week, make seafood the protein on your plate. Besides protein, other nutrients provided include B vitamins (niacin, thiamin, riboflavin, B6, and folate), vitamin E, iron, zinc, and magnesium. You need about 5 ounces of protein every day. One ounce of a protein is 1 ounce of meat, poultry, or fish; ¼ cup cooked beans; one egg; 1 tablespoon peanut butter; or ½ ounce of nuts or seeds.

Oils are not represented on MyPlate because they are not a food group. However, they can provide nutrients that people need. Oils are fats that are liquid at room temperature, like the vegetable oils used in cooking. Oils come from many different plants and from fish. Solid fats are fats that are solid at room temperature, like butter and shortening. Eat oils sparingly—just a little with each meal and throughout the day.

Macronutrients

Macronutrients are the nutrients we need in larger amounts. These include carbohydrates, protein, fats and water. Water will be explained on another day, so this lesson focuses on carbohydrates, proteins and fats. Your body needs a balance of each nutrient to run at its best.

Carbohydrates include things like sugars, fibers and starches. These substances get broken down into simple sugars that supply your muscles, brain and organs with the energy they need to be active. In fact, your brain works only on carbohydrates. This is why breakfast is so important, so that your brain gets the quick start it needs to allow you to think and to move all day long. Carbohydrates are found mainly in grains, fruits and dairy foods. About 50 to 60 percent of the calories you eat should come from carbohydrates. So, if you eat 2,000 calories a day, you need 1,000 to 1,200 calories from carbohydrates.

The next macronutrient is protein. Protein has amino acids, which are the building blocks of your body. They help you build, maintain and restore muscles and tissues. When you grow or when your body is healing from a wound, it uses protein to rebuild itself. Every cell in your body needs protein to be useful and to do its job. When you're active, you need even more protein because your muscles need to be repaired. Protein is found in meats and beans, dairy foods, and a little in vegetables. About 12 to 15 percent of your calories should come from protein. So, if you eat 2,000 calories a day, you need 200 to 300 calories from protein. But again, remember that everyone is different. At times protein needs will be higher, especially if you are training hard or going through a growth spurt.

The third macronutrient is fat. Fat insulates your organs and provides fuel for endurance. Women tend to store more fat than men do, but everyone needs fat. Even your brain is insulated in fat, and when you don't get enough it can affect your thinking and performance. No-fat foods are not always best. We all need some fat in our diet. About 25 to 30 percent of calories should come from fat. If you eat 2,000 calories, 500 to 600 calories should come from fat.

Micronutrients

You learned that macronutrients are the nutrients you need in larger amounts. The nutrients you need in smaller amounts are called micronutrients. These are the vitamins and minerals. All vitamins are important, but for people your age who are active, some are especially important. These include calcium, iron, vitamin C and the B vitamins.

What foods contain calcium? (*dairy products*) What does calcium do? (*builds strong bones and teeth*) Active people put more strain on their bones than those who aren't active, so it's especially important for athletes to get enough calcium.

Iron is a mineral. It helps your body transport oxygen, which is especially important when you're active. When there's not enough oxygen in your blood, your muscles and brain cannot function well.

Does anyone know what kinds of foods contain iron? (*meats, leafy green vegetables, fortified grains*)

Vitamin C helps you heal faster. It's also an antioxidant, which helps combat the stress active people put on their bodies. Does anyone know what foods have vitamin C? (*citrus, strawberries, leafy greens, tomatoes*)

B vitamins help the body turn food into energy. The B vitamins include thiamin, niacin, riboflavin, vitamin B₆, and folate. If you don't get enough B vitamins, you might not have enough energy to do the activities you want. Does anyone know what foods contain B vitamins? (*whole grains, fortified grains, eggs*)

Activity #1

Use these calculation scenarios as class exercises or as a handout.

Question: Phillip is a freshman trying out for the football team. He wants to be sure to eat enough protein so that he builds enough muscle to be a linebacker. He needs 3,000 calories a day, with 15 percent protein. How many calories of protein does he need every day?

Answer: 450 calories

Question: Victoria is on the cross-country team. She runs 25 miles a week and needs lots of carbohydrates to maintain her energy. She needs 2,400 calories, with 60 percent of them from carbohydrates. How many calories from carbohydrates does Victoria need?

Answer: 1,440 calories

Question: Ariel is on the swim team. She competes in the 1 mile event. She eats about 2,200 calories a day and needs to get about 25 percent of her calories from fat. How many calories from fat does Ariel need?

Answer: 550 calories

Activity #2

Create a Healthy Plate

Supplies:

- Printout/poster of MyPlate graphic
- Flying discs, such as Frisbees (1 per person)
- Permanent marker (1 per person)

Instructions:

1. Give each student a flying disc and marker.
2. Have each student draw the borders for each food group (as seen on MyPlate).

3. Have the students label each section with the appropriate food group and draw an example of a food that would belong in that group.
4. Repeat this for each food group until the students have created healthy plates on their discs.
5. Variation: Instead of having the students draw pictures of food, provide a variety of laminated food pictures for the students to tape to their discs in the food groups to which they belong.
6. Once all the students have created healthy plates on their discs, divide them into groups of five or six students. Using one disc, have them take turns tossing the disc to a member of the group. Have the students identify the food group that their hand touched when catching the disc. Then, have the student name a food item that belongs in that food group. Repeat as time allows.

Activity #3 (optional)

How much do I need?

Each person has individual caloric and nutrient needs based upon age, gender, and activity level. This activity will help each student explore their individual needs.

Supplies: Computer with Internet access

Instructions:

1. Have the students access www.choosemyplate.gov.
2. Click on the “food groups” link.
3. Have them explore each food group and determine how much of each food group that they need each day. For example, after clicking on the grains group, there are links on the right-hand side of the screen. Click on “how much is needed?” to access a chart.

Optional activity

Purple Cow Smoothies

Ingredients:

- 1 banana
- 1 cup fat-free or low-fat milk
- 1 cup calcium-fortified 100% orange juice
- ½ cup frozen blueberries
- ¼ cup wheat germ

Additional supplies:

- Blender
- Measuring cups
- Spoon/spatula
- Cups
- Straws (optional)

Directions:

Wash hands and clean the preparation area. Wash and pat dry the banana, then peel and slice it. Place all ingredients in the blender and blend on high speed until smooth. Serve immediately or refrigerate until ready to serve.

Conclusion

Remember that the foods you put in your body affect your athletic performance. “Junk in” equals low performance.

Maintain a healthy lifestyle by:

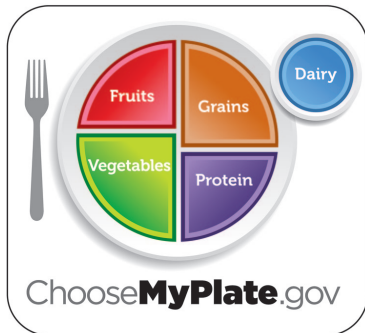
- Building a healthy plate
- Cutting back on foods high in solid fats, added sugars, and salt
- Eating the right amount of calories for you
- Being physically active your way

Resources

W.D. McArdle, F.I. Katch and V.L. Katch. 2008. *Sports & Exercise Nutrition*, 3rd edition. Wolters, Kluwer, Lippincott, Williams & Wilkins. ISBN: 0-7817-7037-8.

MyPlate: www.choosemyplate.gov

Eating For Excellence



MyPlate can help consumers make better food choices by using a familiar mealtime visual, a place setting. Visit www.choosemyplate.gov to learn more.

- Athletes need extra nutrients to maintain performance and endurance.
- Macronutrients are the nutrients you need in large amounts. They include carbohydrates, proteins and fats.
- Carbohydrates give your muscles, brain, and organs the energy they need to be active.
- Protein is the building block of your body. It helps you build, maintain and restore muscles and tissues.
- Fat insulates your organs and provides fuel for endurance.
- Micronutrients are the nutrients you need in smaller amounts. They include vitamins and minerals.
- Some of the most important vitamins and minerals are calcium, iron, vitamin C and the B vitamins.

LESSON TWO:

Hydration Station

Objectives

1. Students will be able to determine whether they are adequately hydrated.
2. Students will be able to explain why water is important to the body and its functions.
3. Students will be able to describe when it is preferable to drink water rather than a sports drink.

Materials needed

Ingredients for sports drink in Activity #1

Copies of word find activity sheets

Assorted prizes for game winners

Supplies for Activity #2 (optional)

Getting started

This lesson can be started with a lecture or with the word find activity. Pass out copies of the word find activity sheet and let the students complete them. If desired, give prizes to those who finish first, second and third. Prizes appropriate for this lesson include water bottles, cups, or allowing the winning students to make the homemade sports drink for the rest of the class. After the students have completed the activity, discuss the terms used in the word find (with the help of the glossary) and their relationship to proper hydration.

Instruction

Hydration before, during and after competition

Fluid intake is vital before and during physical activity. When your body is properly hydrated, nutrients are transported easily and you maintain a healthy body temperature. In addition, fluids protect the body's organs and tissues during physical activity.

When you don't drink enough fluids your body becomes dehydrated. We all know that during physical activity fluids are lost through the skin as sweat. Did you know that you also lose water through your lungs when you breathe and through your urine? Without the proper amount of fluids, the body will not work to its full potential. For athletes, this means their performance will not be at its peak.



