Nutrition
Discovery Cart
Instructional Guide

Revised by Consultant 6/13/2013
Quick Start Guide to Presenting a Discovery Cart

Working a Discovery Cart allows our guests to receive information in a fun and interactive setting while learning from a future health care professional!

Please welcome our guests by engaging them using a question. Below you will find a suggested format for engaging visitors at your cart for about 3-5 minutes.

Feel free to tell them more about your experience in school, studying science, and working hard to become a doctor, nurse, or physician’s assistant.

Recommendations: The 5 E’s

Engage - Engage your audience by asking a question.

Extract - Find out what your audience already knows! Quiz them with questions to make your cart more interactive.

Experiment - Use the models and/or experiments to teach your audience something new.

Explain - Meet your audience at their level of knowledge. Explain science in a way that is interesting and exciting to them. (For example: You would explain the circulatory system very different to a 7 year-old child than to your professor.)

Ending Idea - Make sure your audience walks away with at least one take home point that will encourage them to make more healthy life choices.

Refer to the next page for an Overview of the Nutrition Discovery Cart
Engage

Nutrition Questions to Ask

• What was the first thing you ate after you woke up this morning? (Section 4)
• Do you eat a variety of foods? (Section 4)
• Which fruits or vegetables have you eaten today? (Section 4)
• Do you know how much salt or sugar is in your favorite foods? (Section 6)
• What has more sugar: a candy bar or a can of soda? (Section 6)

Visitor responses will guide what areas of the cart you wish to highlight.

Extract

Quiz to Promote Interaction

1. What percentage of adult Americans are overweight or obese? A: More than 1 out of every 3 Americans are overweight or obese.
2. What is a healthy amount of body fat? A: 15-18% for men, 22-25% for women (Refer to Sections 1 and 2)
3. What takes up more space 5lbs of fat or 5lbs of muscle? (Use the 5lb weight to demonstrate) A: 5lbs of fat (but muscle weighs more than fat)
4. What is the pathway that food takes through your body during digestion? A: mouth, pharynx, esophagus, stomach, small intestine, large intestine (colon), rectum, anus (Show Digestive System Model)
5. How many vegetables should you eat a day? A: Boys and Girls need ~2 cups/day; Adults need ~3 cups/day (Show measuring cup)
6. How much salt (sodium) should you eat in one day? A: Varies but for generally healthy individuals, not more than 2,300mg/day = < 1 teaspoon; less with high blood pressure (Show salt with measuring spoon)
7. How much water should you drink every day? A: Varies depending on weight, activity level, diet, environment, physiology, health status. A quick way to figure out how much you need = half your body weight in ounces (Ex. If you weigh 100lbs you should aim for 50oz ≈ 6 cups per day). Water has many important functions in body. (Show diagram)

Experiment & Explain

Teaching Tools

1. Body Composition
   Explain that body composition is an important factor for diseases like heart disease and diabetes. Demonstrate healthy body fat ranges with BMI chart and Fat Loss Monitor.

2. Fat vs. Muscle
   Explain why more muscle is better than too much fat. Demonstrate with “fat belt” to mimic 5 extra pounds of weight.

3. The Skinny on Fat
   Explain the role of fat in the body and the different types of dietary fats. Demonstrate with the fat vials and food models.

4. Plan a Healthy Plate
   Explain the importance of a well-balanced diet for energy balance. Demonstrate with MyPlate, portion plate, food models, and/or balance scale.

5. Portion Distortion
   Explain how food portions have become larger over the last 20 years. Demonstrate proper portion sizes with portion plate, measuring cups and spoons, and/or balance scale.

6. Hidden Salt & Sugar in Foods
   Explain how there may be hidden salt and sugar in certain foods. Demonstrate with salt and sugar vials and sample food items. Explain what to look for on Nutrition Facts label using poster.

7. Death of an Artery
   Explain how plaque clogs an artery. Demonstrate with heart model and/or “Death of an Artery” poster found on Circulatory Discovery Cart.

8. Water
   Explain that water plays many important roles in the body and why it’s important to stay hydrated. Demonstrate with diagram.

9. Digestion & Intestinal Health
   Explain the digestion basics and the importance of dietary fiber. Demonstrate with digestive system model, digestive tract microscope slides, digestion biokit, Nutrition Facts label poster.

10. Physical Activity
    Explain the health benefits of regular physical activity. Demonstrate with The Heart is a Muscle Activity.

Supplemental Materials for Use in Nutrition, Heart, and/or Lung Discovery Carts

Ending Ideas

Take Home Points

Use the Self-Prescription Questions and Facts about Nutrition & Digestion on the next page.
Ending Ideas
Take Home Points

Self-Prescription Questions
How many glasses of water will you drink each day?
How many minutes will you be physically active each day?
How will you limit the amount of salt you eat?
What could be a consequence of eating too many sugary foods?

Facts about Nutrition & Digestion

- 66% of Americans are considered overweight or obese
- By walking an extra 20 minutes every day, an average person will burn off 7 pounds of body fat in a year.
- 20% of Americans over the age of 65 have type II diabetes.
- 90% of the cases of type II diabetes are due to excessive weight, lack of exercise, and poor diet.
- 80% of children who were overweight at age 10-15 were obese adults at age 25. Overweight children are much more likely to be obese adults.
- 17% of children under the age of 19 are obese
- The adult stomach can hold approximately 1.5 liters of material
- The colon (large intestine) contains more than 400 distinct species of bacteria
- On average, the stomach produces 2 liters of hydrochloric acid (HCL) for digestion
- The human body is 75% water
- The small intestine is 22ft. or 6 meters long.
- Humans make 1-3 pints of saliva per day
- The liver is the largest organ in the body (excluding the skin) the liver performs over 500 functions.

Physical Activity Level Chart

For more information on healthy eating, visit:
www.choosemyplate.gov
www.eatright.org
www.fruitsandveggiesmorerematters.org
Overview

• Explain that body composition is an important factor for determining risk for diseases like heart disease and diabetes.
• Body composition includes muscle mass, fat mass, body water and bone mass.
• Body composition can be estimated with tools such as Body Mass Index (BMI) and the Fat Loss Monitor - both tools estimate body fat percentage.
• Demonstrate healthy body fat ranges with BMI chart and Fat Loss Monitor.

What is Body Mass Index?

• Body Mass Index (or BMI) is an estimate of your body fat based upon a ratio of weight to height.
• Another important factor to look at for health risk is waist circumference. The larger your waist size/abdominal area, the greater the risk for heart disease and diabetes.
• BMI ranges and waist circumference guidelines for adults are shown in the table on the next page.
• BMI is a useful tool for determining disease risk. However, BMI does not take into consideration muscle or bone mass.

How does the Fat Loss Monitor Work?

