

Grade 6: Healthy Eating

Lesson 4 - Healthy Eating for the Cardiovascular System: What is a Heart-Healthy Diet?

Lesson 5 - Healthy Eating for the Circulatory System: Good Fats, Bad Fats

Objectives:

Lesson 4:

1. Record food intake for a week.
2. Analyze food intake and categorize into food groups.
3. Identify the elements of a heart-healthy diet.
4. Read food labels and analyze ingredients to determine whether or not the product is heart-healthy.
5. Create a personal dietary plan that is heart-healthy.

Lesson 5:

1. Observe the nature of various fats (solid or liquid) when heated and at room temperature.
2. Make predictions and hypotheses.
3. Draw conclusions based on observations.

Materials:

Lesson 4:

- Food journal
- Food Journal Analysis (**See Figure 1**)
- Heart Healthy Diet article (**See Figure 2**)
- Food labels—have each student bring in two labels with ingredients listed in detail
- Food Label Analysis (**See Figure 3**)
- Elements of a Heart Healthy Diet (**See Figure 4**)
- Elements of a Heart Healthy Diet - Sample Answers (**See Figure**)

Lesson 5:

- Plastic drinking straws (six for each group)
- $\frac{3}{4}$ cup each of the following:
 - Shortening (Crisco)
 - Butter
 - Margarine (stick)
 - Olive oil
 - Canola oil
- Plastic drinking straws (six for each group)
- Gumdrops or small marshmallows (to close the ends of the straws)
- Masking tape and pens to label the straws
- Large paper plates (one for each group) to hold the filled straws

Activity Summary:

Lesson 4: Students will keep track of and analyze their own diets. After learning the elements of a heart-healthy diet, students will categorize foods into those that are good for heart health and those that are not. Students will read labels and analyze the food products, determining whether or not they are heart-healthy. Students may choose to create their own dietary plans for heart health.

Lesson 5: This experiment demonstrates the “solid” nature of saturated fats such as lard, butter, or stick margarine vs. the “liquid” nature of other fats such as olive oil and canola oil. Fats are observed slightly warmed and at room temperature. Fats that are liquid at room temperature are believed to clog the arteries less than the more saturated fats that remain solid at room temperature.

Background Information for the Teacher:

Lesson 4:

What you eat directly affects your heart! To maintain a healthy heart and Cardiovascular System, your heart must remain strong and your arteries must remain flexible and clear. The food we eat can help keep our arteries clear and flexible, but if we eat a diet that is not heart-healthy, eventually the arteries can clog and become stiff and brittle. There are primarily two areas of heart health that can be affected by diet—cholesterol and blood pressure.

Cholesterol is something we all have—our liver actually produces it. But cholesterol is also found in many of the foods we eat—particularly meats, dairy products and eggs. (Vegetables, fruits, and whole grains don’t contain cholesterol.) There are two types of cholesterol—LDL, which is considered harmful, and HDL, which is considered good for the body. (If you have trouble remembering which is good or bad, think L for lousy—LDL cholesterol is lousy for the body.)

When a person has too much LDL cholesterol, this can contribute to **plaque** building up in the arteries. Over time, plaque build-up can narrow the arteries and cause **atherosclerosis**, or hardening of the arteries. The arteries then are no longer clear and flexible, but clogged and brittle.

Some people appear to be genetically predisposed to high cholesterol, but eating a heart-healthy diet may help these people keep their cholesterol under control. The heart-healthy diet below gives tips for eating foods that are likely to lower LDL cholesterol while raising HDL cholesterol. In addition, a heart-healthy diet is good for overall health and wellness.

Blood pressure can also be affected by diet. Nutritionists have studied how to lower blood pressure with a regimen similar to the diet that reduces cholesterol. Researchers have formulated the DASH (Dietary Approaches to Stop Hypertension) eating plan which has been found to lower blood pressure

significantly. The DASH diet emphasizes fruits and vegetables, whole grains, low-fat milk products, and low-fat protein sources such as fish, poultry, and beans. The most effective DASH plan also limits sodium in the diet. In order to reduce sodium in the diet, limit the salt used in cooking and at the table. Be very careful to read labels on processed, packaged food, as these foods can be very high in sodium. (For more information on the DASH diet from the National Institutes of Health, go to <https://www.nhlbi.nih.gov/health-topics/dash-eating-plan> and click on “The DASH Eating Plan.”)

Building a Heart-Healthy Diet

A heart-healthy diet is generally **high in fiber and low in saturated fats**.

High fiber foods include whole grains, fruits, vegetables and beans. The less processed these foods are, the more fiber is present to help keep arteries clean and contribute to heart health. For example, eating a whole orange provides good fiber that the juice alone doesn’t have. **Choose whole fruits over juices.** **Vegetables** that are fresh and lightly steamed, sautéed, or eaten raw provide more fiber than those that are juiced or over-cooked. For a snack choose half an apple, some carrot sticks and a piece of cheese instead of juice and a cookie.

Beans provide both fiber and protein, and are an excellent heart-healthy choice. Whether you are cooking dry beans or opening a can, they can be combined with vegetables in salads, stews or casseroles. Beans can be combined with whole grains and cheese for a high-protein meal that is still healthy for the heart. You can also benefit by adding soy bean products such as soy milk and tofu to your diet. Edamame is the soy bean pod vegetable now sold widely, fresh or frozen. Include it with carrot and celery sticks for an after-school snack or in a lunch. Scientists studying the effects of beans on heart health are finding that they can lower LDL cholesterol (the kind you don’t want) while raising HDL cholesterol (the kind you do want).