Replacing fluids to stay hydrated is important no matter what type of physical activity you do. Before you begin your activity, start drinking water. Keep drinking during your activity to ensure that you stay at your peak performance. Do not wait until you feel thirsty to drink; thirst is one of the first signs of dehydration!

There are several factors that affect fluid loss:

1. High altitudes increase fluid loss.
2. High temperature can increase fluid loss.
3. Some athletes sweat more than others; sweating increases fluid loss.
4. Longer periods of exercise and your level of endurance can affect fluid loss.

Schedule your water breaks

When you're doing rigorous physical activity, schedule your water breaks. Of course you may not always be able to stop during a game or practice for water, but you should try to stick to this schedule as much as possible. And don't forget to begin hydration several hours before an event.

When	How much to drink
Weigh yourself before physical activity	
2 hours before physical activity	2 cups of water
15 minutes before physical activity	1 to 2 cups of fluid
Every 15 minutes during activity	½ to 1 cup of fluid
Weigh yourself again after the activity	3 cups of fluid for each pound of body weight lost

On warm, humid days, sweat does not evaporate quickly, so you may need to drink more!

Signs of dehydration

The easiest way to know whether or not you are dehydrated is to check the color, volume and odor of your urine. If you have a small volume of urine that is dark and has a strong odor, it is a sign that you are dehydrated. In this case, drink water until the urine volume is normal and it is a pale yellow color with no odor. The color of your urine when you are well hydrated is like the color of light lemonade. When you are dehydrated, urine color compares to apple juice.

Here are some other signs of dehydration:

- Thirst, dry mouth, flushed skin
- Fatigue
- Headache

- Dizziness, weakness
- High body temperature
- Increased breathing rate, rapid pulse
- Skin that stays in a pinched position

If you have any of these symptoms, replace lost fluids immediately. If your symptoms persist or worsen, see your doctor.

Sports drinks vs. water

Nutrition experts seem to agree that water is the best thing to drink for physical activity lasting less than 60 minutes. For activities lasting longer than 60 minutes, sports drinks may be beneficial. Sports drinks provide carbohydrates, or fuel, for muscles, and the sodium and glucose in sports drinks can help the body absorb fluids. If your physical activity lasts longer than 60 minutes, sports drinks may enhance your athletic performance.

Although research suggests that people may drink more (and stay better hydrated) when they have flavored beverages, don't forget that some sports drinks tend to have lots of calories. If weight management is one of your goals, try diluting your sports drink with water. It will still be flavorful, but you will be adding more water to your body and decreasing the number of calories you consume.

The right balance

When comparing sports drinks, experts recommend that you consider the following:

1. **The right amount of carbohydrates.** Look for a range of 4 to 8 percent. Sports drinks containing more than 8 percent carbohydrates will not be absorbed as quickly and could upset your stomach. To determine the percent of carbohydrates in a drink, use the formula below.

$$\frac{\text{\# grams of carbohydrates}}{\text{\# of milliliters}} \times 100 = \% \text{ carbohydrates}$$

Note: 1 cup = 240 milliliters, ½ cup = 120 milliliters

Example: 1 cup of soda (not diet) has 27 grams of carbohydrates

$$\frac{27 \text{ grams}}{240 \text{ milliliters}} \times 100 = 11.25 \% \text{ carbohydrates}$$

Because of its high carbohydrate content, soda would not make a good sports drink.

2. **The right type of carbohydrate.** High levels of fructose can upset the stomach, so look for beverages that contain more sucrose and glucose and less fructose. This information will be printed on the Nutrition Facts panel on the food label.

3. **No carbonation and no caffeine.** Carbonated beverages, like soda, can upset the stomach.
4. **Lightly sweetened, lightly flavored.** Sports drinks contain sodium to make them taste better. Unless you are active for a very long time, extra sodium is not necessary for good hydration.

Facts about energy drinks

Energy drinks are becoming very popular, especially among young people. Most young people turn to energy drinks when they aren't getting enough sleep. When you're tired from being up late studying or when you've been out too late with friends, you might think an energy drink would be a quick fix. An athlete might have an energy drink to get an instant burst of energy and a competitive edge.

But remember that energy drinks usually have double or triple the amount of caffeine in carbonated soda. Although caffeine affects everyone differently, it usually boosts heart rate and blood pressure, it may cause an upset stomach, and it may prevent sleep. We really don't know how caffeine affects teen athletes. Few published studies are available. So use energy drinks cautiously and don't let them replace more nutritious beverages.

Activity #1

Make your own sports drink

We all know that sports drinks are not cheap! Some can cost more than 28¢ per 8 ounces. That adds up quickly! As mentioned earlier, sports drinks are also loaded with calories. In this activity, you will make your own sports drink that is low in calories and costs very little.

Supplies:

- 1 cup of sugar
- 1 teaspoon salt
- 1 cup boiling water
- 1 cup orange juice
- 15 cups cold water

Instructions:

Put the sugar, salt and boiling water in a plastic pitcher and stir until the sugar is dissolved. Add the juice and cold water and stir. Chill. Makes 1 gallon. Each 8-ounce glass contains 12 grams of carbohydrate (5 percent glucose) and about 55 calories and costs about 7¢ to make using store-brand products.

As the students are enjoying their sports drink, have them name it and design a label for it. The label should include the nutrition information. Have the students use the formula to calculate the percentage of carbohydrate.

Other sports drink recipes to try:

Alternate Recipe 1

Mix together:

- ½ cup honey
- ½ teaspoon light salt
- ¼ cup lemon juice
- 2 liters water

Alternate Recipe 2

Mix together:

- 10 tablespoons sugar
- ¾ teaspoon light salt
- 1 pkg. unsweetened powdered drink mix
- 2 liters water

Supplemental activities

1. Ask a local company or organization to donate water bottles for the students. Have students attach the labels they design to the bottles.
2. Purchase a few different sports drinks and fruit juices. Have students compare the amounts of fructose and glucose they contain.
3. Purchase four different beverages (water, juice drink, soda, energy drink, etc.) and have students decide which would be best for a sports drink, giving their reasons.

Activity #2

How much sugar is in my drink?

Supplies:

- Sugar
- Measuring spoons (teaspoons, at least three)
- Colored paper or colored plates (paper or plastic)
- Sturdy paper for table tents
- 1 12-ounce Coke®
- 1 20-ounce Gatorade®
- 1 12-ounce Red Bull®
- 1 16-ounce Borden® whole chocolate milk
- 1 16-ounce Minute Maid® orange juice
- Optional: Purchase the poster “Rethink Your Drink” from Health Edco. Cut out the pictures of the drinks.
- Table

Instructions:

Make table tents; put the name of a drink or a picture of the drink on one side and the number of teaspoons of sugar it contains on the other side. Place the table tents on a table, with the names or pictures facing away from students so they can't see them. Place the colored paper or plates in front of the table tents. Have students measure the amount of sugar indicated on each table tent onto the paper or plate in front of it. Show students the various types of beverages and ask them to work as a group to place each drink in front of the plate where they think it belongs. Then turn the table tents to reveal the names of the drinks. Compare the students' choices with the actual amount of sugar in each drink.

MEASUREMENTS

12-oz Coke® = 9 ½ teaspoons

20-oz Gatorade® = 8 ½ teaspoons

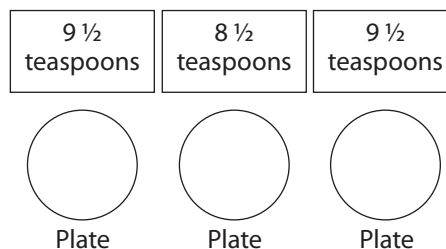
12-oz Red Bull® = 9 ½ teaspoons

16-oz Borden® whole chocolate milk = 12 teaspoons

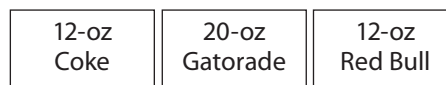
16-oz Minute Maid® orange juice = 12 teaspoons

EXAMPLE

Step 1:



Step 2:



Resources

“Energy and Sports Drinks: Help or Hype.” *HealthHints Newsletter*, February/March 2006 (fcs.tamu.edu/health/healthhints)

Nutri-Facts, Issue 6, Revised November 2004
fcs.tamu.edu/food_and_nutrition/nutrifacts/

Preventing Dehydration: Sports Drinks or Water, Bob Murray, June 2008
<http://www.gssiweb.com/> (Search by author or title)

Brown University Health Education, December 2008
http://www.brown.edu/Student_Services/Health_Services/Health_Education (Search for energy drinks)

Name _____

Date _____

Hydration Station Word Find

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A	A	G	A	N	D	E	S	Y	D	P	D	L	D	I	Y	A	D	S	S	E	H	S	E	E