• Body fat is tissue that has little electric conductivity. The Fat Loss Monitor sends an extremely weak electrical current through your body to determine the amount of fat tissue (versus lean muscle mass?)
• The monitor uses a method call Bioelectrical Impedance (BI). Body fat percentage is estimated by a formula that includes electric resistance, height, weight, age and gender.
• {Refer to attached instructions} - missing; need to find and include in this document if possible

Note to volunteer:
If visitors ask specific, individual questions about BMI, body fat, weight loss, etc., avoid trying to give personal advice. You can refer them to their physician or to "Find a Registered Dietitian" on the Academy of Nutrition & Dietetics Web page: http://www.eatright.org/programs/rdfinder/
### Risk of Associated Disease According to BMI and Waist Size

<table>
<thead>
<tr>
<th>BMI</th>
<th>Waist less than or equal to 40 in. (men) or 35 in. (women)</th>
<th>Waist greater than 40 in. (men) or 35 in. (women)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.5 or less</td>
<td>Underweight</td>
<td>N/A</td>
</tr>
<tr>
<td>18.5 - 24.9</td>
<td>Normal</td>
<td>N/A</td>
</tr>
<tr>
<td>25.0 - 29.9</td>
<td>Overweight</td>
<td>Increased</td>
</tr>
<tr>
<td>30.0 - 34.9</td>
<td>Obese</td>
<td>High</td>
</tr>
<tr>
<td>35.0 - 39.9</td>
<td>Obese</td>
<td>Very High</td>
</tr>
<tr>
<td>40 or greater</td>
<td>Extremely Obese</td>
<td>Extremely High</td>
</tr>
</tbody>
</table>

**NOTE:** BMI 30.0-34.9 = Obesity Class I; BMI 35.0-39.9 = Obesity Class II; BMI 40.0+ = Obesity Class III

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### Chart Showing Height & Weight ranges with Corresponding BMI

**Weight in Pounds**

<table>
<thead>
<tr>
<th>Height in Feet and Inches</th>
<th>Weight in Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>100</td>
</tr>
<tr>
<td>4'2&quot;</td>
<td>110</td>
</tr>
<tr>
<td>4'4&quot;</td>
<td>120</td>
</tr>
<tr>
<td>4'6&quot;</td>
<td>130</td>
</tr>
<tr>
<td>4'8&quot;</td>
<td>140</td>
</tr>
<tr>
<td>4'10&quot;</td>
<td>150</td>
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<td>5'</td>
<td>160</td>
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<td>210</td>
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<td>6'</td>
<td>220</td>
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<td>230</td>
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<tr>
<td>6'4&quot;</td>
<td>240</td>
</tr>
<tr>
<td>6'6&quot;</td>
<td>250</td>
</tr>
</tbody>
</table>

[http://www.freebicalculator.net](http://www.freebicalculator.net)
Experiment & Explain
Section 3: The Skinny on Fat

Overview:
• Explain the different types of dietary fats.
• Demonstrate amount of fat found in typical foods using the fat vials and food models. Note that each vial is labeled with its content.

The Skinny on Fat
• Fat sometimes gets a bad wrap but is actually essential to give our bodies energy and promote growth of cells.
• Fats help your body absorb certain vitamins and make hormones your body needs to regulate different bodily functions.
• Our bodies need fat – but not as much as some people may be eating.

What are the different types of dietary fats?
• The major types of fats we eat are:
  o Saturated and Trans fats aka “bad fats”
  o Monounsaturated and Polyunsaturated fats aka “better fats”
  o Saturated fats are carbon atoms saturated with hydrogen atoms and are solid at room temperature.
  o Foods high in saturated fat (fatty meat, bacon, sausage, poultry skin, lard, cream, butter) can increase your risk for heart disease because they can increase your LDL = “bad cholesterol” which clogs your arteries and causes plaque formation.
  o Trans fats are also solid at room temperature. They’re created during a chemical process when hydrogen atoms are added to liquid vegetable oils.
  o Foods high in trans fat (stick margarine, shortening, fried foods, hydrogenated oils) can increase your LDL = “bad cholesterol” and may also lower your HDL = “good cholesterol.”
  o Monounsaturated fats have one double-bonded/unsaturated carbon atom. These fats are liquid at room temperature and when refrigerated.
  o Foods rich in monounsaturated fat include: vegetable oils, avocados, olives, nuts, and seeds.
Polyunsaturated fats have more than one double-bonded/unsaturated carbon atom. These fats are also liquid at room temperature and when refrigerated.

Foods rich in polyunsaturated fat include: vegetable oils, nuts, seeds, and fatty fish like salmon and tuna.

Both poly- and monounsaturated fats can help lower risk for heart disease by helping to lower “bad” cholesterol levels in the body.

A Day's Worth of Fat
• Creates awareness about the dangers of a high-fat diet.

The heart-shaped bottle (pictured at left) contains simulated blood and ~98g of “fat.”

The bottle illustrates the estimated amount of fat a person consumes with a 2,200-calorie diet if eating 40% of calories from fat.

Everyone’s nutritional needs are different but in general, a healthy diet for adults consists of 20% to 35% of calories from dietary fat with an emphasis on “good” fats (monounsaturated and polyunsaturated) and less than 10% of total calories from “bad” (saturated) fat.

Sources: Academy of Nutrition and Dietetics; American Heart Association
Overview

- Explain the importance of a well-balanced diet for energy balance by reviewing the content below and on the following seven pages.
- Demonstrate with MyPlate, portion plate, food models, and/or balance scale.
- Ask visitors to "Plan a Healthy Plate" using portion plate and food models.
- If/when time permits, engage visitors with the "Healthy Helpings" MyPlate game by following instructions provided. This game is available in the Museum Gift Store.

Key Messages from MyPlate

- Eat 3 cups of vegetables and 2 cups of fruits every day.
- Substitute whole grain choices for refined grains (brown rice vs. white rice).
- Eat a variety of foods from the protein food group each week (seafood, lean meats and poultry, eggs, beans, peas, nuts).
- Choose skim or 1% milk, low-fat yogurt.
- Be physically active your way: Children and Teens need at least 60 minutes every day; Adults need at least 2½ hours every week of moderate level activity

Understanding MyPlate vs MyPyramid

- MyPlate is part of a larger communications initiative based on 2010 Dietary Guidelines for Americans to help consumers make better food choices.
- MyPlate illustrates the five food groups similar to MyPyramid but using a familiar mealtime visual, a place setting. The information about what and how much to eat has not changed—both MyPyramid and MyPlate are illustrations that are based on the same food groups and recommendations about what and how much to eat.
ChooseMyPlate.gov features practical information and tips to help Americans build healthier diets. It features selected messages to help consumer focus on key behaviors. Selected messages include:

**Balancing Calories**
- Enjoy your food, but eat less.
- Avoid oversized portions.

**Foods to Increase**
- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

**Foods to Reduce**
- Look out for salt. Compare sodium in foods like soup, bread, and frozen meals—and choose foods with lower numbers. Add spices and herbs to season food without adding salt.
- Choose foods and drinks with little or no added sugars. Drink water instead of sugary drinks. Select fruit for dessert and eat sugary desserts less often. Choose 100% fruit juice instead of fruit-flavored drinks.

