This document contains Lesson 4: Food Math of the 2013 *Nutrition to Grow On: A Garden-Enhanced Nutrition Education Curriculum for Upper Elementary School Children (Second Edition)* prepared under the direction of the Nutrition Services Division, California Department of Education. The entire publication is available at http://www.cde.ca.gov/ls/nu/he/nrttogrow.asp.

Lesson 4

Food Math

OBJECTIVES

- To review the concepts of and information on MyPlate
- To identify the recommended daily amounts to eat from each food group
- To measure and identify standard food portion sizes through the use of visual cues
- To create a daily menu based on recommendations from MyPlate

APPLICABLE CONTENT STANDARDS

- English–language arts
- Mathematic
- Science

(See the matrix in Appendix B.)

Materials for In-class Lesson and Activities	Materials for Gardening Activity
Handouts: 4-1 Matching Cup and Ounce Equivalents with Visual Cues 4-2 Food Math 4-3 Activity Cards (one copy per class) "10 tips" MyPlate poster Familiar objects (See the table Equivalents for Foods on page 62 for the items needed to complete handout 4-1.) Paper plates, bowls, cups, napkins Food for snacks (a few foods from the table on page 62) Masking tape	**Handouts:** 4-4 Common Weeds in California *Optional materials:* Reference book(s) on weeds in your area (Contact the county cooperative extension for ideas.)

Preparation for In-class Lesson and Activities	Preparation for Gardening Activity
Day before the lesson: Photocopy handouts 4-1, 4-2, 4-3 (one copy), and the "10 tips." Gather the materials.	**Day before the lesson:** Photocopy handout 4-4. Gather the materials.
Just before the lesson: Tape the large MyPlate poster onto the board and cover it with a sheet of blank newsprint. Cut out the activity cards. Set up stations for handout 4-1 in a corner of the classroom. Have students take out the nutrition folders.	**Just before the lesson:** Display the illustrations of common weeds in your area.

Nutrition Lesson Activities

(60 min.)

1. Review of Lesson 3

Draw a circle on the newsprint covering the MyPlate poster.

- Why is MyPlate important?

  It is a guideline that shows us that different foods fit into different groups. We need to eat foods from each of these food groups every day because together they provide the different nutrients that our bodies need to grow and stay healthy.

- What food groups are listed on MyPlate?

  Have the students give the name of each food group on MyPlate and identify some of the foods that belong in each group.

  For example, *grains group: cereal, bread, rice, tortilla*

  Remember that the size of the portions on the MyPlate circle does not mean it is more or less important than another. Instead, it means we need to eat more from that group to get the right amount of nutrients.

Remove the blank sheet to display the MyPlate poster in color. Keep the newsprint MyPlate on the board so that you can write on it later.

2. Review of healthy food choices within each food group

(Refer to the MyPlate poster during the discussion.)

- Make half your plate fruits and vegetables.
- Add more vegetables to your day. Choose to eat a variety of vegetables each day, including dark green and orange vegetables.
- Focus on fruits. Include fruit for dessert or as a snack.
- Make at least half your grains whole. Look for ingredients such as brown rice, whole oats, and whole wheat in your grain foods.
- Got dairy today? Choose fat-free or low-fat (1 percent fat) milk.
- With protein foods, variety is key. Choose foods lower in fat, such as turkey, chicken, or beans.
- Get enough physical activity. Try to get 60 or more minutes of physical activity each day.

3. How much food do we need?

- Now that we know how to make healthier choices, let's take a closer look at how much we need from each food group.
- Write the recommended daily amounts on the newsprint MyPlate:
  - Vegetables—2 1/2 cups
  - Fruits—1 1/2 cups
  - Grains—6 ounces
  - Dairy—3 cups
  - Protein foods—5 ounces
- MyPlate gives the amounts to eat in ounces and cups. For the grains and protein food groups, amounts are given in ounces. For vegetables, fruits, and dairy, amounts are given in cups.
- There are several different ways to measure ounce and cup equivalents of foods. We can use measuring cups (wet and dry), measuring spoons, or a scale; or we can count whole pieces (for example, one slice of bread).
- *Equivalent* means something that has the same amount or value. For example, the recommendation is 6 ounces of grains every day. One slice of bread is about 1 ounce, as is 1/2 cup of cooked rice. Those measures are equivalent, or have equal value, because the nutrients are present in similar amounts.