CAFFEINE
DEHYDRATION
HYDRATED
PROTEIN

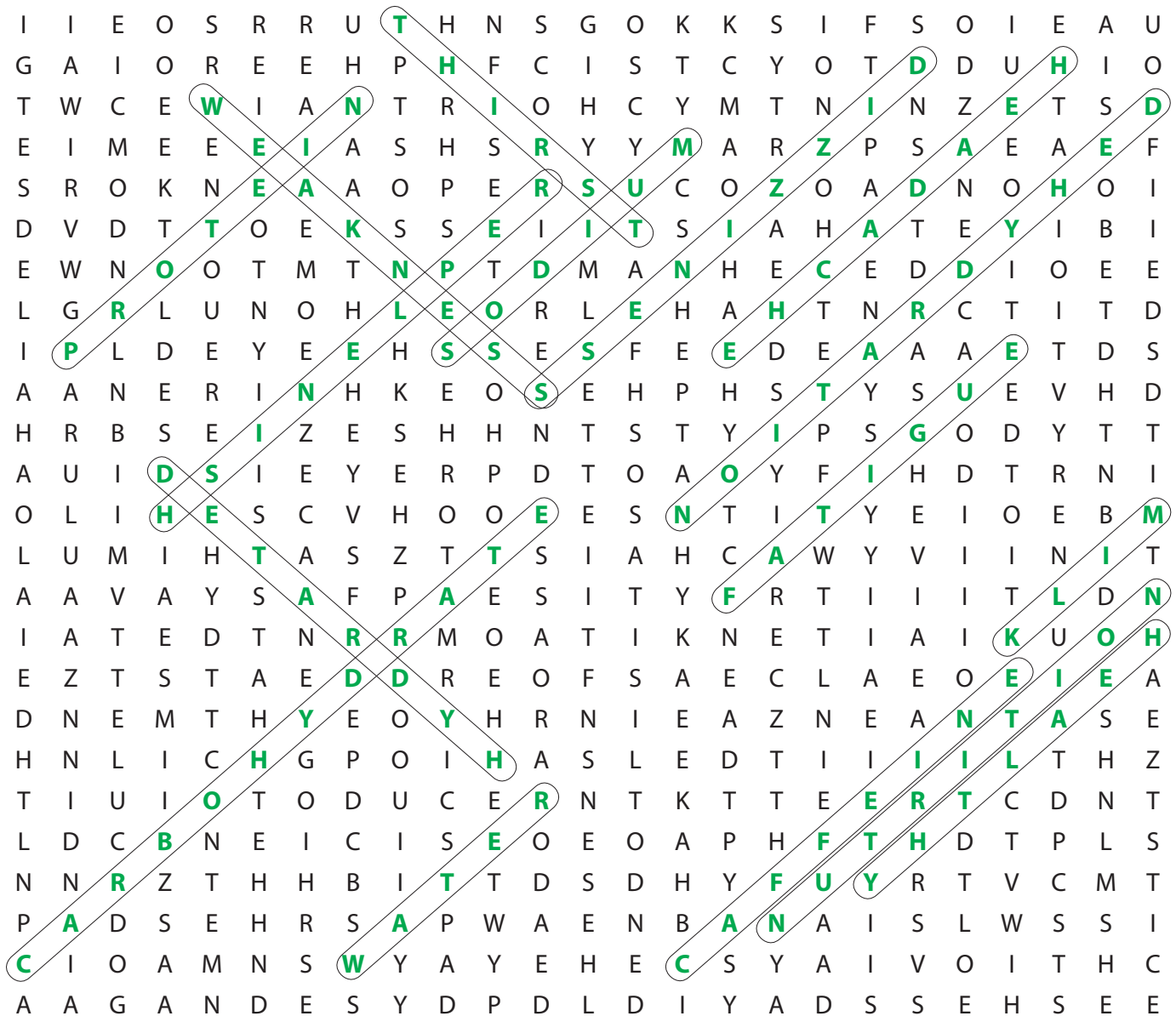
FATIGUE
HEADACHE
THIRST
REPLENISH

MILK
WEAKNESS
CARBOHYDRATE
NUTRITION

WATER
DIZZINESS
SODIUM
HEALTHY



Hydration Station Word Find Solution



Hydration Station...Keys to Keeping Athletes Hydrated

Hydration is a key factor in a solid athletic performance. To ensure proper hydration, you need to drink fluids before, during and after a game or workout. Don't rely on thirst to tell you it is time to drink more; keep to a hydration schedule!

2 hours before a workout	Weigh yourself. Drink 2 cups of water
15 minutes before workout	Drink 1 to 2 cups of fluid.
During the workout	Try to drink ½ to 1 cup of fluid every 15 minutes.
After the workout	Weigh yourself. For every pound lost, drink 3 cups of fluid.

Note: 1 cup = 8 ounces

Make sure you are adequately hydrated with normal or above normal urine production and light yellow urine.

Water vs. Sports Drinks

Water is a great source of fluid when exercising for less than 60 minutes, but for activities lasting more than an hour a sports drink might be a better choice. Sports drinks provide fuel for muscles and the sodium and glucose in the beverage can help the body absorb the fluids.



When choosing a sports drink, look for:

- 12 to 15 grams of carbohydrates per 8-ounce serving
- Sucrose and glucose as the carbohydrate source (fructose may cause stomach upset)
- No carbonation, no caffeine, and no alcohol
- Lightly sweetened, light flavor

Make Your Own Sports Drink

- 4 tablespoons sugar
- ¼ teaspoon salt
- ¼ cup boiling water
- ¼ cup orange juice OR 2 tablespoons lemon juice
- 3 ¾ cups cold water

Put the sugar, salt and boiling water in a plastic pitcher. Stir until the sugar is dissolved. Add the juice and cold water, then chill in the refrigerator. Makes 1 quart. Each 8-ounce glass of this sports drink contains 12 grams of carbohydrate (5 percent glucose) and 55 calories and costs about 7¢ to make.

Energy Drinks Ups and Downs

Energy drinks may sound like a good way for a sluggish athlete to perk up, but be careful! Energy drinks are often full of sugar, caffeine and other ingredients. Most energy drinks have double or triple the amount of caffeine in a soda. Caffeine can boost heart rate and blood pressure and prevent sleep. To make sure you are alert and ready for a game, get plenty of sleep, eat a proper diet, drink plenty of water or sports beverages, and skip the energy drink!

LESSON THREE:

Game Day Dining

Objectives

1. Students will be able to review and prepare sample menus.
2. Students will be able to identify appropriate nutrient-dense snack choices.
3. Students will be able to make appropriate fast food selections.
4. Students will be able to create a schedule for game day dining.

Materials needed

Giant Food Label Poster (make your own or purchase from www.healthedco.com)

Food labels from various products (Nutrition Facts panels)

Copies of “Timing Meals for Events” (handout)

Copies of activity worksheets and handouts

Game day dining Jeopardy media presentation

Getting started

1. Name the nutrient groups that provide calories in our diet.
2. What is the recommended intake from each of these nutrient groups?
3. Name the food groups as referenced in MyPlate.
4. Name some of the foods found in each group.

Instruction

What you eat affects the way you perform. The day of the event is important, but meal planning should begin several days before the event.

Carbohydrate loading, or glycogen loading, is a diet and training program that helps the endurance athlete maximize his or her stores of glycogen. Glycogen is the form in which sugar (specifically glucose) is stored in the liver and skeletal muscles. Muscle glycogen is the body’s main energy source during moderate to strenuous exercise. Carbohydrate or glycogen loading involves increasing your carbohydrate consumption (foods containing glucose) and decreasing exercise before an endurance event. Events for most high school athletes are not long enough to use up the normal levels of muscle



glycogen; therefore, full-blown carbohydrate loading is not generally recommended for high school athletes. However, young athletes can make sure they have adequate stores of glycogen by eating more carbohydrate foods and reducing exercise during the last 24 to 48 hours before an event. Remember, food groups with larger amounts of carbohydrate include grains, milk and fruit.

You can't make up for a poor diet on the day of the event. Good nutrition every day is the key to being the best you can be. The *choosemyplate.gov* website can help you determine your calorie needs based on age, gender and activity level.

Before competition

Pre-event eating does not provide immediate energy, but it can provide the energy for exercises that last an hour or more. You want to finish eating 1 to 4 hours before a competition so you are not too full. If you have an early-morning competition, eat a high-carbohydrate dinner and bedtime snack the night before; then eat a high-carbohydrate snack 1 to 2 hours before the event in the morning.

If the event is later in the day, eat 700 to 800 calories 4 hours before the event (foods that are high-carbohydrate, moderate-protein) and 300 to 400 calories 1 hour before the event (foods that are high-carbohydrate, low-fat, low-fiber). Don't eat high-fat foods because they can slow down digestion and may stay in your stomach longer. Skip foods that cause gas, such as beans, cabbage, onions and cauliflower, and high-fiber foods such as raw fruits and vegetables with seeds and tough skins.

Be fully hydrated by drinking at least 2 cups of fluid 1 to 2 hours before the event and another 1 to 2 cups of fluid 15 minutes before the event.

During competition

Whether or not you eat during competition depends on your sport. During competition, the main goal is to drink $\frac{1}{2}$ to 1 cup of fluids every 15 minutes to avoid becoming dehydrated. For endurance sports lasting 60 minutes or more, you may want to drink a lightly sweetened carbohydrate drink (sports drink) or eat a high-carbohydrate snack to help maintain blood sugar levels. This would be about 0.5 gram carbohydrate per pound of body weight per hour.

During day-long events, snack on high-carbohydrate, low-fat foods. Good choices include crackers, bagels, rice cakes, orange slices, apples, bananas and fruit bars. Bring snacks with you, as these types of foods probably will not be available at a concession stand.

After competition

Make fluids your top priority. The amount to drink depends on how much weight you lost during the event. To figure this, simply weigh yourself before and after the event. For every pound you lost, drink 3 cups of fluid.

Replenish your energy supply with a high-carbohydrate meal or snack within 30 minutes after competition. You can also include some low-fat protein with the meal or snack, particularly for strength training. Athletes need nourishment after completing a workout. If your sport has practices twice a day, it's important to eat within 30 minutes after each practice.