For more information:
www.DietaryGuidelines.gov  
www.ChooseMyPlate.gov  
www.Health.gov/paguidelines  
www.HealthFinder
PLAN A HEALTHY PLATE ACTIVITY

As you review the following information, make the visitor experience more interactive by inviting them to “Plan a Healthy Plate” using the portion plate and food models.

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.

VEGETABLES
Vegetables are any vegetable or 100% vegetable juice counts as a member of the vegetable group. Vegetables may be raw or cooked; fresh, frozen, canned, or dried/dehydrated; and may be whole, cut-up, or mashed.

Vegetables are organized into 5 subgroups, based on their nutrient content. Dark Vegetables, Orange Vegetables, Dry Beans & Peas, Starchy, Other

Some commonly eaten vegetables in each subgroup are listed below.

<table>
<thead>
<tr>
<th>Dark green</th>
<th>Orange</th>
<th>Dry beans and peas</th>
<th>Starchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>broccoli</td>
<td>acorn squash</td>
<td>black beans</td>
<td>corn</td>
</tr>
<tr>
<td>collard greens</td>
<td>butternut squash</td>
<td>black-eyed peas</td>
<td>green peas</td>
</tr>
<tr>
<td>dark green leafy lettuce</td>
<td>carrots</td>
<td>garbanzo beans (chickpeas)</td>
<td>lima beans (green)</td>
</tr>
<tr>
<td>romaine lettuce</td>
<td>pumpkin</td>
<td>kidney beans</td>
<td>potatoes</td>
</tr>
<tr>
<td>spinach</td>
<td>sweet potatoes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other vegetables
Artichokes, asparagus, bean sprouts, beets, Brussels sprouts, cabbage, cauliflower, celery, cucumbers, eggplant, green beans, green or red peppers, iceberg (head) lettuce, mushrooms, okra, onions, tomatoes, tomato juice, vegetable juice, zucchini

FRUITS
Fruits may be fresh, canned, frozen, or dried, and may be whole, cut-up, or pureed. Any fruit or 100% fruit juice counts as part of the fruit group.
**Grains**
Any food made from wheat, rice, oats, cornmeal, barley, or another cereal grain is a grain product. Bread, pasta, oatmeal, breakfast cereals, tortillas, and grits are examples of grain products.

Grains are divided into 2 subgroups, whole grains and refined grains.

<table>
<thead>
<tr>
<th>Whole grains contain the entire grain kernel -- the bran, germ, and endosperm. Examples include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• whole-wheat flour</td>
</tr>
<tr>
<td>• bulgur (cracked wheat)</td>
</tr>
<tr>
<td>• oatmeal</td>
</tr>
<tr>
<td>• whole cornmeal</td>
</tr>
<tr>
<td>• brown rice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refined grains have been milled, a process that removes the bran and germ. This is done to give grains a finer texture and improve their shelf life, but it also removes dietary fiber, iron, and many B vitamins. Examples include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• white flour</td>
</tr>
<tr>
<td>• white bread</td>
</tr>
<tr>
<td>• white rice</td>
</tr>
</tbody>
</table>
**Vary your protein food choices.**
Choose lean protein foods, such as lean beef, pork, and turkey, skinless chicken, beans, or tofu. Twice a week, make seafood the protein on your plate.

**GO LEAN WITH PROTEIN**
All foods made from meat, poultry, fish, dry beans or peas, eggs, nuts, and seeds are considered part of the protein group. Dry beans and peas are part of this group as well as the vegetable group. Most meat and poultry choices should be lean or low-fat. Vegetarian options in this food group include beans and peas, soy products.

**Switch to skim or 1% milk.**
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 alternatives such as soy milk or include yogurt in your meal.

**DAIRY** All fluid milk products and many foods made from milk are considered part of this food group. Foods made from milk that retain their calcium content are part of the dairy group, while foods made from milk that have little to no calcium, such as cream cheese, cream, and butter, are not. Most milk group choices should be fat-free or low-fat.
**Eat fewer foods that are high in saturated fats.**
Select lean cuts of meats or poultry and fat-free or low-fat milk, yogurt, and cheese. Switch from solid fats to oils when preparing foods. Make foods that are high in solid fats (cakes, cookies, ice cream, pizza, cheese, sausages, hot dogs, etc.) occasional choices—not every day foods.

**SOLID FATS**
- Beef, pork, chicken fat
- Butter, cream, milk fat
- Coconut, palm and palm kernel oils
- Hydrogenated oil
- Partially hydrogenated oil
- Shortening
- Stick margarine

**OILS**
- Canola
- Corn
- Olive
- Peanut
- Safflower
- Sunflower
- Tub (soft) margarine
- Vegetable oil

**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. A number of foods are naturally high in oils, like:
- Nuts
- Olives
- Avocados
- Fish

- Processed foods that are mainly oil include mayonnaise, certain salad dressings, and soft margarine with no *trans* fats.
- Most oils are high in monounsaturated or polyunsaturated fats, (the healthy fats) and low in saturated fats (the unhealthy fat).
- Oils from plant sources (vegetable and nut oils) do not contain cholesterol. In fact, no foods from plants sources contain cholesterol. A few plant oils, however, including coconut oil and palm kernel oil, are high in saturated fats and for nutritional purposes should be considered to be solid fats.

**Solid fats** are fats that are solid at room temperature.

Solid fats come from many animal foods and can be made from vegetable oils through a process called hydrogenation.
Experiment & Explain

Section 5: Portion Distortion

Overview:
• Explain how food portions have become larger over the last 20 years.
• Demonstrate proper portion sizes with portion plate, food models, measuring cups/spoons, and/or balance scale.
• Test visitor knowledge with the “Portion Distortion Quiz.”

Food Portions Over the Past 20 Years
• Average portion sizes have grown tremendously over the past 20 years. Often times, a plate has enough food for two or three people.
• Larger portion sizes served in restaurants and other food establishments have changed what Americans perceive as a "normal" portion not only while dining out but also when eating at home. This is called portion distortion. The table below gives a few examples.