  Note: Ounce equivalents for grains can also be measured in cups, for example, 1 cup ready-to-eat cereal or 1/2 cup cooked cereal. Ounce equivalents for protein foods may also be measured in tablespoons (for example, 1 tablespoon peanut butter).
- Unless you do a lot of cooking, these sizes can be difficult to picture. To help you, we are going to take a look at some ounce and cup equivalents and compare them to familiar objects.
- Provide the students with the opportunity to compare ounce and cup equivalents of some food items to familiar objects (see the chart "Equivalents for Foods").

- Distribute handout 4-1. Ask the students to fill in the food group column on the left while you set up the stations.
- Place the food items listed in the chart in stations set up around the classroom. Each station will have an activity card, a food item, a measuring device (if applicable), and a familiar object (if applicable) that is equivalent to an ounce or a cup. For those stations that need a dry measuring cup, set out cups of several different sizes so that students can see the differences.
- Demonstrate one example to the class.
- Instruct the students to go around the room and look at the different ounce or cup equivalents and compare them to the more familiar objects. (Each station displays a one-ounce or one-cup equivalent.) Tell the students to match the ounce or cup equivalent with the familiar objects noted on handout 4-1.
- Although children will be handling food, remind them that this is not an eating activity. Provide a snack at the end of the activity as an incentive.
- Students do not need to write answers to the questions on the activity cards. The questions are used to provoke discussion.
- Mention which, if any, of the foods were selected from the garden. Ask the students, "Do you know how many ounce or cup equivalents you will get from one seed? From your whole garden?" Have the students predict the amounts and record those figures.
- Remember that two cups of raw, leafy greens will look about the same as two cups of cereal because two cups will always look about the same size as a softball. That is why it is helpful to know some visual cues.

Equivalents for Foods

Food Stations	One Ounce or Cup Equivalents	Place in or on a . . .	Visual Cues Equal to One Ounce or Cup Equivalent
Apple	1 small	Plate	Your fist
Cooked rice*	1/2 cup	Bowl	Paper cupcake holder
Raisins	1/2 cup	Plate	2 small raisin boxes
Chopped lettuce	2 cups	Bowl	Softball
Milk	1 cup	10-oz. glass	School-lunch milk carton (8 oz.)
Cheese	1 1/2 oz.	Plate	3 dominoes
Peanut butter	1 tablespoon	Plate	Your thumb
Sandwich meat slices	1 oz.	Plate	1 CD

* After cooking the rice, mix in a small amount of oil to keep it from sticking.

4. Review activities

- Distribute snacks to each group (optional).
- Review the cup and ounce equivalent activity.
- Direct students to complete the Food Math handout (4-2) and to circle those foods that can be grown in their garden. Review the students' work in class.

Gardening Activity
(30 min.)

- Consult a local master gardener or a good reference book for pictures of weeds common to your area (such as *Weeds of the West*).* An Internet search may also provide information on weeds that grow in your area.

  Some common weeds are oxalis, mallow (cheeseweed), dandelion, scarlet pimpernel, and many different annual grasses.

- What is a weed?

  A weed is a plant that is growing where we don't want it and often at a faster rate than the seeds we intentionally planted in the garden. Crops and weeds compete for nutrients, water, and sunlight. Since weeds grow so quickly, they absorb the nutrients from the soil that are intended for our crops. Before we go into the garden and start pulling "weeds," we need to make sure that we are removing weeds, not the vegetables we planted. To do this, we must first be able to identify the weeds.

- Distribute the Common Weeds in California handout (4-4).
- Have the students go out to the garden in small groups to identify and pull different weeds.
- If time allows, have the students draw pictures of the weeds they were unable to identify in the garden. Use the references to identify the weeds.

(The idea for this activity was provided by Mary Shaw and Meg Grumio, Solano County Master Gardeners, University of California Cooperative Extension.)

*Tom D. Whitson, *Weeds of the West*, 9th ed. (Laramie, WY: Western Society of Weed Science in cooperation with the Western United States Land Grant Universities Cooperative Extension Services, 2006).