Activity #1

Calculating grams of carbohydrate, protein and fat

Review sample calculations on the Macronutrient Goals worksheet and then calculate the recommended grams of carbohydrate, protein and fat for a 2,500- and 3,000-calorie diet.

Activity #2

Game day meals

Review the sample meal plans on the Game Day Dining worksheet and create a game day meal using nutrition labels. Have a variety of labels available, including those from sports drinks and nutrition bars.

Activity #3

Fast food

Because fast food menus offer far more options than they used to, fast food meals can be healthful if you make the right choices. Fast food guideline: Order more fruits and vegetables, foods with calcium, and foods with less fat and sugar. Also watch your portions. Complete a game day menu using fast food selections on the Fast Food Menu worksheet. If time permits, use the website www.dietfacts.com to complete this activity, or obtain the menu analyses from local fast food restaurants for the students to evaluate.

Activity #4

Game day dining Jeopardy

Use this game to review and reinforce the game day dining principles. A projector and laptop will be needed. Students can play individually or in teams. If possible, award small prizes such as pedometers.

Available online at: <http://texas4-H.tamu.edu/publications/enrichment/>

Conclusion

It is important for athletes to eat healthful foods and get proper nutrition before a workout or competition. This means eating a diet with adequate carbohydrate, protein and fat. It's also important to drink ample fluids to stay hydrated. Remember, your performance depends on what you eat.

Resources

Duyff, Roberta Larson. 2006. American Dietetic Association: Complete Food and Nutrition Guide, 3rd edition. John Wiley & Sons, Inc. ISBN: 0-470-04115-3

Fast food websites 2009:

- www.mcdonalds.com
- www.subway.com
- www.tacobell.com
- www.whataburger.com

Macronutrient Goals

Carbohydrate – starches, fibers and sugars found in grains, fruits and dairy
50 to 60 percent of daily calories

Protein – found in meat, beans and dairy
12 to 15 percent of daily calories

Fat – found in oil, margarine and nuts
25 to 30 percent of daily calories

Example 2,000-calorie diet

Carbohydrate

Calories	X	50-60%	=	Total carbohydrate calories	÷	4 calories per gram	=	Total grams carbohydrate per day
2,000	X	50-60%	=	1,000-1,200	÷	4 calories per gram	=	250-300 grams per day

Protein

Calories	X	12-15%	=	Total protein calories	÷	4 calories per gram	=	Total grams protein per day
2,000	X	12-15%	=	240-300	÷	4 calories per gram	=	60-75 grams per day

Fat

Calories	X	25-30%	=	Total fat calories	÷	9 calories per gram	=	Total grams fat per day
2,000	X	25-30%	=	500-600	÷	9 calories per gram	=	56-67 grams per day

continued

Directions: Using the example for the 2,000-calorie diet, figure carbohydrate, protein and fat goals for the following diets:

2,500 calories per day

Carbohydrate

Calories	X	50-60%	=	Total carbohydrate calories	÷	4 calories per gram	=	Total grams carbohydrate per day
2,500	X	50-60%	=		÷	4 calories per gram	=	

Protein

Calories	X	12-15%	=	Total protein calories	÷	4 calories per gram	=	Total grams protein per day
2,500	X	12-15%	=		÷	4 calories per gram	=	

Fat

Calories	X	25-30%	=	Total fat calories	÷	9 calories per gram	=	Total grams fat per day
2,500	X	25-30%	=		÷	9 calories per gram	=	

3,000-calorie diet

Carbohydrate

Calories	X	50-60%	=	Total carbohydrate calories	÷	4 calories per gram	=	Total grams carbohydrate per day
3,000	X	50-60%	=		÷	4 calories per gram	=	grams per day

Protein

Calories	X	12-15%	=	Total protein calories	÷	4 calories per gram	=	Total grams protein per day
3,000	X	12-15%	=		÷	4 calories per gram	=	grams per day

Fat

Calories	X	25-30%	=	Total fat calories	÷	9 calories per gram	=	Total grams fat per day
3,000	X	25-30%	=		÷	9 calories per gram	=	grams per day

Game Day Dining

Meal 1

- 1 cup cereal
- 1 banana
- 8 oz fat-free milk
- 1 bagel with 1 tbsp jelly
- ¾ cup cranberry juice drink

Calories: 630

Carbohydrate: 136 g

Meal 2

- 2 cups beef noodle soup
- 6 crackers
- 1 medium baked potato
- 1 cup vegetable juice

Calories: 620

Carbohydrate: 116 g

Meal 3

- 2 pancakes with 2 tbsp syrup
- 1 cup fat-free yogurt
- ½ cup strawberries
- 1 cup apple juice

Calories: 625

Carbohydrate: 110 g

Meal plans obtained from: Duyff, Roberta L., *Complete Food and Nutrition Guide*. 3rd Ed., John Wiley & Sons, Inc., Hoboken, New Jersey, 2006.

Directions: Using food labels, create a high-carbohydrate, moderate-protein, low-fat game day meal.

Your meal:

Food choice	Serving size	Calories	Fat (g)	Carbohydrate (g)
Totals:				



Fast Food Menu

Directions: Using the attached fast food menus, create a high-carbohydrate, moderate-protein, low-fat game day meal.

Your meal:

Food choice	Serving size	Calories	Fat (g)	Carbohydrate (g)	Protein (g)
Totals:					

continued

McDonald's					
Menu item	Serving size	Calories	Total fat (g)	Carb (g)	Protein (g)
Big Mac® - 7.5 oz	1 each	540	29	45	25
Premium Grilled Chicken Classic – 8 oz	1 each	420	10	51	32
French fries (small)	1 each	230	11	29	3
French fries (large)	1 each	500	25	63	6
Chicken McNuggets® - 6 pieces	1 each	280	17	16	14
Southwest Salad w/Grilled Chicken	1 each	320	9	30	30
Bacon, Egg, Cheese McGriddles®	1 each	420	19	48	15
Egg McMuffin	1 each	300	12	30	18
Sausage Biscuit with Egg – regular size	1 each	510	33	36	18
Snack size fruit & walnut	1 pkg	210	8	31	4
Fruit & yogurt parfait with granola	1 each	160	2	31	4
1% low-fat milk jug	1 carton	100	2.5	12	8
Orange juice (small)	12 fl oz	140	0	33	2
Hi-C Orange Lavaburst® (child)	12 fl oz	120	0	32	0
Coke® (child)	12 fl oz	110	0	29	0

Subway					
Menu item	Serving size	Calories	Total fat (g)	Carb (g)	Protein (g)
6-inch Turkey Breast & Ham	1 each	290	5	47	19
Foot-long Ham	1 each	570	10	93	35
6-inch Double Bacon & Cheese Omelet Sandwich	1 each	520	25	47	29
Cream of Potato Soup with Bacon	10 oz	240	13	26	5
Oatmeal Raisin Cookie	1 each	200	8	30	3
Yogurt	1 each	80	0	16	5
Coke®	12 oz	110	0	29	0
Fruzile Berrylicious	Small	110	0	28	1

continued

Taco Bell					
Menu item	Serving size	Calories	Total fat (g)	Carb (g)	Protein (g)
7-Layer burrito	1 each	490	18	65	17
Double Decker® Taco	1 each	320	13	38	14
Chicken Fiesta Taco Salad	1 each	800	38	77	37
Bean burrito	1 each	330	7	54	13
Gordita Supreme (beef)	1 each	300	14	30	14
Mexican pizza	1 each	530	30	46	20
Zesty Chicken Border Bowl	1 each	640	35	60	22
Nachos	1 each	330	21	31	4
Cheese quesadilla	1 each	470	26	39	19
Pepsi® (small)	16 oz	200	0	56	0
Strawberry Frutista Freeze®	1 each	230	0	57	0
Diet Pepsi® (small)	16 oz	0	0	0	0

Whataburger					
Menu item	Serving size	Calories	Total fat (g)	Carb (g)	Protein (g)
Chicken strips, 3-piece	1 each	580	37	34	28
French fries (small)	1 each	260	13	31	4
Grilled chicken sandwich	1 each	470	19	49	27
Texas toast (1 slice)	1 slice	150	7	20	3
Whataburger Jr.®	1 each	300	15	28	13
Whataburger®, triple meat	1 each	1120	68	58	61
Biscuit Sandwich w/sausage, egg & cheese	1 each	690	49	33	26
Breakfast on a Bun with bacon	1 each	360	21	25	15
Coke®	small	200	0	56	0
Vanilla shake	small	560	17	87	14

Timing Meals Before Events

8:00 a.m. event such as a road race or swim meet

Meals: The night before, eat a high-carbohydrate dinner and drink extra water. The morning of the event, about 6:00 or 6:30, have a light, 200- to 400-calorie meal (depending on your tolerance). This could be yogurt and a banana or one or two sports bars, plus extra water. Eat familiar foods. If you want a bigger meal, you might want to get up early and eat by 5:00 or 6:00 a.m.

10:00 a.m. event such as a bike race or soccer game

Meals: The night before, eat a high-carbohydrate meal and drink extra water. The morning of the event, eat a familiar breakfast by 7:00 to allow 3 hours for the food to be digested. This meal will prevent the fatigue that results from low blood sugar. If your body cannot handle any breakfast, eat a late snack before going to bed the night before. This will boost liver glycogen stores and prevent low blood sugar the next morning.