Comparison of Portions and Calories 20 Years Ago to Present Day

<table>
<thead>
<tr>
<th></th>
<th>20 Years Ago</th>
<th></th>
<th>Today</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portion</td>
<td>Calories</td>
<td>Portion</td>
<td>Calories</td>
</tr>
<tr>
<td>Bagel</td>
<td>3&quot; diameter</td>
<td>140</td>
<td>6&quot; diameter</td>
<td>350</td>
</tr>
<tr>
<td>Cheeseburger</td>
<td>1</td>
<td>333</td>
<td>1</td>
<td>590</td>
</tr>
<tr>
<td>Spaghetti w/meatballs</td>
<td>1 cup sauce, 3 small meatballs</td>
<td>500</td>
<td>2 cups sauce, 3 large meatballs</td>
<td>1,020</td>
</tr>
<tr>
<td>Soda</td>
<td>6.5 ounces</td>
<td>82</td>
<td>20 ounces</td>
<td>250</td>
</tr>
<tr>
<td>Blueberry muffin</td>
<td>1.5 ounces</td>
<td>210</td>
<td>5 ounces</td>
<td>500</td>
</tr>
</tbody>
</table>

Source: We Can! National Heart, Lung and Blood Institute Web site

• It’s important to understand the difference between portions and servings:

  portion → the amount of food you choose to eat at a meal or snack
  Examples: a bowl of cereal or a bottle of soda

  serving → a measured amount recommended for a certain food group
  Examples: one slice of bread or one cup (eight ounces) of milk
Proper Portion Sizes

- For a healthy diet, learn what proper portion sizes are for different foods. Refer to information on the following pages:
  "Know the Amounts You Need Each Day"
  "Make It Count"
  "Portion Cup Equivalents"

- Avoid oversized portions.
  Use a smaller plate, bowl and glass.
  Portion food out before you eat.
  Choose “small” instead of “large.”

- Don’t “clean” your plate.
  Share a meal or pack a portion to take home for another meal.
  Ask for half-sized portions.

- Learn to eyeball serving sizes.
  At home, use measuring cups or a food scale to measure foods you eat most often to help you know what an actual serving looks like when dining out.
  ➢ Demonstrate above points with portion plate, food models, measuring cups/spoons, and/or balance scale.
  ➢ Test visitor knowledge with the "Portion Distortion Quiz"

Sources: U.S. Department of Health and Human Services; National Institutes of Health, National Heart, Lung and Blood Institute; Academy of Nutrition and Dietetics
Know the amounts you need each day

1. Go to your chart. Choose your level of physical activity. Use these definitions to determine your lifestyle physical activity that is above the light activity of everyday life:

   Less Active: You average less than 30 minutes a day.
   Moderately Active: You average 30 to 60 minutes a day.
   Active: You average more than 60 minutes a day.

2. Choose your age range. Your physical activity level and age determine how many calories you need each day and your calorie needs determine how many fruits and vegetables you should eat.

### Women

<table>
<thead>
<tr>
<th>AGE</th>
<th>FRUITS</th>
<th>VEGETABLES</th>
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<tbody>
<tr>
<td>19-30</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
</tr>
<tr>
<td>31-50</td>
<td>1 1/2 cups</td>
<td>2 1/2 cups</td>
</tr>
<tr>
<td>51+</td>
<td>1 1/2 cups</td>
<td>2 cups</td>
</tr>
<tr>
<td>19-50</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
</tr>
<tr>
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<td>1 1/2 cups</td>
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<td>51+</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
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### Men

<table>
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<tr>
<th>AGE</th>
<th>FRUITS</th>
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<td>19-30</td>
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<tr>
<td>51+</td>
<td>2 cups</td>
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### Girls

<table>
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<th>VEGETABLES</th>
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<tbody>
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<td>2-3</td>
<td>1 cup</td>
<td>1 cup</td>
</tr>
<tr>
<td>4-8</td>
<td>1 1/2 cups</td>
<td>1 1/2 cups</td>
</tr>
<tr>
<td>9-13</td>
<td>1 1/2 cups</td>
<td>2 cups</td>
</tr>
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<td>14-18</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
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<td>2-3</td>
<td>1 cup</td>
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<td>4-8</td>
<td>1 1/2 cups</td>
<td>1 1/2 cups</td>
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<tr>
<td>9-13</td>
<td>1 1/2 cups</td>
<td>2 cups</td>
</tr>
<tr>
<td>14-18</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
</tr>
</tbody>
</table>

### Boys

<table>
<thead>
<tr>
<th>AGE</th>
<th>FRUITS</th>
<th>VEGETABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3</td>
<td>1 cup</td>
<td>1 cup</td>
</tr>
<tr>
<td>4-8</td>
<td>1 1/2 cups</td>
<td>1 1/2 cups</td>
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<tr>
<td>9-13</td>
<td>1 1/2 cups</td>
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<td>14-18</td>
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<tr>
<td>2-3</td>
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<td>4-8</td>
<td>1 1/2 cups</td>
<td>2 cups</td>
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<tr>
<td>9-13</td>
<td>2 cups</td>
<td>2 1/2 cups</td>
</tr>
<tr>
<td>14-18</td>
<td>2 1/2 cups</td>
<td>3 1/2 cups</td>
</tr>
</tbody>
</table>
make it count
Include fruits and vegetables throughout your day in little ways — for snacks, toppings, side dishes, or in your main meal. Whether they’re frozen, fresh, canned, or dried, all fruits and vegetables (including beans) count toward your daily amount.

Learn what 1 cup and 1/2 a cup look like:

**EXAMPLES OF 1 CUP**

- 1 large ear of corn
- 1 large orange
- 1 large sweet potato

**EXAMPLES OF 1/2 CUP**

- 5 broccoli florets
- 16 grapes
- 4 large strawberries

For more examples, visit 5aday.gov.

Simple ways to enjoy fruits and vegetables throughout your day:

**MORNING**

<table>
<thead>
<tr>
<th>1 cup</th>
<th>1/2 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 small apple</td>
<td>1 small banana</td>
</tr>
</tbody>
</table>

**MID-DAY**

<table>
<thead>
<tr>
<th>1 cup</th>
<th>1/2 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup of lettuce* and 1/2 cup of other vegetables</td>
<td>6 baby carrots</td>
</tr>
</tbody>
</table>

**EVENING**

<table>
<thead>
<tr>
<th>1 cup</th>
<th>1/2 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 large sweet potato and 1/2 cup of green beans</td>
<td>1/2 cup of fresh mixed fruit</td>
</tr>
</tbody>
</table>

In addition to fruits and vegetables, a healthy diet also includes whole grains, fat-free or low-fat milk products, lean meats, fish, beans, eggs and nuts, and is low in saturated fats, trans fats, cholesterol, salt, and added sugars.

* 1 cup of lettuce counts as 1/2 cup of vegetables.
What does 1 cup look like?

Fruits shown at actual size.

Hey kids! Color the fruit.

1 medium apple

1 large banana

1 cup

1 cup

2 ¾”

1 ½ cantaloupe (1 slice)

1 cup

½ cup

That’s just 1 cup divided in 2!

What about ½ cup?

Hey kids!

fruits & veggies
more matters™

fruitsandveggiesmorematters.org
Vegetables

What does 1 cup look like?

Vegetables shown at actual size.

1 small potato

1 large corn cob

12 baby carrots

What about ½ cup?
That’s just 1 cup divided in 2!

Hey kids! Color the veggies.

fruits & veggies
more matters™

fruitsandveggiesmorematters.org
Dried cup equivalents

1 cup fresh is equivalent to ½ cup dried!