Additional Activities

1. Provide a small snack with the lesson on ounce and cup equivalents so that students will not eat the foods used as a part of the hands-on activity. Include foods from two or more of the food groups.
2. Take a closer look at the foods in a typical school lunch. (The nutrition services staff may be able to provide you with a sample meal.) Measure the amounts of each item. How many ounce equivalents is each item? Identify the food group into which each lunch item falls.
3. Have the students record the types and amounts of fruits and vegetables they eat for one to three days. Are they eating the recommended amounts? Are they eating a variety of healthful choices? One way to tell is whether they are eating a "rainbow of colors."
4. Have the students record all the food they eat for one day and then compare their intake with the MyPlate recommendations. For additional math activities, graph the results for the whole class, determine the class average, or calculate the percentage of students who ate the recommended amount from each food group.

NAME: **DATE:**

Handout 4-1

Matching Cup and Ounce Equivalents with Visual Cues

Directions

1. To the left of each food, write the name of the food group in which it belongs.
2. Then draw a line from the cup or ounce equivalent of each food to the appropriate familiar object (visual cue).
   Hint: You may see the familiar objects at the stations in the classroom.

Food Groups	Food	One Ounce or Cup Equivalents
	Apple	1 whole small
	Cooked rice	1/2 cup
	Raisins	1/2 cup
	Peanut butter	1 tablespoon
	Milk	1 cup
	Chopped lettuce	2 cups
	Cheese	1 1/2 ounces
	Sandwich meat	1 ounce

One Ounce or Cup Equivalent Looks About the Same Size as . . .
Your thumb
1 CD
Your fist
Softball
3 dominoes
Cupcake wrapper
2 small boxes
School-lunch milk carton

Handout 4-1

Matching Cup and Ounce Equivalents with Visual Cues—Answer Key

Directions

1. To the left of each food, write the name of the food group in which it belongs.
2. Then draw a line from the cup or ounce equivalent of each food to the appropriate familiar object (visual cue).
   (*Hint:* You may see the familiar objects at the stations in the classroom.)

Food Groups	Food	One Ounce or Cup Equivalents
FRUIT	Apple	1 whole small
GRAIN	Cooked rice	1/2 cup
FRUIT	Raisins	1/2 cup
PROTEIN FOODS	Peanut butter	1 tablespoon
DAIRY	Milk	1 cup
VEGETABLE	Chopped lettuce	2 cups
DAIRY	Cheese	1 1/2 ounces
PROTEIN FOODS	Sandwich meat	1 ounce

One Ounce or Cup Equivalent Looks About the Same Size as . . .
Your thumb
1 CD
Your fist
Softball
3 dominoes
Cupcake wrapper
2 small boxes
School-lunch milk carton

NAME: **DATE:**

Handout 4-2

FOOD MATH

Jason is nine years old. He's physically active sometimes. Each day, he needs to eat:

Vegetables	Fruits	Grains	Dairy	Protein Foods
2½ cups	1½ cups	6 ounces	3 cups	5 ounces

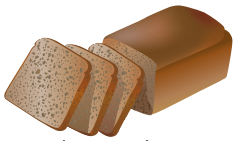
Help Jason decide what to eat today. Plan breakfast, lunch, dinner, and a snack. Be sure he gets all the food he needs from each group. (Food items may be selected more than once.)

Vegetables 2½ cups

_____ 6 baby carrots* (½ CUP EQ.)
_____ 1 large ear of corn (1 CUP EQ.)
_____ 1 medium baked potato (1 CUP EQ.)
_____ 1 cup cooked greens* (1 CUP EQ.)
_____ 1 large baked sweet potato* (1 CUP EQ.)
_____ 3 spears broccoli* (1 CUP EQ.)
_____ ½ cup tomato juice (½ CUP EQ.)
_____ 1 cup chopped lettuce (½ CUP EQ.)

*Items marked with a * are dark green or orange vegetables.*

Grains 6 ounces



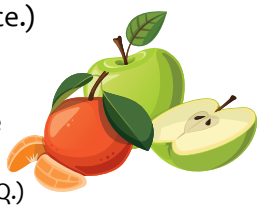
_____ 1 slice whole-wheat toast* (1 OZ EQ.)
_____ 5 whole-wheat crackers* (1 OZ EQ.)
_____ 1 slice white bread (1 OZ EQ.)
_____ 1 slice whole-wheat bread* (1 OZ EQ.)
_____ 1 cup whole-grain ready-to-eat breakfast cereal* (1 OZ EQ.)
_____ ½ cup cooked brown rice* (1 OZ EQ.)
_____ 1 cup cooked pasta (2 OZ EQ.)
_____ 1 hamburger bun (2 OZ EQ.)
_____ 3 cups low-fat popcorn* (1 OZ EQ.)