2:00 p.m. event such as a football or tennis game

Meals: An afternoon game allows time for you to have either a big, high-carbohydrate breakfast and a light lunch, or a substantial brunch by 10:00, allowing 4 hours for digestion. As always, eat a high-carbohydrate dinner the night before and drink extra fluids the day before and up to noon on the day of the event.

8:00 p.m. event such as a basketball game

Meals: A hefty, high-carbohydrate breakfast and lunch will be thoroughly digested by evening. Eat dinner, as tolerated, by 5:00 p.m. or have a lighter meal between 6:00 and 7:00 p.m. Drink extra fluids all day.

All-day event such as a 100-mile bike ride, triathlon or long, hard hike

Meals: Two days before, cut back on your exercise; the day before, take a rest day to allow your muscles to replace depleted glycogen stores. Eat carbohydrate-rich meals at breakfast, lunch and dinner. Drink extra fluids. The day of the event, eat breakfast depending on your tolerance—whatever you usually have before exercising. Throughout the day, snack at least every 1 ½ to 2 hours on wholesome carbohydrates to maintain normal blood sugar. At lunchtime, eat a high-carbohydrate meal. Drink fluids before you get thirsty; you should need to urinate at least three times throughout the day.

Source: *Special Foods Needs: A reference guide for county agents*, Texas AgriLife Extension Service, page 194.

Game Day Dining

It is important for athletes to eat healthful foods and get proper nutrition for top performance. This means eating a diet with the right amounts of carbohydrate, protein and fat. It's also important to drink ample fluids to maintain hydration throughout an event. Remember that your performance depends on good nutrition.

Before competition

- Choose pre-event meals that are light, easy to digest, and high in carbohydrate.
- Drink plenty of fluids to be fully hydrated.
- Finish eating 1 to 4 hours before competition.
- For early morning competition, eat a high-carbohydrate dinner and bedtime snack the night before and a high-carbohydrate snack 1 to 2 hours before the event in the morning.

During competition

- Drink fluids every 10 to 15 minutes to prevent weight loss and to avoid becoming dehydrated.
- For endurance sports lasting longer than 60 minutes, consider drinking a lightly sweetened carbohydrate drink (sports drink) or high-carbohydrate snack. This will help maintain blood sugar levels.
- During day-long events, snack on high-carbohydrate, low-fat foods like crackers, bagels, rice cakes, orange slices, apples, bananas and fruit bars.

After competition

- Drink lots of fluids.
- Replenish energy supplies with a high-carbohydrate meal or snack within 30 minutes after competition. Include a low-fat protein food with the meal or snack, particularly for strength training.

Visit www.choosemyplate.gov to learn more about individual calorie needs based on age, gender and activity level.

Remember, good nutrition is key to being the best you can be!

LESSON FOUR:

Performance Robbers

Objectives

1. Students will be able to identify the benefits of sleep and its effect on performance.
2. Students will be able to identify the effects of alcohol on athletic performance.
3. Students will be able to identify the effects of smoking on athletic performance.

Materials needed

A straw for every student

A ruler for every group of two to four students

Clever Catch Ball: Drugs & Alcohol (available from www.healthedco.com)

Copies of "Performance Robbers" (handout)

Supplies for Activity #3 (optional)

Getting started (optional)

Use the Clever Catch Ball to generate discussion about drugs and alcohol.

Instruction

Sleep

How many hours of sleep did you get last night? *(wait for answer)* How many do you think you need? *(wait for answer)* You need between 8 ½ and 9 ½ hours of sleep a night. How important to you is sleep? What happens if you don't get enough? *(wait for answer)* What keeps you from getting the sleep you need? *(wait for answer)* When you don't get enough sleep, how does it affect your athletic performance? *(wait for answer)*

During exercise and sports, your body actually breaks down a little and you need enough sleep to recover and rebuild your body. Getting enough sleep can make you a better athlete. Your reaction times will be faster and you'll have more energy and better coordination. In fact, they say reaction times in someone who is sleep deprived are just as bad as in someone who is legally drunk. When you don't get enough sleep, your heart has to work harder and so does your brain. You'll get tired sooner during a workout so you won't be able to perform and practice at the



desired level. Also, workouts may seem harder even though you're doing the same amount of work as before. When your body is worn out, it can't use its stored energy very efficiently. You're essentially running on empty. Because of the lack of sleep, you do not perform to your potential and there is a greater risk of injury or over-training.

Sleep deprivation also snowballs—when you lose sleep, the only way to make it up is to sleep more. So if you wake up 30 minutes earlier than usual for 5 days, that's 2 ½ hours of sleep lost and you'll have to sleep an extra 2 ½ hours another day to make it up. If you have to wake up 30 minutes earlier, how can you be sure to get enough sleep? *(wait for answers)*

Alcohol

Everyone knows that drinking alcohol at your age is illegal. But did you also know what happens when an athlete consumes alcohol?

What do you think would happen if someone who had been drinking tried to work out or compete in an athletic event? *(wait for answer)*

Drinking alcohol leads to slower reaction times just like sleep deprivation. Alcohol decreases your hand-eye coordination and affects your balance. You can't run as fast, you get tired faster, and your heart has to work harder. Alcohol affects everything that makes you a good athlete.

You all know that proper hydration is essential to your performance during any physical activity. Alcohol has properties that contribute to dehydration. What are some signs of dehydration? *(wait for answer: fatigue, headache, muscle cramps, slower thinking, slower reaction times, passing out, heat stroke, not sweating)*

Alcohol is also linked to breathing difficulty, asthma and sleep deprivation. If sleep is your best friend when you're an athlete, then alcohol is not your friend. Alcohol makes it difficult to fall asleep and stay sleep; and it decreases the deep sleep that really helps your body recover from training and exercise.

Using alcohol:

- Decreases overall performance level
- Slows running and cycling times
- Weakens the functioning of the heart
- Decreases grip strength and jump height
- Makes you tired sooner during high-intensity exercise
- Speeds dehydration
- Increases health risks during prolonged exercise in hot weather
- Limits your ability to think and respond quickly
- Robs you of the deep sleep your body needs to recover from exercise

Ask yourself:

- How important is my sport to me?
- How important is drinking or partying to me?
- How important is it that I perform to the best of my ability?
- How will drinking affect my ability to perform?
- How will I benefit from my decision to drink or not to drink?
- Will I violate team, school or state laws and regulations if I choose to drink?
- Will I put myself or others at risk of injury, health problems or legal problems if I drink?

Smoking

How many of you know people your age who smoke? *(wait for answer)* Why do you think people smoke? *(wait for answer)* When you think of older people who smoke, what do you notice about them? *(wait for answer: coughing, yellow teeth, bad smell, difficulty breathing, etc)*. Some of those things happen to younger people, too. Smoking can affect you and your athletic performance immediately.

First of all, the nicotine in cigarettes and other tobacco products is highly addictive. So once you start, it's hard to stop. It is hard for smokers to compete on the same level as non-smokers because their hearts beat faster and have to work harder. Their blood doesn't circulate as well and they have a harder time breathing. Smoking also affects the body's ability to produce collagen, which is in your skin, tendons and ligaments. Collagen helps injuries heal. So young athletes who smoke need more time to heal from injuries and may have to sit out longer than those who don't smoke. Smokers also get colds and flu more often than non-smokers.

As an athlete, you really can't afford to harm your lung capacity, your heart, and your ability to heal. So which would you rather be hooked on? Nicotine or sports?

Activity #1

Ruler reaction time

This activity challenges your reaction time. If you are sleep deprived, your reaction times might be slower.

One student should hold her hand in front of her in a loose fist, as if holding an invisible cup. Another student should hold a ruler above her hand, vertically, with the number 1 closest to the first student's hand. The person holding the ruler should drop the ruler and the first student should try to catch it as quickly as possible. Record the number on the ruler at which the student caught it. The higher the number, the slower the reaction time. Give each student an opportunity to do the activity.

You could record the amounts of sleep students had the night before and their reaction times. See if there is a correlation.

Activity #2

Running with a smoker's lungs

Each student will place a straw in his or her mouth and then run 50 yards and back while breathing through the straw. Afterward, ask them how it felt. Explain that this is what running feels like to a smoker. Have students try it again while holding their noses closed. This demonstrates the extremely reduced breathing capacity of someone who has smoked for awhile.

Warning: Tell students to stop if they begin to feel dizzy or lightheaded during this activity.

Activity #3

What's in the smoke?

Gather the following items: rubber cement, vinegar, nail polish remover, insecticide, cigarette lighter, batteries, lighter fluid, moth balls, candle. Tell the students that there are more than 4,000 chemicals in a single cigarette and the smoke people inhale when smoking. More than 40 of those chemicals are human carcinogens—substances that cause cancer. Read the following list of cigarette ingredients and show the products that contain them.

- Acetic acid – found in vinegar, hair dye and photo developing fluid
- Acetone – main ingredient in paint thinner and nail polish remover
- Benzene – found in rubber cement
- Butane – cigarette lighter fluid
- Cadmium – found in batteries and artists' oil paints
- DDT/Dieldrin – insecticides
- Formaldehyde – used to embalm dead bodies and preserve small animals for biology classes
- Hexamine – in barbecue lighter fluid
- Hydrazine – used in jet and rocket fuels
- Hydrogen cyanide – used as poison in gas chambers
- Lead – a highly poisonous metal that used to be found in some paints
- Napthalenes – used in explosives, mothballs and paint pigments
- Nitrobenzene – a gasoline additive
- Phenol – used in disinfectants and plastics
- Polonium-210 – a highly radioactive element
- Stearic acid – found in candle wax
- Toluene – found in embalmer's glue

Optional activities

“Smoke Screen IQ” and “Tobacco Trivia: Do You Know Your Snuff”

(These activities are part of the curriculum “Yea 4-H! An after-school learning adventure for Grades 6-8,” which is available at <http://agrillifebookstore.org>.)