Hey kids! It’s coloring time.

32 grapes = ½ cup raisins
Chopped, Mashed or Sliced

1 cup measures volume not shape

Heck kids! Have fun coloring.

1 cup chopped yam = 1 cup mashed yam = 1 cup sliced yam
Portion Distortion Quiz

You’ve probably noticed that food portions in restaurants and other places have grown in size and provide enough food for at least two people. Larger portion sizes can lead to bigger waistlines and weight gain.

Take the Portion Distortion Quiz below to see if you know how today's portions compare to the portions available 20 years ago, and about the amount of physical activity required to burn off the extra calories provided by today's portions. The answers are provided below.

1. A **bagel** 20 years ago was 3 inches in diameter and had 140 calories. How many calories do you think are in today's bagel?
   a. ❌ 150 calories
   b. ❌ 250 calories
   c. ❌ 350 calories

2. A **cheeseburger** 20 years ago had 333 calories. How many calories do you think are in today's cheeseburger?
   a. ❌ 590 calories
   b. ❌ 620 calories
   c. ❌ 700 calories

3. A 6.5-ounce portion of **soda** had 85 calories 20 years ago. How many calories do you think are in today's portion?
   a. ❌ 200 calories
   b. ❌ 250 calories
   c. ❌ 300 calories

4. 2.4 ounces of **french fries** of 20 years ago had 210 calories. How many calories do you think are in today's portion?
   a. ❌ 590 calories
   b. ❌ 610 calories
   c. ❌ 650 calories

5. A portion of **spaghetti and meatballs** 20 years ago had 500 calories. How many calories do you think are in today's portion of spaghetti and meatballs?
   a. ❌ 600 calories
   b. ❌ 800 calories
c. 1,025 calories

6. A cup of coffee with milk and sugar 20 years ago was 8 ounces and had 45 calories. How many calories do you think are in today's mocha coffee?

a. 100 calories
b. 350 calories
c. 450 calories

7. A muffin 20 years ago was 1.5 ounces and had 210 calories. How many calories do you think are in a muffin today?

a. 320 calories
b. 400 calories
c. 500 calories

8. Two slices of pepperoni pizza 20 years ago had 500 calories. How many calories do you think are in today's large pizza slices?

a. 850 calories
b. 1,000 calories
c. 1,200 calories

9. A chicken Caesar salad had 390 calories 20 years ago. How many calories do you think are in today's chicken Caesar salad?

a. 520 calories
b. 650 calories
c. 790 calories

10. A box of popcorn had 270 calories 20 years ago. How many calories do you think are in today's tub of popcorn?

a. 520 calories
b. 630 calories
c. 820 calories

Thank you for taking the Portion Distortion quiz. We hope it was fun and insightful. We also hope that next time you eat out, you will think twice about the food portions offered to you.
Answers
1. c: 350 calories for a 6 inch bagel. If you rake leaves for 50 minutes you’ll burn the extra 210 calories.*

2. a. 590 calories. You’ll need to lift weights for 1 hour and 30 minutes, to burn the extra approximately 257 calories.*

3. b. 250 calories for a 20-ounce soda. If you work in the garden for 35 minutes you will burn the extra 165 calories.**

4. b. 610 calories for a 6.9-ounce portion of french fries. If you walk leisurely for 1 hour and 10 minutes, you will burn the extra 400 calories.**

5. c. 1,025 calories for a portion consisting of 2 cups of pasta with sauce and 3 large meatballs. If you houseclean for 2 hours and 35 minutes, you will burn approximately 525 calories.*

6. b. 350 calories for a 16-ounce cup of coffee. If you walk approximately 1 hour and 20 minutes, you will burn the extra 305 calories.*

7. c. 500 calories for a 5-ounce muffin. If you vacuum for approximately 1 hour and 30 minutes you will burn the extra 310 calories.*

8. a. 850 calories for 2 large slices of pizza. If you play golf (while walking and carrying your clubs) for 1 hour, you will burn the extra 350 calories.**

9. c. 790 calories for a 3 cup portion. If you walk the dog for 1 hour and 20 minutes, you will burn the extra 400 calories.**

10. b. 630 calories for a tub of popcorn. If you do water aerobics for 1 hour and 15 minutes, you will burn the extra 360 calories.**

* Based on a 130-pound person
** Based on a 160-pound person
Experiment & Explain
Section 6: Hidden Salt & Sugar in Foods

Overview:
• Explain how there may be hidden salt and sugar in certain foods.
• Demonstrate by measuring portions of salt and sugar.
• Demonstrate with salt and sugar vials, food models, or sample food items.
• Explain what to look for on Nutrition Facts label using poster.

Change Your Salty Ways
• The average American consumes about 3,400 milligrams of sodium each day—more than twice the 1,500 milligrams recommended by the American Heart Association/American Stroke Association. To put this in perspective 1 teaspoon of salt is approximately 2,400 milligrams of sodium.
  ➢ Demonstrate with salt vials.
  ➢ Demonstrate by measuring 1 teaspoon of salt or ask visitor to measure.

• Changing your taste for salt may be challenging, especially since many of us have acquired a taste for salt, but making a change doesn’t have to be hard.
• The American Heart Association has identified the “Salty Six”— common foods that may contain too much sodium and thereby increase your risk for heart disease: (1) breads and rolls; (2) cold cuts and cured meats; (3) pizza; (4) poultry; (5) soup; (6) sandwiches
  ➢ Demonstrate with assorted food items or use food models.

• Also, become familiar with the Nutrition Facts label to help you track your sodium intake. Look for foods with less than 20 percent sodium or less than 140 milligrams of sodium per serving.
  ➢ Demonstrate with Nutrition Facts label poster—highlighting “Sodium”

Sources: American Heart Association, Academy of Nutrition and Dietetics
Shaking the Sugar Habit

• Sugar is a type of carbohydrate along with starches and fiber. The best carbohydrates to eat are whole grain breads, cereals, rice and pasta plus fruits and vegetables.

• Simple carbohydrates (simple sugars) occur naturally in foods such as fruit (fructose) or come from refined sources such as table sugar (sucrose) or corn syrup that are often added to foods.
  ➢ Demonstrate with sugar vials.
  ➢ Demonstrate by measuring 1 teaspoon of sugar versus 20 teaspoons of sugar (or ask visitor to measure).

