

## NUTRITIONAL NEEDS OF INDIVIDUALS AND FAMILIES ACROSS THE LIFESPAN

### Nutrition Issues and Adolescents

Grade Levels: 9-12

**Concept:** Nutrition – Calcium **NEW**

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

**Technical Standard:** 6.2.1 Analyze the effects of nutrients on health, appearance, job performance and personal/family life

#### LESSON COMPETENCIES:

- Evaluate the role of key nutrients in maintaining and sustaining good health
- Identify food sources of the key nutrients
- Analyze the nutritional needs of adolescents
- Identify appropriate guidelines for healthy eating

#### ANTICIPATED BEHAVIORAL OUTCOMES:

- Students identify the nutrients in food
- Make personal food choices that are nutrient dense.

#### Resources Needed:

##### References for teachers and students:

**NEW** The *Dietary Guidelines for Americans* has been published jointly every 5 years since 1980 by the Department of Health and Human Services (HHS) and the Department of Agriculture (USDA). The *Guidelines* provide authoritative advice for people two years and older about how good dietary habits can promote health and reduce risk for major chronic diseases. They serve as the basis for Federal food and nutrition education programs. This site will provide scientifically based research information on calcium in the diet as well as a link to food sources of calcium.

**NEW** Learn more about the scientific justification for 3 servings of low fat milk products/day at **Science Base: Selected Food Groups**; other food groups are discussed as well.

**NEW** The **Center for Disease Control Bone Health** site has a wealth of information related to bone health, osteoporosis, food sources of calcium and links to other credible sources of related information. They also provide a link to the **National Osteoporosis Foundation** with information on this disease and how to prevent it.

**NEW** The USDA has a webpage with links to numerous sources of information on osteoporosis and calcium consumption at their **Diet and Disease** page.

**NEW** The **Center for Young Women's Health**, a part of Children's Hospital Boston, provides a list of calcium rich foods and the amount of calcium found in each at this webpage, **Calcium and Teens: How to Prevent Osteoporosis**.

**NEW** The **Milk Matters** campaign offers a variety of free materials on the importance of calcium in the diets of children and teens. Brochures, booklets, fact sheets, coloring books, stickers, and posters are among those items available on its recently revamped Web site, most in both English and Spanish. The **Milk Matters Web site**, [www.nichd.nih.gov/milkmatters](http://www.nichd.nih.gov/milkmatters), is also an excellent source for information on calcium for health care professionals and nutrition educators.

The **National Dairy Council** website has a wealth of information on dairy consumption as well as educational resources at [www.nationaldairycouncil.org](http://www.nationaldairycouncil.org). The section labeled as Additional Educational Materials is best suited to middle and high school level students. Other materials are available for k-6 education and could be used by FCCLA members or middle/high school students to promote nutrition education with younger students. NOTE TO TEACHER: The 2005 Dietary Guidelines for Americans recommend 2 cups of milk or milk equivalent for children 8 and younger. More than that could lead to consuming too many calories. The 3 a day recommendation by the National Dairy Council is for children over age 8. The National Dairy Council materials promote milk and dairy products so teachers should make students aware that there are alternative ways to get calcium for children who don't like milk or can't drink milk. Encourage students to read labels to determine their calcium intake.

The **American Dietetics Association** provides additional information including a fact sheet on **Calcium and Vitamin D** provides solid nutritional information for youth and educators. The fact sheet includes a table with the recommended guidelines for calcium and Vitamin D consumption for all age groups.

### **3-A-Day™ of Dairy** [www.3aday.org](http://www.3aday.org)

Information, tip sheets, recipes and snack ideas you can use to extend the dairy wellness message to parents and beyond.

West, D. (2006). *Nutrition and Fitness: Lifestyle Choices for Wellness*. Goodheart-Wilcox Publishing, [www.g-w.com](http://www.g-w.com) or phone at 1-800-323-0440 Chapter 3, *How Nutrients Become You* and Chapter 11, *Nutrition For All Ages*; Chapters 5-10 address each of the six key nutrients: carbohydrates, fats, proteins, vitamins, minerals and water.

Largen, V., and Bence, D. (2006). *Guide to Good Food*. Goodheart-Wilcox Publishing, [www.g-w.com](http://www.g-w.com) or phone at 1-800-323-0440 see Chapter 2 *Nutritional Needs*, Chapter 3, *Making Healthful Food Choices* and Chapter 4, *Nutrition Through the Life Cycle*.

A calcium education program for girls 11-14, *Calcium! Do You Get It?* is available for downloading at <http://www.cfsan.fda.gov/~dms/ca-toc.html> Many of the activities can be adapted for older teens as well.

Another nutrition education program is **Girl's Health**, a government site; check out the page on **Bone Health**; it features a question and answer section as well as a list of calcium-rich foods and the amount found in each.