Show pictures of the effects of using tobacco.

www.faqs.org/health/images/uchr_02_img0171.jpg

http://www.oralcancerfoundation.org/dental/slide_show.htm

Resources

These are available from Health Edco (www.healthedco.com/):

- Mr. Gross Mouth
- Lou-Wheeze™ Smoker’s Lungs Comparison Model
- A Year’s Worth of Tar™ Model
- Tobacco Ingredients Display

“On Ice” and “Alcohol and Marijuana – Gateway Drugs” — Drug abuse lessons located at:

<http://walkacrosstexas.tamu.edu/tools-and-resources/teacher-lesson-plans.php#grade9>

www.uofmchildrenshospital.org (Search for “drug abuse”)

Performance Robbers

The effects of smoking, alcohol and lack of sleep contribute to poor athletic performance.

- Alcohol slows reaction times, decreases coordination, and affects your balance. It is also linked to breathing difficulty, sleep deprivation, slower thinking and fatigue.
- Alcohol contributes to dehydration.
- Smoking makes it hard to compete successfully. Smoking affects the athlete's heart and makes it beat faster.
- Smoking impairs blood circulation and affects the lungs, making it hard to breathe.
- Athletes need about 8 ½ hours of sleep each night. Lack of sleep decreases energy and affects your coordination and reaction times. It can increase your risk of injury.



LESSON FIVE:

Fads and Facts

Objectives

1. Students will be able to recognize fad diets.
2. Students will be able to identify healthful ways to manage weight.
3. Students will be able to identify the risks of using fad diets.
4. Students will be able to identify correct uses for nutritional supplements.

Materials needed

Copies of "Spotting a Fad Diet" activity sheet

Copies of "Fad Diet Evaluator" activity sheet

Variety of magazines

Scissors

Copies of "Nutrition: Fads and Facts" (handout)

Copies of "Build a Healthy Meal" – www.choosemyplate.gov

Getting started

Have students work in pairs to answer the following questions:

1. What are some examples of fad diets?
2. What attracts people to use these diets?
3. What effects do fad diets have on your overall health?
4. Why do people use dietary supplements?

Optional opening activity

Present several of the following claims, asking students to say whether they are fact or fiction. After getting their answers, discuss the claims.

Claim: *Low-carb (high-protein) diets are the most effective way to lose weight.*

Fiction. Although there will be some weight loss, this type of diet appears to have few benefits, and they may not last long. This is not a realistic diet for most people. Any time you eliminate a certain food or food group from your diet, you are eliminating a source of the nutrients you need. The best diet is one that has all food groups and that balances the calories you eat with the calories you burn. If you eliminate certain types of foods you do not have a balance and any effort to lose weight will be sabotaged. You must reduce your calorie intake by 3,500 calories to lose a pound. You can do this by eliminating 500 calories each day, by eating less, and/or by exercising more.



Claim: Eating white foods (or any other color of food) is bad for you.

Fiction. The color of a food has nothing to do with its nutritional value. Some of the most nutritious foods are white—bananas, pears and garlic. Color may indicate the kind of nutrients a food contains. Eliminating white foods would eliminate good sources of fiber for a healthy GI tract, potassium for normal kidney and heart function, and vitamin C for a healthy immune system. Remember, there are no “bad” foods, just bad food choices.

Claim: Eating grapefruit (or putting lime/lemon in your water) will help you burn fat.

Fiction. There is no food that can magically melt fat from your body. However, grapefruit can be part of a well-rounded diet. It is fat free, low in calories and a great source of vitamin C, fiber and folic acid. Folic acid is essential for combating birth defects and keeping the immune system healthy. The same applies to lemons and limes. The citric acids in these fruits will not melt away fat. But if flavoring your water with them causes you to drink more water, they are beneficial.

Claim: Calories eaten after 8:00 p.m. turn to fat.

Fiction. There is no connection between calories and the clock. It is all about the amount of calories consumed versus the amount of calories used. If you eat more calories than your body burns in a day, the excess calories will be stored as fat. Remember, you must reduce your daily calories by 500 to lose 1 pound each week. You can do this by eating fewer calories or by exercising more to burn calories. The opposite effect occurs if you consume 500 additional calories daily without burning them off. You will gain 1 pound over the week. Some people suffer from acid reflux, which can be worse after eating a late meal. If you suffer from this, choose light, low-acid foods for late evening meals and snacks.

Claim: Drinking lots of water will help you lose weight.

Fact and Fiction. Sugar-sweetened teas, juice drinks and regular sodas are full of calories but have no nutritional value. A 12-ounce can of regular soda has about 150 calories. If you drink water instead you will consume fewer calories, which is the key to weight loss. Simply increasing your water intake and not eliminating high-calorie beverages won't cause weight loss, won't boost your metabolism, and won't flush away fat. However, it may make your stomach feel fuller temporarily.

Claim: Exercising on an empty stomach burns more fat.

Fiction. This is the number one way to sabotage your weight loss and muscle-building regime. During exercise, the body uses carbohydrates and fat for energy. The best way to provide fuel for exercise is to eat a snack first. Skipping a pre-workout meal or snack won't help you burn more calories or fat. It will only bring on fatigue more quickly so that you shorten your exercise time and burn fewer calories. Make sure your pre-activity snack has enough

carbohydrates, which provide glucose—the main source of energy for the body. This will help you get the most out of your workout and make it to the end of your training routine.

Claim: *If I quit exercising, my muscles will turn into fat.*

Fiction. Muscle, or lean tissue, does not transform into fat tissue in the absence of exercise. The same is true for fat; it will not turn into muscle with exercise. The two types of tissues are completely different. Muscles are built through repetitious exercise. If you're injured and can't exercise for awhile, your muscles may lose size and tone, but those can be rebuilt. If you eat too many calories while you're not exercising you'll gain body fat. It may seem that fat is replacing muscle, but that is because body fat is increasing while you're losing muscle tone.

Claim: *To bulk up my muscles I should eat only high-protein foods.*

Fiction. Consuming extra dietary protein won't help you build up extra muscle. Muscles are built up through strength and resistance exercises. In fact, eating too much protein and not enough carbohydrate will actually cause you to lose muscle. When you exercise, your muscles need fuel and the best source of fuel for your muscles is carbohydrates. If you're eating mostly protein and little carbohydrate, your body will begin to use protein as its energy source, which means there is less protein available in your body for muscle building. The best diet for athletes contains about 12 to 15 percent protein, with 50 to 60 percent coming from healthful carbohydrates such as brown rice, wheat pasta, whole-grain bread, and low-fat fruits and vegetables, and 25 to 30 percent from fats.

Claim: *If I am working on my endurance by concentrating only on cardio exercises, I should eat primarily carbohydrates, such as pasta, cereals and whole grains.*

Fact and Fiction. For endurance activities you do need to build up the stores of glycogen in your muscles. You can do this by consuming a diet that has more carbohydrates than normal. This is commonly called "carb loading." However, carb loading is much more than just eating a big plate of spaghetti. It is not a one-day event.

Think of nutrition as part of your training routine. You need to give your body time to adjust to the activity as well as to the nutrients you are putting into your body. The best diet for any athlete is one that has balanced nutrition. About 55 to 65 percent of your daily calories should come from carbohydrates. This amount will allow you to replenish depleted glycogen stores. Don't overdo the carbohydrates because too much can lead to gastrointestinal distress. It is recommended that you eat 4 grams of carbohydrates per pound of body weight per day. But you also need adequate protein. Plan to eat 0.6 to 0.7 grams of protein per pound of body weight per day. Although fat is essential in the diet, you will want to reduce your fat intake to approximately 25 to 30 percent of

your daily calories. Remember, if you are including more calories from carbohydrates, you will have to cut the calories from another source—in this case, fat.

Instruction

“Fad” diets are diets that claim to help you lose a large amount of weight in a small amount of time, but aren’t based on the facts of nutrition and health. These diets are usually not supervised by a doctor or dietitian and often lead to long-term health problems. You may have heard of some fad diets such as the low-carb diet, the grapefruit diet, and the high-protein diet. How can you know if a diet is healthy or if it is a fad?

Here are a few clues to identifying a fad diet.

- **The diet is based on drastically reducing the number of calories consumed every day.** Starvation-type diets that require fasting or eating very little often promise quick results. Unfortunately, our bodies are not designed to drop pounds quickly. The body’s natural reaction to fasting is to dump water. So on a starvation-type diet most, if not all, of the weight lost is from water. Once a person begins to eat normally again, the body absorbs all of the water it is lacking and the lost water weight comes back quickly.
- **The diet is based on taking special pills, powders, herbs, etc.** These diets are usually just gimmicks—ways to get your money. Many diet pills contain laxatives or diuretics that force the body to eliminate water. As with fasting-type diets, the weight loss from these supplements is mainly water, not fat.