• Also, become familiar with the Nutrition Facts label to help you identify added sugars. To find if sugars and caloric sweeteners have been added, you need to look at the ingredient list. Beware! Added sugars go by many different names, including:

<table>
<thead>
<tr>
<th>Added Sugars</th>
<th>Natural Sugars</th>
</tr>
</thead>
<tbody>
<tr>
<td>agave nectar</td>
<td>lactose</td>
</tr>
<tr>
<td>barley malt</td>
<td>maltodextrin</td>
</tr>
<tr>
<td>brown rice syrup</td>
<td>maltose</td>
</tr>
<tr>
<td>brown sugar</td>
<td>malt syrup</td>
</tr>
<tr>
<td>cane syrup</td>
<td>mannitol</td>
</tr>
<tr>
<td>corn syrup</td>
<td>maple syrup</td>
</tr>
<tr>
<td>dextrose</td>
<td>muscovado sugar</td>
</tr>
<tr>
<td>fructose</td>
<td>sorbitol</td>
</tr>
<tr>
<td>fruit juice concentrate</td>
<td>sucanat</td>
</tr>
<tr>
<td>high-fructose corn syrup</td>
<td>sucrose</td>
</tr>
<tr>
<td>glucose</td>
<td>sugar</td>
</tr>
<tr>
<td>honey</td>
<td>turbinado</td>
</tr>
<tr>
<td>invert sugar</td>
<td>xylitol</td>
</tr>
</tbody>
</table>

➢ Demonstrate with assorted food items or food models by showing (or asking visitors to guess) which foods have natural sugars (fresh fruit models) versus added sugars (soda, fruit punch, juice, tea, lemonade, energy drinks, candy, cookies, sweet rolls, ice cream products).

➢ Demonstrate with Nutrition Facts label poster—highlighting “Sugars” and Ingredient List.

Sources: American Heart Association, Academy of Nutrition and Dietetics, U.S. Food and Drug Administration's Center for Food Safety and Applied Nutrition, Office of Nutritional Products, Labeling, and Dietary Supplements, Candy Unwrapped Exhibit's "Hidden Sugars in Food Labeling."
Experiment & Explain
Section 7: Death of an Artery

Overview:
- Explain how plaque clogs an artery.
- Demonstrate with heart model (shared between Heart and Nutrition carts)
- Show how the progression of fatty build-up (plaque) can lead to clogging of the arteries.
- To help prevent plaque build-up, a diet low in saturated fat and regular physical activity are recommended.

Note to volunteer: Explore other sections of the Nutrition Discovery Cart for more information.
Experiment & Explain
Section 8: Water

Overview:
• Explain that water plays many important roles in the body and why it’s important to stay hydrated.
• Demonstrate with diagram on following page.

Daily Water Intake

Why is water so important?
Water is your body’s principal chemical component, comprising, on average, 60-75 percent of your weight. Every system in your body depends on water. Water flushes toxins out of vital organs, carries nutrients to your cells and provides a moist environment for ear, nose and throat tissues.

FACT
Every day you lose water through your breath, perspiration (sweat), urine and bowel movements.

For your body to function properly, you must replenish its water supply by consuming enough through beverages and foods that contain water.

How much water should you drink every day?
Studies show varying recommendations, but in truth, your water needs depend on many factors, including your health, how active you are and the climate where you live. Though no single formula fits everyone; knowing more about your body’s need for fluids will help you estimate how much water to drink each day.
Functions of Water in the Body

- Keeps Mucosal Membranes From Drying Out (Eyes, Mouth, etc.)
- Comprises At Least 3/4 of Total Body Mass & Substance
- Maintains Optimal Digestive Function & Elimination
- Permits the Absorption of Life-Essential Nutrients & Energy
- Maintains Optimal And Stable Heating & Cooling
- Facilitates Blood Flow, Cellular Reproduction, Movement & Life Itself
- Supports The Efficient Removal of Toxins & Waste From Internal Organs
- Primary Conduit For Delivering All Body Fluids, Molecular Messages And Especially Oxygen Delivery
- The Body Can Survive For Weeks Without Food, But Only A Few Days Without Water
- Without Water, Cells Cannot Grow, Reproduce or Survive, and the Entire Organism Dies
Estimating water needs for the average, healthy adult living in a temperate climate.

Replacement approach. The average urine output for adults is 1.5 liters a day. You lose close to an additional liter of water a day through breathing, sweating and bowel movements. Food usually accounts for 20 percent of your total fluid intake, so if you consume 2 liters of water or other beverages a day (a little more than 8 cups) along with your normal diet, you will typically replace the lost fluids.

Dietary recommendations. The Institute of Medicine advises that men consume roughly 3.0 liters (about 13 cups) of total beverages a day and women consume 2.2 liters (about 9 cups) of total beverages a day.

Apart from the above approaches, it is generally the case that if you drink enough fluid so that you rarely feel thirsty and produce between one and two liters of colorless or pale yellow urine a day, your fluid intake is probably adequate.

Factors that influence water needs
- Physical activity level
- Environment/Climate
- Illnesses or health conditions
- Pregnancy or breast-feeding

Staying Hydrated Safely
- Drink a glass of water before or after each meal and between meals.
- Hydrate before, during and after exercise.
- Substitute sparkling water for alcoholic drinks at social gatherings.

SIGNS AND SYMPTOMS OF DEHYDRATION
- Mild to extreme thirst
- Fatigue
- Headache
- Dry mouth
- Little or no urination
- Muscle weakness
- Dizziness/Lightheadedness

Dehydration
Failing to get enough water can lead to dehydration. Even mild dehydration—as little as a 1 percent to 2 percent loss of your body weight can sap your energy and make you tired. Common causes of dehydration include strenuous activity, excessive sweating, vomiting and diarrhea.

Overhydration
Though uncommon, it is possible to drink too much water. When your kidneys are unable to excrete excess water, the electrolyte content of the blood is diluted, resulting in a condition called hyponatremia (low sodium levels in the blood).

In general, drinking too much water is rare in healthy adults who consume a healthy diet. If you’re concerned about your fluid intake, check with your doctor or a Registered Dietitian. He or she can help you determine the amount of water that’s best for you.
Experiment & Explain
Section 9: Digestion and Intestinal Health

Overview:
• Explain the basics of digestive system.
• Explain the importance of dietary fiber for intestinal health.
• Demonstrate with digestive system model, digestive tract microscope slides, digestion biokit, and/or Dietary Fiber and Digestion images on page 3, and/or Nutrition Facts label poster.

The Basics of Digestion

Path of Digestion
• Starts in mouth with chewing
• Saliva - begins chemical digestion and breakdown of food
• Esophagus
• Stomach
• Small intestine
• Large intestine
• Rectum

➢ Demonstrate with digestive system model, digestive tract microscope slides, and/or digestion biokit.

The Importance of Dietary Fiber
• Dietary fiber is the non-digestible form of carbohydrates and is naturally found in plants. Fiber has a range of health benefits, from maintaining proper digestion, to helping lower cholesterol and helping maintain steady blood sugar levels. It is also associated with satiety (feeling full longer) and weight loss. However, only 5 percent of Americans are meeting their needs.
• Adult women need 25 grams of fiber per day; adult men need 38 grams.
• Best food sources: beans, peas, lentils, vegetables, fruits, whole grains, nuts
• On packaged foods, look for at least 3 to 5 grams of fiber per serving.
➢ Demonstrate with Nutrition Facts label poster—highlighting “Dietary Fiber.”