### **Background Information:**

Calcium is one nutrient lacking in the diets of many children and teens and yet it is an essential nutrient found in great abundance in the body. 99% of all calcium in the body is found in bones and teeth. Calcium plays important roles in nerve conduction,

muscle contraction and blood clotting. If calcium levels in the blood drop below normal, calcium from the bone will be taken by the body and put into the blood in order to maintain calcium levels.

**Osteoporosis** – The following information on this disease comes from the **National Osteoporosis Foundation**. Osteoporosis means “porous bone” and is characterized by a decrease in bone mineral density, bone calcium content and an increased risk of fractures. Osteoporosis risk factors that cannot be changed include:

- \* being female
- \* postmenopausal
- \* having a small skeleton
- \* being Caucasian/Asian
- \* family history of osteoporosis and fractures
- \* advanced age

Osteoporosis risk factors that can be changed include:

- \* medications with negative affects on bone
- \* inadequate or excessive intake of nutrients
- \* sedentary lifestyle
- \* excessive exercise
- \* low body weight
- \* cigarette smoking
- \* high alcohol consumption

Even though the symptoms of osteoporosis aren't noticed until later in life, more health professionals are referring to osteoporosis as a childhood disease with adult consequences. The **National Institute of Arthritis and Musculoskeletal and Skin Diseases** states that the amount of bone tissue in the skeleton (known as bone mass) peaks by late 20s. At that point, bones have reached maximum strength and density. Up to 90% of peak bone mass is acquired by age 18 in girls and 20 in boys.

According to the **National Institute of Child Health and Human Development**, in the years of peak skeletal growth, teenagers get more than 25% of their adult bone and by the time teens finish their growth spurts around age 17, 90% of their adult bone mass is established. Furthermore, research suggests that peak adult bone mass may even be reached as early as late adolescence at multiple sites, especially the proximal femur and vertebrae. Research indicates that peak calcium accretion (the body's maximum ability to retain calcium) occurs at age 12.5 for girls and 14 for boys.

Findings from nationwide food intake surveys reveal that teens' low calcium intakes make it unlikely that they will reach their full genetic potential for bone mass development. Considering the wide gap between teens' actual calcium intake and the amount of calcium needed to reduce the risk of osteoporosis, it is critical that efforts be made to improve the calcium status of teens.



According to the National Academy of Science, the recommended dietary reference intakes for calcium are:

|                            |                  |
|----------------------------|------------------|
| Adolescents 9-13 years old | 1,300 mg per day |
| Adolescents 14-18          | 1,300 mg per day |

The American Dietetic Association fact sheet, **Calcium and Vitamin D: Essential Nutrients for Bone Health** makes the following recommendations for a lifetime of healthy bones:

- \* consume 3 servings of low-fat or fat-free milk or other dairy products daily
- \* supplement your diet with calcium from calcium-fortified foods and beverages, if you don't or can't consume milk
- \* follow an overall healthy eating plan using the MyPyramid Food guidance system
- \* be physically active with weight-bearing exercise like walking, running or weight training.

[2005 Dietary Guidelines for Americans](http://www.health.gov/dietaryguidelines/dga2005/document/html/chapter5.htm) recommendations on Milk and Milk Products (<http://www.health.gov/dietaryguidelines/dga2005/document/html/chapter5.htm>) include the following:

*Another source of nutrients is milk and milk products. Milk product consumption has been associated with overall diet quality and adequacy of intake of many nutrients. The intake of milk products is especially important to bone health during childhood and adolescence. Studies specifically on milk and other milk products, such as yogurt and cheese, showed a positive relationship between the intake of milk and milk products and bone mineral content or bone mineral density in one or more skeletal sites (see **table 1** for information on equivalent amounts of milk products).*

*Adults and children should not avoid milk and milk products because of concerns that these foods lead to weight gain. There are many fat-free and low-fat choices without added sugars that are available and consistent with an overall healthy dietary plan. If a person wants to consider milk alternatives because of lactose intolerance, the most reliable and easiest ways to derive the health benefits associated with milk and milk product consumption is to choose alternatives within the milk food group, such as yogurt or lactose-free milk, or to consume the enzyme lactase prior to the consumption of milk products. For individuals who choose to or must avoid all milk products (e.g., individuals with lactose intolerance, vegans), non-dairy calcium-containing alternatives may be selected to help meet calcium needs (**app. B-4**).*

The following information (in italics) is from the Milk Matters education campaign of the National Institutes of Health, *The preferred source of calcium is through calcium-rich foods such as dairy products. Calcium-fortified foods and calcium supplements are other means by which optimal calcium intake can be reached in those*

who cannot meet this need by ingesting conventional foods. The section **Sources of Calcium** ([http://www.nichd.nih.gov/milk/prob/calcium\\_sources.cfm](http://www.nichd.nih.gov/milk/prob/calcium_sources.cfm)) provides additional information on meeting calcium needs.