Other supplements claim that their ingredients speed up metabolism, suppress the appetite, or even block the absorption of fat into the body. These claims may not be true. (Very few dietary supplements are approved by doctors or the Food and Drug Administration.) These kinds of supplements are considered very dangerous for teens because their long-term effects on growth patterns are not known.
- **The diet tells you to eat only specific foods or foods in certain combinations.** There is no scientific proof that combining different types of foods will help you lose weight. And if you are limiting your diet to only certain foods, your body is not getting all the nutrients it needs for healthy development and performance.
- **The diet eliminates fat, sugar or carbohydrates.** Depriving your body of certain foods and their nutrients is a very bad idea for growing teenagers or athletes. It is better to eat smaller portions in well-balanced meals that contain foods from every food group. Eating smaller portions will also help you set good eating habits that will help you keep the weight off.
- **The diet requires you to skip meals or replace meals with special shakes or food bars.** Diets that ask you to replace meals with their products could be denying your body the nutrients it needs for healthy development and performance.

- **The diet is part of a special weight-loss program.** You have probably seen claims that some weight loss programs help you sweat off extra weight. Sweating in a sauna—or wearing a rubber belt or nylon clothes that make you sweat during exercise—may cause weight loss. However, the pounds that disappear come from water loss, not body fat. As soon as you drink or eat, weight returns. Instead of helping to achieve a healthful weight goal, “sweating off” pounds may damage your health through dehydration.

Some fad diets are linked to potential health risks:

- **Loss of muscle:** People who lose a lot of weight quickly risk losing lean body tissue (muscle). When muscle is lost, your metabolism slows down. This is one reason why most people regain the weight they lost when they are no longer “on a diet.”
- **Gastrointestinal problems:** Diets containing lots of protein or fat and little carbohydrate usually lack dietary fiber. Not having enough fiber in your diet can lead to constipation. If you are on a diet that limits your fruit and vegetable consumption, you are missing out on some important phytochemicals that may promote health and prevent disease.
- **Increased risk of osteoporosis:** Diets with little calcium and lots of animal protein may increase the rate at which calcium is lost from the bone. This can lead to osteoporosis. Remember, your bones are as strong as they will be by the time you turn 30 years old! Until that age you are still building bones, so it’s important not to limit the calcium bones need to continue growing and strengthening.

The bottom line for fad diets is that if they sound too good to be true, they most certainly are! To lose weight successfully you must reduce calories and increase physical activity. You must choose a healthful eating plan that includes a variety of foods from all the food groups and be physically active at least 60 minutes each day.

Sometimes diets encourage people to think of certain foods as “good” and “bad,” when the truth is that everything is okay in moderation. Teens should eat a variety of foods, and there is nothing wrong with the occasional treat. The best way to stay at a healthful weight is to make wise food choices every day. Eating well does not mean you are always on a diet. It means understanding that food is the way to fuel the body!

Ten tips for building a healthy meal:

1. Make half your plate vegetables and fruit. They are full of nutrients and may help promote good health. Choose red, orange, and dark green vegetables such as tomatoes, sweet potatoes, and broccoli.
2. Choose protein foods such as lean beef and pork, chicken, turkey, beans, or tofu. Twice a week, make seafood the protein on your plate.
3. Aim to make at least half your grains whole grains. Look for the words “100% whole grain” or “100% whole wheat” on the food label. Whole grains provide more nutrients, like fiber, than do refined grains.

4. Pair your meal with a cup of fat-free or low-fat milk. They provide the same amount of calcium and other essential nutrients as whole milk, but less fat and calories. If you don't drink milk, try soy milk or include fat-free or low-fat yogurt in your meal.
5. Heavy gravies and sauces add fat and calories to otherwise healthy choices. For example, steamed broccoli is great, but avoid topping it with cheese sauce. Try other options, like some low-fat Parmesan cheese or a squeeze of lemon.
6. Savor your food. Eat slowly, enjoy the taste and textures, and pay attention to how you feel. You're more likely to eat too much if you eat very quickly.
7. To help with portion control, use a smaller plate at meals. It helps you finish your entire meal and feel satisfied without overeating.
8. Eat at home more often so you know exactly what you are eating. If you eat out, compare the nutrition information for the various dishes. Choose healthier options such as baked instead of fried foods.
9. Keep it interesting by eating foods that you've never tried before, like mango, lentils, or kale. You may find a new favorite!
10. Indulge in a naturally sweet dessert—fruit! Serve a fresh fruit cocktail or a fruit parfait made with yogurt. For a hot dessert, try baked apples topped with cinnamon.

Supplements

You've all seen ads for products that claim they can help you lose weight and be a better athlete. These products usually claim that a doctor or scientist has said their product really works and will make you stronger, thinner, smarter, or better at whatever you do.

You may be tempted to take supplements because it sounds so easy—all you have to do is take the pills and you'll get wonderful results. The truth is, there is little evidence that dietary supplements have the benefits they claim. There is evidence, however, that they can seriously damage your health, especially if you're a teenager.

Dietary supplements are products that contain vitamins, minerals, amino acids, herbs or botanicals (plants), or any concentration, extract or combination of these. Supplements are sold as pills, gel capsules, liquids or powders. Unfortunately, no one really knows how safe they are because the U.S. Food and Drug Administration, which checks the safety of foods and medicines before they come on the market, does not check supplements. The FDA does not even have the authority to ensure that supplements contain the ingredients they claim to have.

Some athletes take dietary supplements to improve their performance. But claims for these products are often exaggerated or not based on scientific evidence. Sports supplements such as creatine are unregulated. That means no one knows what the standard dose should be and how safe it is, especially for teens.

Another popular supplement for teen athletes is amino acid powder, which claims to increase muscle mass. The truth is, this product doesn't have any special muscle-building powers. Amino acids are the building blocks of protein, which the body uses, along with exercise, to build muscle. But the human body can easily get all the amino acids it needs from the protein in food. So if you work out properly and eat a balanced diet with enough protein, taking amino acid supplements won't actually do anything for you, except cost you money!

Energy bars are sometimes used as supplements as well. Use them with caution. They are packed with calories and many other ingredients. They may serve a purpose for athletes who burn lots of calories in high-intensity workouts like competitive cycling and running, but for most people they just add unwanted calories to the diet.

The best way to get your daily dose of vitamins and minerals is through the foods you eat. Talk to your doctor before taking any additional vitamins or supplements.

Conclusion

Being healthy is really about being at a weight that is right for you. The best way to find out whether you are at a healthy weight or if you need to lose or gain weight is to talk to a doctor. He or she can help you set realistic goals. Following fad diets, using unnecessary supplements, and putting yourself at risk for eating disorders is not a healthful or successful way to meet your weight loss and athletic performance goals.

Activity

Have students complete the "Spotting a Fad Diet" worksheet, then discuss it.

Have students go through a variety of magazines and look for ads for fad diets and weight loss programs. Working in groups, the students should cut out the ads and give group presentations about them, including their claims and the fact/fiction surrounding them.

Resources

"Getting the Skinny on Fad Diets," Texas AgriLife Extension Service
fcs.tamu.edu/food_and_nutrition/nutrifacts – Issue #7

www.kidshealth.org – Nemours Foundation

www.pbskids.org/itsmylife/body – Information on smoking and alcohol

www.youngwomenshealth.org – Center for Young Women's Health

Duyff, Roberta Larson. 2006. American Dietetic Association: Complete Food and Nutrition Guide, 3rd edition. John Wiley & Sons, Inc. ISBN: 0-470-04115-3.

American Psychiatric Association

www.healthyminds.org/Main-Topic/Addiction.aspx

www.choosemyplate.gov

Spotting a Fad Diet

A “fad” is a currently popular practice. Fad diets may help you lose weight quickly—and some may even be safe—but others may cause some big health problems and may even be dangerous. Here is a sample fad diet. Read it carefully and evaluate it using the Fad Diet Evaluator Sheet.

Dr. Atlas’s Wonder Diet

Breakfast

3 hard-boiled eggs
4 slices of bacon
1 ounce of cheese

Dinner

Salami and cheese
Fried flounder (fish)
Tossed salad

Lunch

Chicken salad
Ham rolls
Orange juice

Evening snack

Whole milk

1. In order to lose weight one must not eat more than 20 grams of carbohydrate per day—the amount of carbohydrate found in two slices of bread or one piece of fruit.
2. By eating a low-carbohydrate diet, you may reach a state called “ketosis,” which is a condition caused by abnormal burning of fat in the body. This diet enables you to lose weight without feeling hungry, and your body will wash away extra calories.
3. Concentrate on eating mostly meats, poultry, fish, and dairy products.
4. Don’t worry about your fat intake. When you reach the ketosis state, the fat calories will simply be washed away.
5. You must avoid all foods that contain any sugars, sweeteners, white flour, and cornstarch. Also avoid all processed foods.
6. Make sure you take a multi-vitamin and the following amino acid supplements: arginine, lysine, and branched-chain amino acids.
7. You can lose 5 pounds in only 1 week as long as you follow the diet exactly.

Fad Diet Evaluator

Your comments:

What is your personal reaction to this diet?

Why do you think this diet could be appealing to someone?

What are some possible negative consequences of this diet? Are there any health risks to staying on the diet?
Emotional risks?

How could this diet be improved?

What would you say to a friend who was considering this diet? Or what would you do if a friend pressured you to go on it with him or her?

What does "weight management" mean to you?

Nutrition: Fads and Facts

“Fad” diets are diets that claim to help you lose a lot of weight in a short time, but may have little scientific truth to back them up.