Sources: Dietary Guidelines for Americans 2010; Today’s Dietitian “Filling the Fiber Gap” Webinar
Dietary Fiber and Digestion

- **Stomach**: once chewed and swallowed, food enters the stomach, where the big pieces are broken down into much smaller pieces, so the body can pull nutrients out of the food. Typically, food stays in the stomach for one to three hours.

- **Small intestine**: this is the powerhouse of digestion, where food components are broken down to individual nutrients, and these nutrients are then absorbed into the body.

- **Colon or Large intestine**: the last part of the digestive system contains friendly bacteria, which feed on undigested fiber in a process called fermentation. Through this process, the bacteria provide other important components that support health.

---

**How do Fibers work to reduce blood cholesterol levels?**

Suggested Mechanism for the Cholesterol-Lowering Effects of Fibers

1. **Fibers**, soluble fibers in particular, bind bile acids in the small intestine. Bile acids are synthesized in the liver from cholesterol, and secreted into the small intestine.

2. The fiber-bile acids complex prevents bile acids from being reabsorbed from the small intestine, enhancing the secretion of bile acids.

3. To replace the lost acids, cholesterol is drawn from the circulation for the production of bile acids, thereby reducing the blood cholesterol levels.

Source: Bing Images
Experiment & Explain
Section 10: Physical Activity

Overview:
• Explain the health benefits of regular physical activity.
• Demonstrate with “The Heart is a Muscle” activity to expand visitor understanding of the function of the heart and their own target heart rate.

Physical Activity Charts

Ask visitors if they participate in physical activities.

Ask visitors their favorite ways to stay active.
Then, look up the activity on the Exercise Energy Expenditure Chart to see how many calories are burned with that activity.

Explain the importance of staying active for health and well being. (see next page)
Benefits of Regular Physical Activity

Want to feel better, have more energy and perhaps even live longer?
The merits of physical activity — from preventing chronic health conditions to boosting confidence and self-esteem — are hard to ignore. And the benefits are yours regardless of age, sex or physical ability. Need more convincing? Check out six specific ways exercise can improve your life.
(at right)

1. Physical activity improves mood.
2. Physical activity helps combat chronic diseases.
3. Physical activity helps with weight management.
4. Physical activity strengthens your heart and lungs.
5. Physical activity promotes better sleep.
6. Physical activity can be fun!

1. Exercise improves your mood.
Need to blow off some steam after a stressful day? A workout at the gym or a brisk 30-minute walk can help you calm down. Exercise stimulates various brain chemicals, which may leave you feeling happier and more relaxed than you were before you worked out. You’ll also look better and feel better when you exercise regularly, which can boost your confidence and improve your self-esteem. Exercise even reduces feelings of depression and anxiety.

2. Exercise combats chronic diseases.
Worried about heart disease? Hoping to prevent osteoporosis? Regular exercise might be the ticket. Regular exercise can help you prevent — or manage — high blood pressure. Your cholesterol will benefit, too. Regular exercise boosts high-density lipoprotein (HDL), or "good," cholesterol while decreasing low-density lipoprotein (LDL), or "bad," cholesterol. This one-two punch keeps your blood flowing smoothly by lowering the buildup of plaques in your arteries. And there's more. Regular exercise can help you prevent type 2 diabetes, osteoporosis and certain types of cancer.
3. Exercise helps you manage your weight.
Want to drop those excess pounds? Trade some couch time for walking or other physical activities. This one’s a no-brainer. When you exercise, you burn calories. The more intensely you exercise, the more calories you burn — and the easier it is to keep your weight under control. You don’t even need to set aside major chunks of time for working out. Take the stairs instead of the elevator. Walk during your lunch break. Do jumping jacks during commercials. Better yet, turn off the TV and take a brisk walk. Dedicated workouts are great, but activity you accumulate throughout the day helps you burn calories, too.

4. Exercise strengthens your heart and lungs.
Winded by grocery shopping or household chores? Don’t throw in the towel. Regular exercise can leave you breathing easier. Exercise delivers oxygen and nutrients to your tissues. In fact, regular exercise helps your entire cardiovascular system — the circulation of blood through your heart and blood vessels — work more efficiently. Big deal? You bet! When your heart and lungs work more efficiently, you’ll have more energy to do the things you enjoy.

5. Exercise promotes better sleep.
Struggling to fall asleep? Or stay asleep? It might help to boost your physical activity during the day. A good night’s sleep can improve your concentration, productivity and mood. And, you guessed it, exercise is sometimes the key to better sleep. Regular exercise can help you fall asleep faster and deepen your sleep. The timing is up to you — but if you’re having trouble sleeping, you might want to try late afternoon workouts. The natural dip in body temperature five to six hours after you exercise might help you fall asleep.

6. Exercise can be fun!
Wondering what to do on a Saturday afternoon? Looking for an activity that suits the entire family? Get physical! Exercise doesn’t have to be drudgery. Take a ballroom dancing class. Check out a local climbing wall or hiking trail. Push your kids on the swings or climb with them on the jungle gym. Plan a neighborhood kickball or touch football game. Find an activity you enjoy, and go for it. If you get bored, try something new. If you’re moving, it counts! Are you convinced? Good. Start reaping the benefits of physical activity today!
How much physical activity should I get?

For healthy adults younger than age 65, the American Heart Association and the American College of Sports Medicine recommend at least 30 minutes of moderate-intensity aerobic activity (think brisk walking or swimming) five days a week or at least 20 minutes of vigorous aerobic activity (such as running) three days a week, plus strength training exercises twice a week.

If you want to lose weight or meet specific fitness goals, you may need to increase your activity even more. Remember, the more active you are, the greater the benefits. If you can’t set aside time for a longer workout, try 10-minute chunks of activity throughout the day.

For adults age 65 and older and adults who have chronic health conditions, balance exercises are recommended in addition to aerobic activity and strength training exercises. At any age gentle stretching is also important.

Source: mayoclinic.com

Notes on Physical Activity
Physical activity simply means movement of the body that uses energy. Walking, gardening, climbing the stairs, playing soccer, or dancing the night away are all good examples of being active. For health benefits, physical activity should be moderate or vigorous and add up to at least 30 minutes most days for adults and at least 60 minutes every day for children.