*Items marked with a * are whole-grain.*

Protein Foods 5 ounces

_____ 1 ounce of nuts (2 oz eq.)
_____ 1 cup split pea soup (2 OZ EQ.)
_____ 1 small chicken breast half (3 OZ EQ.)
_____ 1 small lean hamburger (3 OZ EQ.)
_____ 1 hard-boiled egg (1 OZ EQ.)
_____ 1 tablespoon peanut butter (1 OZ EQ.)
_____ ½ cup of pinto beans (1 OZ EQ.)
_____ 1 slice of turkey (1 OZ EQ.)

Fruits 1½ cups



_____ 1 small apple or ½ large apple (1 CUP EQ.)
_____ 1 large orange (1 CUP EQ.)
_____ 1 snack-sized container of peaches (½ CUP EQ.)
_____ 1 large plum (½ CUP EQ.)
_____ 1 small box raisins (½ CUP EQ.)
_____ 1 cup 100% orange juice (1 CUP EQ.)
_____ 1 medium wedge cantaloupe (½ CUP EQ.)
_____ 1 small wedge watermelon (1 CUP EQ.)

Dairy 3 cups

_____ ½ cup low-fat or fat-free cottage cheese (½ CUP EQ.)
_____ 1 cup fat-free milk (1 CUP EQ.)
_____ 1 snack-sized low-fat or fat-free yogurt (½ CUP EQ.)
_____ 1 half-pint container 1% or 2% milk (1 CUP EQ.)
_____ 2 ounces of low-fat or fat-free American cheese (1 CUP EQ.)
_____ 1½ ounces of low-fat or fat-free cheddar cheese (1 CUP EQ.)
_____ 1½ cups light ice cream (1 CUP EQ.)

Key: 1 OZ EQ. means 1-ounce equivalent.

Handout 4-3

Activity Cards

Directions for teachers: Photocopy these activity cards onto card-stock paper and cut out each one. Laminate the cards (if desired) and place them at each station.

APPLE

1 cup equivalent = 1 whole small

Activity:

1. **Pick up the apple.**
2. **How does one serving compare to the size of your fist? Is it the same size?**

COOKED RICE

1 ounce equivalent = 1/2 cup

Activity:

1. **Put the rice into the correct measuring cup.**
2. **Put the rice back into the bowl.**
3. **A half cup of rice would be about the same size as what familiar object?**

Handout 4-3

Activity Cards

Directions for teachers: Photocopy these activity cards onto card-stock paper and cut out each one. Laminate the cards (if desired) and place them at each station.

RAISINS

1 cup equivalent = 1/2 cup

Activity: DO NOT EAT!

1. **Put the raisins into your hand.**
2. **What does one serving of raisins feel like in your cupped hand?**
3. **Put the raisins back into the bowl.**

PEANUT BUTTER

1 ounce equivalent = 1 tablespoon

Activity: DO NOT TOUCH!

1. **Look at one serving of peanut butter.**
2. **One tablespoon is about the same size as what familiar object?**
3. **How many servings of peanut butter do you put on your peanut butter and jelly sandwich?**

Handout 4-3

Activity Cards

Directions for teachers: Photocopy these activity cards onto card-stock paper and cut out each one. Laminate the cards (if desired) and place them at each station.

MILK

1 cup equivalent = 1 cup

Activity:

1. **Carefully pour the milk into the measuring cup.**
2. **How much milk was in the glass?**
3. **Carefully pour the milk back into the glass.**
4. **How many servings of milk do you drink with your lunch?**

RAW, LEAFY GREENS

1 cup equivalent = 2 cups

Activity: DO NOT EAT!

1. **Put the greens into the correct measuring cup.**
2. **How many servings of salad do you think you eat with dinner?**
3. **Put the leafy greens back into the bowl.**
4. **Two cups look about the same size as what familiar object?**

Handout 4-3

Activity Cards

Directions for teachers: Photocopy these activity cards onto card-stock paper and cut out each one. Laminate the cards (if desired) and place them at each station.

CHEESE

1 cup equivalent = 1½ ounces

Activity: **DO NOT EAT!**

1. Carefully place the cheese on the scale.
2. How much does one serving of cheese weigh?
3. Put the cheese back on the plate.
4. One and one-half ounces look about the same size as what familiar object?