*The NICHD has selected low-fat or fat-free milk as an excellent source of calcium because it has high calcium content without added fat, and because the calcium is easily absorbed by the body. Low-fat and fat-free milk products are also good sources of calcium.*

*In addition to calcium, milk provides other essential nutrients that are important for optimal bone health and development, including:*

- *Vitamins D, A, and B12*
- *Potassium*
- *Magnesium*
- *Phosphorous*
- *Riboflavin*
- *Protein*

Remember that for all sources of calcium, adequate Vitamin D from food or sunlight is also needed to help absorption.

## **Learning Activities:**

### **Middle School Level**

- Have students complete the *Test Your Calcium IQ* quiz available at the **National Dairy Council** website and discuss correct responses with students  
NOTE TO TEACHER – an answer key with supporting facts is provided
- Hold a Three-A-Day competition for one week by asking each student to complete the **3-A-Day Tracker**. Calculate how many grams of calcium consumed each day to see if students are meeting the recommended intake of calcium for their age and gender
- Conduct a Dairy Snackin' Lab using the recipe suggestions from the **Power of 3 Planner or 33 Terrifically Tasty Snack Ideas** at the National Dairy Council site. Conduct a Non-dairy Calcium Snackin' Lab with snack foods high in calcium that are found in non-dairy foods.
- Review the **advertorials on the National Dairy Council website**, have students create their own ads/posters to promote 3-A-Day dairy intake to students throughout the school system. Assign an age group or ask students to choose an age group to target.
- Conduct a taste panel of calcium rich foods in your class or school. Some examples include: leafy greens, fortified breakfast cereals, nuts, fortified

juices, fortified soy milk, low fat cheeses, nonfat yogurt, etc. You might also purchase several flavors of milk. Develop a survey to compare calories, amount of calcium, fat and sugar content as well as determining the amount of each food they would need to get enough calcium. Also, consider determining the flavor favorites. Ask students if they would like to have flavored milk available at school. If flavored milk is not available in your community, prepare some of the milk recipes at the [www.whymilk.com](http://www.whymilk.com) site for the taste panel. Graph the results comparing student reactions to the various flavors and compare to unflavored milk – skim, 1%, 2% and whole. For more information about flavored milks, read *Flavored Milk: More Than Just Great Taste!* at <http://www.nutritionexplorations.org/sfs/milkfacts.asp> and learn more about one company that is making flavored milk by visiting “SPRING INTO ACTION WITH FLAVORED MILK In the beginning there was white. Then there was chocolate. Now, there’s everything from banana to vanilla to orange.” [www.qchekd.com/pdf/5661.pdf](http://www.qchekd.com/pdf/5661.pdf)

**NOTE TO TEACHER:** For this activity you will want to check on the availability of flavored milk in your community. Flavored milk can also be ordered through Internet sites or use some of the milk recipes as suggested on the student activities list. Remember to remind students that flavored milk will also have added sugar.

- Complete *The BEST Beverage activity*. You can find tables with the Nutritive Values of foods in most nutrition textbooks or at the **NATS** website: <http://nat.crgq.com/mainnat.html>

**NOTE TO TEACHER:** For this activity, you will need to provide nutrition panel labels for each of the beverages OR provide samples of the actual products. The second option will be more realistic for students.

### High School

- Have students complete the *Test Your Calcium IQ* quiz available at the **National Dairy Council** website and discuss correct responses with students  
**NOTE TO TEACHER** – an answer key with supporting facts is provided
- Conduct a breakfast lab featuring the recipes from **Jumpstart Your Day with Breakfast** handout; have students complete a nutritional analysis of each recipe using a nutritional analysis tools such as **NATS** at <http://nat.crgq.com/mainnat.html> How many mg of calcium are found in the food prepared?
- Find out more about the crippling disease related to the lack of calcium by having students complete the *In the Know About Osteo* activity.  
**NOTE TO TEACHER:** You will need to visit the website and complete a key before asking students to complete the activity.
- Using the Recommended Dietary Intake tables, find out how many milligrams of calcium should be included in your daily diet by completing the *How Much Calcium is Enough?* Activity. A table can be found at

<http://www.iom.edu/Object.File/Master/7/294/0.pdf> (Page 2) or in nutrition textbooks.

- Ask students to plan a menu for Jamie, age 15, a lacto-ovo vegetarian; she/he will eat milk and egg products but no meat. Plan a day's menu that will provide her/him with the RDA for calcium without meat. Ask students to plan a menu for Jordan, age 15, a strict vegan, to provide his/her calcium needs.

**Extended Learning Activities:**

- **Dairy Dazzling Calcium Carnival** – Plan a Dairy Dazzling Calcium Carnival for elementary students or after school programs to promote the consumption of dairy foods and the 3-A-Day message; see the [National Dairy Council website](#) for a booklet to help plan the carnival including games and activities for the carnival. FCCLA members could use this as a Student Body project.
- **Non Dairy Calcium Carnival** – Co-sponsor/plan a second carnival or hold it at the same time as the Dairy Carnival with foods high in calcium that are nondairy products with food sources of calcium that include nondairy sources.

**Academic Connections**

- √ **Mathematics** – after conducting the taste panel, have students graph the results of their survey of flavored milk and low-fat milk.