Moderate physical activities include:

- Walking briskly
  (about 3 ½ miles per hour)
- Hiking
- Gardening/yard work
- Dancing
- Golf (walking and carrying clubs)
- Bicycling (less than 10 miles per hour)
- Weight training (light workout)
Vigorous physical activities include:

- Running/jogging (5 miles per hour)
- Bicycling (more than 10 miles per hour)
- Swimming (freestyle laps)
- Aerobics
- Walking very fast (4 ½ miles per hour)
- Heavy yard work, such as chopping wood
- Weight lifting (vigorous effort)
- Basketball (competitive)

Some physical activities are not intense enough to help you meet the recommendations. Although you are moving, these activities do not increase your heart rate, so this may not count toward the 30 or more minutes a day that you should strive for. These include walking at a casual pace, such as while grocery shopping, and doing light household chores.
The Heart is a Muscle Activity
Adapted from HEADS UP Nutrition/Physical Activity Second Edition
© 2008 The University of Texas Health Science Center at Houston

Materials Needed
• Copies of "The Heart is a Muscle" Worksheet (optional)
• Calculators
• Stopwatches

Talking Points
• If someone's heart beats an average of 80 times in each minute, how many times does the heart beat in a day? In a 365-day year? In an 80-year lifetime? The answers are, respectively, 115,200; 42,048,000; and 3,363,840,000!
• The heart is actually a muscle, so like any muscle, the more it is exercised the better it will work. We're going to do an activity that is a way to find out how good of a condition your heart muscle is in. First, you need to know your target heart rate.
• **Target Heart Rate** is the heart rate range that should be maintained during aerobic exercise for 20 minutes for optimal cardiovascular fitness. The range is also called the Target Heart Rate Zone.

<table>
<thead>
<tr>
<th>Target Heart Rate Zone Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Limit= (220-age) x 50% (0.5)</td>
</tr>
<tr>
<td>Upper Limit= (220-age) x 75% (0.75)</td>
</tr>
</tbody>
</table>

**Example**
What is the Target Heart Rate Zone for a 20 year-old person?
Lower Limit = (220 - 20) x 50% = 100 bpm
Upper Limit = (220 - 20) x 75% = 150 bpm
A 20 year old person’s target heart rate zone = 100 to 150 bpm
The Heart is a Muscle Worksheet

Note to volunteer: You can simply help visitors calculate their target heart rate. If there is time and interest, you can assist them with the remaining portion of the activity.

1. Calculate your target heart rate. (formula on previous page)
2. Take your resting heart rate. (Remember, time your pulse for 15 seconds and multiply by 4.) Write it in the table below.
3. Do some kind of physical activity for 2 minutes. You may run in place, do sit ups or push ups, jumping jacks, or whatever you prefer as long as it is active enough to get your heart rate really pumping.
4. As soon as you finish, you will count your pulse for 15 seconds.
5. When finished, you will wait for ten seconds. At the end of the waiting period, you will take your pulse again. Continue this pattern of waiting and then taking it for ten seconds until your rate has returned to normal, or until the table is filled, whichever comes first.

<table>
<thead>
<tr>
<th></th>
<th>Beats counted in 15 seconds</th>
<th>Multiplied by 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting (example)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resting (yours)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediately after exercising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30 seconds after exercising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-50 seconds after exercising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-70 seconds after exercising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-90 seconds after exercising</td>
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<tr>
<td>100-110 seconds after exercising</td>
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<tr>
<td>120-130 seconds after exercising</td>
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Conclusion

• People who exercise regularly often have very low resting heart rates because their hearts are stronger and pump more blood each time they contract.
• During exercise, these healthy hearts quickly soar to within target range. Also, the better shape your heart is in, the faster your heart rate will return to normal.
• To have a healthy heart, it is important to do some kind of physical activity that puts your heart into its target range for at least 60 minutes of moderate activity every day. Do you have a healthy heart?
EFFECT OF SALT INTAKE ON BLOOD PRESSURE

Information below can be used to tie in Nutrition Cart with Heart Cart

• Sodium is an important mineral that our body needs, but only in small amounts. Too much sodium (salt) in the diet causes fluid build up that can lead to high blood pressure, stroke, heart failure, kidney disease, blindness and other health problems.

• High blood pressure is dangerous because it makes your heart work too hard, hardens the walls of your arteries, and can cause the brain to hemorrhage.

• For dietary guidelines and ways to cut sodium, visit the Museum’s Nutrition Discovery Cart. Here are a couple of quick insights:
  o Most people consume twice as much sodium as potassium. For good health, what is desired is a ratio closer to five times more potassium than sodium. This can be accomplished by eating a variety of vegetables and fruits – these are rich sources of potassium.
  o The minerals potassium and magnesium both play a role in blood pressure regulation: potassium is an electrolyte that helps regulate blood pressure and fluid balance by aiding in heart and kidney function while magnesium dilates arteries for better blood flow.

Sources: American Heart Association; Academy of Nutrition and Dietetics; Escott-Stum 2012
EFFECT OF SMOKING ON TASTE

Information below can be used to tie in Lung Cart with Nutrition Cart

• Smoking dulls senses such as smell and taste that together impact our ability to taste food and in turn can affect whether we enjoy the right kinds of food for good health.
• Taste sensitivity depends mainly on chemical sensors in taste buds of the tongue that help us distinguish among the different types of flavor: sweet, sour, salty, bitter, and umami. This is why smokers may tend to salt their food more—because they cannot taste as well so it can take more seasoning for them to be able to taste better. But too much salt in your diet can negatively affect your health. (See section: “Effect of Salt Intake on Blood Pressure”)
• Taste relies heavily on olfaction (the sense of smell), which is why you may notice food doesn’t taste as good when you have a cold.
• Smoking affects chemoreceptors both on the tongue and in the nasal passages, which “attacks” the ability to taste.
• Smoking can even affect the shape of taste buds. Some studies have found that taste buds on smokers’ tongues are flatter than taste buds of nonsmokers. Not only does quitting smoking improve your lung function, it can also help restore taste buds and improve sense of taste.

Sources: Discovery Health; MedicineNet.com; MedLine Plus; WebMD
ANTIOXIDANTS / ANTIOXIDANT FOODS

Information below can be used to tie in Lung Cart with Nutrition Cart

• **Oxidative stress** = damage from “too much oxygen” and inflammation at the cellular level from too much exposure to **free radicals** = highly reactive molecules with unpaired electron that try to “steal” electrons from other molecules.

• Some free radicals form normally during metabolism. Sometimes our immune system cells create them to neutralize viruses and bacteria. However, environmental factors such as pollution, radiation, **cigarette smoke** and herbicides can also generate free radicals.

• Normally, the body can handle free radicals, but if antioxidants are unavailable, or if free radical production becomes extreme (like from aging), damage can occur.

• Antioxidants are nutrients found mostly in plant foods that carry natural properties that are health protective. A diet rich in antioxidants is associated with lower risks for many types of diseases and premature aging.

• **Antioxidants** such as Vitamins A, C, and E neutralize free radicals by donating one of their own electrons, which prevents the electron-"stealing" reaction. Antioxidant nutrients act like scavengers, helping to prevent cell and tissue damage that could lead to cellular damage and disease.

• **Best Antioxidant Foods** are fruits, vegetables, beans, and spices. Visit the Museum’s Nutrition Discovery Cart to learn more about MyPlate and healthy eating.

Sources: Academy of Nutrition and Dietetics; Health Check Systems