SANDWICH MEAT

1 ounce equivalent = 1 ounce

Activity: **DO NOT EAT!**

1. Carefully place the meat on the scale.
2. How many servings of meat do you think you put on your sandwich?
3. Put the meat back onto the plate.
4. One ounce of meat looks about the same size as what familiar object?

Handout 4-4

Common Weeds In California

Oxalis

Mallow (Cheeseweed)

Dandelion

Scarlet Pimpernel

Wild Oats

Soft Chess

10 tips
Nutrition Education Series

build a healthy meal

10 tips for healthy meals

A healthy meal starts with more vegetables and fruits and smaller portions of protein and grains. Think about how you can adjust the portions on your plate to get more of what you need without too many calories. And don't forget dairy—make it the beverage with your meal or add fat-free or low-fat dairy products to your plate.

1 make half your plate veggies and fruits

Vegetables and fruits are full of nutrients and may help to promote good health. Choose red, orange, and dark-green vegetables such as tomatoes, sweet potatoes, and broccoli.

2 add lean protein

Choose protein foods, such as lean beef and pork, or chicken, turkey, beans, or tofu. Twice a week, make seafood the protein on your plate.

3 include whole grains

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 refined grains.

4 don't forget the dairy

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. Don't drink milk? Try soymilk (soy beverage) as your beverage or include fat-free or low-fat yogurt in your meal.

5 avoid extra fat

Using heavy gravies or sauces will 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 a sprinkling of low-fat parmesan cheese or a squeeze of lemon.

6 take your time

Savor your food. Eat slowly, enjoy the taste and textures, and pay attention to how you feel. Be mindful. Eating very quickly may cause you to eat too much.

7 use a smaller plate

Use a smaller plate at meals to help with portion control. That way you can finish your entire plate and feel satisfied without overeating.

8 take control of your food

Eat at home more often so you know exactly what you are eating. If you eat out, check and compare the nutrition information. Choose healthier options such as baked instead of fried.

9 try new foods

Keep it interesting by picking out new foods you've never tried before, like mango, lentils, or kale. You may find a new favorite! Trade fun and tasty recipes with friends or find them online.

10 satisfy your sweet tooth in a healthy way

Indulge in a naturally sweet dessert dish—fruit! Serve a fresh fruit cocktail or a fruit parfait made with yogurt. For a hot dessert, bake apples and top with cinnamon.

USDA United States Department of Agriculture
Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 7
June 2011
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10 consejos
Serie de educación en nutrición

cómo preparar platos sanos

10 consejos para platos sanos

Un plato sano comienza con más vegetales y frutas, y porciones más pequeñas de proteínas y granos. Piense en cómo ajustar las porciones en su plato para obtener más de lo que necesita sin demasiadas calorías. Tampoco olvide los productos lácteos; haga de ellos su bebida de acompañamiento o agregue a su plato productos lácteos descremados o con bajo contenido de grasa.

1 haga que la mitad de su plato consista en frutas y vegetales

Las vegetales y las frutas están repletas de nutrientes que tal vez le ayuden a promover la buena salud. Elija vegetales de color rojo, anaranjado y verde oscuro como tomates, camotes (batatas) y brócoli.

2 agregue proteínas magras

Elija alimentos ricos en proteína, como carne de res y cerdo magras, pollo y pavo, frijoles o tofú. Dos veces por semana, haga que la proteína en su plato provenga de pescados y mariscos.

3 incluya granos integrales

Intente que por lo menos la mitad de los granos consumidos sean granos integrales. Busque las designaciones “100% granos integrales” o “100% trigo integral” (“whole grain, whole wheat”) en las etiquetas. Los granos integrales contienen más nutrientes, como fibra, que los granos refinados.

4 no olvide los productos lácteos

Acompañe sus comidas con una taza de leche descremada o baja en grasa. Esta contiene la misma cantidad de calcio y otros nutrientes esenciales que la leche entera, pero con menos grasa y calorías. ¿No bebe leche? Pruebe leche de soja (bebida de soja) como su bebida, o bien incluya en su comida yogur descremado con bajo contenido de grasa.

5 evite la grasa adicional

El uso de salsas o aderezos espesos agregará grasas y calorías a comidas que de otro modo serían sanas. Por ejemplo, el brócoli al vapor es excelente, pero evite cubrirlo con salsa de queso. Pruebe otras opciones, como queso parmesano rallado bajo en grasa o jugo de limón.