Here are some ideas to help you spot a fad diet:

- The diet is based on drastically reducing the number of calories consumed each day.
- The diet is based on taking special pills, powders, herbs, etc.
- The diet tells you to eat only specific foods or foods in certain combinations.
- The diet eliminates fat, sugar or carbohydrates.
- The diet requires you to skip meals or replace meals with special shakes or food bars.
- The diet is part of a special weight loss program.

Remember, if it sounds too good to be true, it probably is!!

The media often delivers the message that being thin and beautiful is the solution to all problems. Many of today’s teen athletes are influenced by what they see and may try fads to help them lose weight or bulk up. However, such practices are rarely helpful and may actually be harmful. Becoming obsessed with your weight and the food you eat can lead to an eating disorder.

Being healthy is really about being at a weight that is right for you. The best way to find out if you are at a healthy weight is to talk with a doctor. Following fad diets, using unnecessary supplements, and putting yourself at risk for eating disorders is not a healthy way to meet your weight loss or athletic performance goals.

BACKGROUND INFORMATION FOR INSTRUCTORS

Supplements

As you present these nutrition lessons for teen athletes, you may encounter questions about supplements. The following information will help in answering such questions.

Introduction

It's natural to wish for a magic pill or powder that will give you an extra edge. Imagine, if a single pill could give you 2 extra hours of endurance, or if 1 ounce of a powder could add an extra 5 pounds of pure muscle to your body, wouldn't you be willing to try it? These are the kinds of claims diet supplements advertise.

Although most supplements are relatively safe, and sometimes effective, you must be careful. And you should know some things before you use any supplement.

First of all, is the product safe? You must be able to determine what the active ingredients are and what they do for the body. And you need to know whether those ingredients are safe and legal. Second, you must consider the effectiveness of the product. By understanding what the key ingredients do, you can determine whether the product can support the claims printed on the label. Finally, you must consider the balance between the benefits and risk of the product. If there is any type of risk associated with the product or its key ingredients, then is there really any benefit to taking the product? You certainly don't want to harm yourself for the sake of a few extra pounds of muscle.

Supplements are not regulated by the Food and Drug Administration (FDA); therefore, there are no quality control measures to ensure that ingredients are legal and safe. Products may contain ingredients that are harmful to athletes or illegal in sports competitions. Let's look at some of the most popular supplements and analyze their key ingredients and effects.

Amino acids, protein powders and protein bars

Lean tissue is made from dietary protein. The building blocks for protein are amino acids. Although the body can make some amino acids, there are nine amino acids that must be provided by the diet. These are called essential amino acids. It makes sense that a diet that provides ample protein will be a diet that helps to build muscle.

There are many amino acid supplements available on the market. Taking these individual amino acids will not give you more or bigger



muscles because amino acids must work together. No single amino acid in a supplement will contribute to muscle growth. Real food that contains high-quality protein will provide all the amino acids the body needs for muscle growth, when combined with exercise.

One of the most popular amino acid supplements on the market is arginine. It claims to build muscle and improve strength by increasing blood flow, oxygen transport, and delivery of nutrients to the muscle tissue. However, there is little research to support these claims. When arginine is oxidized, the by-product is nitric oxide, which aids in vasodilation. Therefore, watch for patented ingredients that include “vaso” in the name on supplement bottles. Supplements often rename ingredients to make the products seem more complex than necessary. If you see “vaso” on the label, it’s a strong indication that the secret ingredient is arginine.

Protein powders and drinks are also becoming popular. These beverages boast that they increase muscle growth and muscle strength. They may even claim that their unique and patented proteins are the key to the products’ success. In reality, these powders and drinks are mostly mixtures of milk-based proteins such as whey protein, casein and/or soy proteins. The milk-based proteins, whey and casein, are highly bio-available, which means that it is easy for the body to digest them and break them down into the amino acids necessary for tissue growth. Studies show that protein beverages do work. When protein beverages (soy, casein and/or whey) were compared to a placebo, they did increase lean body mass and muscle strength versus the placebo.

Because soy, whey protein and casein occur naturally in foods, they are considered safe in supplements except for people with milk allergies.

Cost is a factor, however. Mixed with water, a serving of protein powder will provide 28 to 32 grams of protein but can cost \$1.60 to \$2.00 a serving. If mixed with milk, the cost goes up. Protein bars cost \$2.00 to \$4.00 and provide 22 to 27 grams of protein. Compare that to 1 quart of skim milk, 6 ounces of tuna, or 4 ounces of meat, which cost \$0.50 to \$1.25 and provide 28 to 32 grams of protein. Real food provides more bio-available protein at a lower cost than manufactured protein bars, powders or pills.

Something else to consider is that extra calories are needed to fuel the exercise that builds muscle. Athletes need additional calories and the best way to get them is by adding carbohydrates to the diet. Using protein supplements alone is a less effective and more expensive source of fuel. It is much better to eat a diet with the right balance of carbohydrates, fat and protein. If you do use protein supplements, be sure to consume plenty of carbohydrate foods such as whole grains, fruits and skim milk also to maximize your muscle-building potential.

Creatine

Creatine is a naturally occurring component of meat, poultry and seafood. Creatine supplements claim to build lean body mass and increase performance over short periods of time. Some products

contain creatine alone, and some include it with other ingredients. To understand the claims for creatine we must understand its role in the body.

Muscles use creatine phosphate to create bursts of energy that last for approximately 10 seconds. These energy bursts maximize the work performed by the muscles. In a workout, this could help an athlete lift more weight or do more reps. It could also help in competition by giving a sprinter an extra boost to the finish line or a football player extra energy to make a strong tackle.

Studies have shown that creatine can increase lean body mass, muscle size and muscle strength, depending on the amount taken and the number of days it was taken. Not everyone responds to it, however. Creatine is not harmful to adults if taken as prescribed, but no studies have been done on the effects of creatine on growing children. For this reason, it is recommended that young athletes not use it.

Illegal substances

You need to be aware that some supplements on the market contain prohibited or illegal substances such as anabolic steroids, non-hormonal supplements, and ephedrine. Even more disturbing, these substances may not be listed on the labels! Your job as an instructor is to give young athletes the best possible advice about supplements, but the consequence of taking any substance rests with the athlete. There is no excuse for taking an illegal substance. The consequence could be disqualification or banishment from the sport.

Taking illegal substances can change your life in larger ways than simply being disqualified from competition. These substances are banned for a reason—they are harmful to the body.

Steroids

One of the most publicized of the illegal substances is steroids, such as anabolic steroids and steroidal supplements. Anabolic steroids are artificially produced and are available as pills, creams and injections. They mimic the effects of testosterone on the body by increasing muscle mass, aggressive behavior, and the growth of body hair. Steroidal supplements contain dehydroepiandrosterone (DHEA) and androstenedione. The use of anabolic steroids has been linked to heart disease, heart attacks, joint problems, liver damage and risk of cancer. When you use injectable steroids, you put yourself at risk for human immunodeficiency virus (HIV) by sharing needles. Dirty needles can lead to hepatitis or bacterial endocarditis. If you wonder whether the risks are worth the benefits, the answer is a definite no. There are no studies confirming that steroids improve athletic performance.

Hormones

Human Growth Hormone (hGH) has also made headlines. It is illegal to use hGH without a doctor's prescription. Doctors prescribe it only for

people who lack or are deficient in growth hormone. Like steroids, the claim for hGH is that it improves athletic performance. However, there is no evidence that this is true. hGH is an injectable substance, so using it carries the risk of HIV, hepatitis and bacterial endocarditis.

When steroids or growth hormones are purchased on the street or online, you do not know what you are actually getting because only prescribed hGH is regulated.

Ephedra

At one time ephedra was a popular weight loss supplement and stimulant. It increases blood pressure and is thermogenic. It stimulates the brain, increases the heart rate, expands the bronchial tubes to make breathing easier, and the thermogenic portion increases metabolism, which burns more calories. However, it was banned in 2004 because it was found to cause heart attack and stroke. Ephedra caused the untimely deaths of very prominent professional athletes.

Ephedra contains ephedrine, a performance enhancing drug banned from sports competitions such as the Olympics, National Football League and National Basketball Association.

With ephedra removed from the market, consumers were eager to find a similar product. The void was filled with citrus aurantium, also known as Bitter Orange. It claims to have effects similar to those of ephedra—increased metabolic rate and weight loss—but is ephedra-free. Citrus aurantium, especially when combined with caffeine, increases the heart rate and blood pressure and, thus, the risk of stroke, ischemic colitis and heart attack. So its adverse effects on the body are the same as those of ephedra. Plus, scientific studies have shown that citrus aurantium will not help with significant, long-term weight loss.

Citrus aurantium is not a banned substance and is used in products that claim to be “ephedra-free.” You need to be aware that products that are “ephedra-free” are not necessarily stimulant-free and safe.

Resources

Natural Medicines Comprehensive Database

<http://naturaldatabase.com>

Dietary Supplement Information Bureau

<http://www.supplementinfo.org>

PubMed

<http://www.ncbi.nlm.nih.gov/pubmed>

Consumer Lab

<http://www.consumerlab.com>

NSF International

<http://www.nsf.org>

Produced by Texas A&M AgriLife Communications
Extension publications can be found on the Web at *AgriLifeBookstore.org*

Visit the Texas AgriLife Extension Service at *AgriLifeExtension.tamu.edu*

Educational programs of the Texas AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age, or national origin.

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New