6 coma con calma

Saboree la comida. Coma despacio, disfrute del sabor y las texturas, y preste atención a cómo se siente. Tenga en cuenta que comer demasiado rápido puede resultar en comer demasiado.

7 use un plato más pequeño

Use platos más pequeños a la hora de comida para controlar las porciones. De esa manera puede “limpiar el plato” y sentirse satisfecho sin comer demasiado.

8 controle sus alimentos

Coma en casa con más frecuencia para que sepa exactamente lo que come. Si sale a comer, estudie y compare la información de nutrición. Elija opciones más sanas como alimentos horneados en lugar de fritos.

9 pruebe alimentos nuevos

Mantenga el interés al elegir alimentos nuevos que tal vez nunca antes ha probado, como mangos, lentejas o lechuga japonesa. ¡Tal vez encuentre su nuevo alimento favorito! Intercambie recetas sabrosas y divertidas con sus amigos, o busque recetas nuevas en línea.

10 satisfaga el gusto dulce de manera sana

Permítase un postre naturalmente dulce: ¡frutas! Sirva ensalada de frutas frescas o un postre helado con yogur y fruta. Para un postre caliente, hornee manzanas y cúbralas con canela.

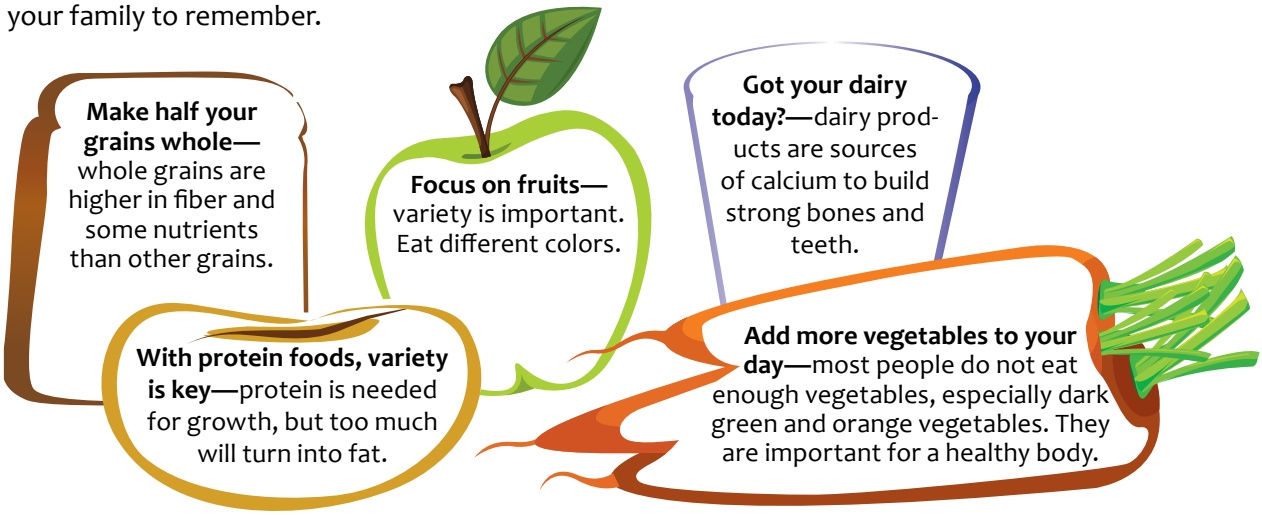
USDA Centro para Políticas y Promoción de la Nutrición

Visite www.ChooseMyPlate.gov para obtener más información.

DG TipSheet No. 7
Septiembre 2011
EL USDA es un proveedor y empleador que ofrece igualdad de oportunidades para todos.

Family Activity

How can I tell if I am making healthful choices? Here are some great hints that will be easy for you and your family to remember.



Fruits and Vegetables—More Matters!

For the next three days, keep track of how many cups of fruits and vegetables your family eats.

Directions:

1. List your family members' names, including yourself, on the left. (Use a separate sheet of paper if necessary.)
2. Starting today, draw a ☺ under "Day 1" each time you eat a cup of fruit or vegetables.
3. Tomorrow, draw a ☺ under "Day 2," and the next day draw a ☺ under "Day 3."
4. Who in your family eats the most fruits and vegetables? Discuss how you can eat more fruits and vegetables every day.
5. Bring this activity sheet back to class as soon as you have completed it.

Family Activity—Fruits and Vegetables

Family Member's Name	Day 1	Day 2	Day 3

Notes