Whole grains are an important building block of a heart-healthy diet. Choose whole grains over refined grain products such as white bread, white rice, or other products from refined flour. Look for bread that contains whole wheat or other whole grain flour. (The label must specify whole grain—many breads that claim to be “wheat bread” are actually made from refined flour, not whole grain flour.) Eat brown rice instead of white rice, and include some other grains in your diet, such as millet or barley.

Practice reading labels and choose grain products that include a high percentage of whole grains, low sugar, and low fat. For example, read the labels on cereal boxes. You will find that most are made from refined flour, sugar, and fat. Compare labels to see if you can find the one with the most whole grains and the least sugar and fat. Better yet, instead of eating packaged cereal, choose oatmeal or another whole grain. Oats and other whole grains are beneficial because the fiber reduces cholesterol and can also lower blood pressure.

It is extremely important to **eat a diet low in saturated fats**. This doesn't mean no fats, however. We all need a certain amount of fat in our diet, but it's important that it be from healthy fats such as nuts, seeds, olive oil or canola oil. Reduce high-fat meats such as beef and pork, as well as high-fat dairy products (whole milk cheeses, whole milk, and butter.) Lowfat dairy products are good sources of protein even though they contain a little fat.

Some of the most harmful saturated fats are found in stick margarine (which has had the fat altered to hold its shape) and packaged baked goods such as cakes, cookies, and donuts. Often these products contain **trans-fats**, a form of saturated fat that is particularly harmful to the body. Another food that is extremely high in saturated fat and trans-fats is French fries. A steady diet of hamburgers, French fries and sodas is a prescription for obesity and heart disease!

In summary, **a heart-healthy diet is high in fiber from whole grains, fruits, and vegetables, but low in saturated fats**, reducing the consumption of red meat and high-fat dairy products. Also included are low-fat dairy products, as well as other sources of lean protein, such as fish and beans. Fats are included in the form of nuts, seeds, olive oil, and canola oil. Foods likely to be high in trans-fats such as French fries, packaged bakery goods, and other sugary snacks are kept to a minimum.

Lesson 5:

The fats used in this lesson should be warmed ahead of time so they are all in liquid form. One way to do this is in a warm-water bath on a hot-plate. Put each fat in a heat-resistant glass measuring cup and place the cups in a shallow pan filled with water. Place on the hot plate and warm the fats until they are all liquid. (The olive oil and canola oil don't need to be warmed to become liquid, but for the sake of the experiment, it's better to compare all the fats at the same temperature.)

Vocabulary:

Lesson 4:

- atherosclerosis
- blood pressure
- cholesterol
- plaque
- fiber
- saturated fat
- unsaturated fat

Lesson 5:

- fats
- saturated fats
- unsaturated fats

Lesson 4: Healthy Eating for the Cardiovascular System: What is a Heart Healthy Diet?

Engage:

While you are doing other lessons in this unit, and before you begin this lesson, have students keep a **food journal** for a week. Have them report **everything** they eat—even snacks, candy, and other junk food. You're not trying to have them change their eating habits right now—just report them accurately. Ask students to be specific. For example, if they eat bread, identify what kind of bread.

Help students remember to do this exercise by devoting a few minutes at the beginning of the day to write down what they had for breakfast. Do the same after lunch. Remind them to write down what they eat after school, for dinner, and before bed.

Explore: Food Journal Activity

Have students categorize the foods in their journals by day (**see Figure 1** at the end of the lesson - Food Journal Analysis), filling out a sheet for each day of the week. Go through the food journal day by day and record what was eaten into the correct category. Finally, have students answer the following questions:

- 1) Which category had the most foods consumed?
- 2) Calculate the average number of servings of fruits and vegetables per day.
- 3) How many of the grains were **whole grains**?
- 4) How much of the dairy was **low fat**? (1% milk or 2% milk, lowfat or nonfat yogurt, lowfat or nonfat cottage cheese, reduced fat cheese.)
- 5) How many of the fats consumed were olive oil, canola oil, or other **unsaturated fats**?
- 6) What foods are you eating too much?
- 7) What foods do you need to eat more often?

Explain:

Have students read the article on a Heart Healthy Diet (**see Figure 2**). Discuss what it means to eat a heart-healthy diet.

To help students read the article carefully, utilize an active reading activity. Divide the class into groups, assigning each group a section of the article. Have each

group create a chart listing the important ideas from their section. Have them construct charts similar to the one shown below.

Healthy for the Heart	NOT Healthy for the Heart
<p>Low cholesterol Clean arteries Low blood pressure</p> <p>High fiber foods Whole grains Fruits and vegetables</p> <p>Etc.</p>	<p>High cholesterol Blocked arteries High blood pressure</p> <p>Refined flour High fat Lots of sugar</p> <p>Etc.</p>

Share the charts with the whole class and post them in the classroom.

Extend: Label Activity

Have students bring in labels from packaged foods. Each student should bring at least two labels. Have students work in groups to analyze food values on the labels, then have them fill in the **Food Label Analysis (see Figure 3)** sheet for each label.

Have a discussion about the foods. Which foods appear to be the most heart-healthy? Why?

Web Research:

Have students do research on the Web. Go to www.familydoctor.org and search for the following articles:

- Nutrition: Healthy Food Choices
- Nutrition: Tips for Kids
- Cholesterol: What Your Level Means
- Nutrition and Exercise: Healthy Balance for a Healthy Heart
- Diet: Keeping a Food Diary

Go to www.kidshealth.org and search for articles on cholesterol and heart health.

Have students create their own diet plan, listing good food choices for them for each meal of the day.

Create a “healthy snack” list and post in the classroom.

Evaluate:

Have students complete the chart “Elements of a Heart Healthy Diet” (**see Figure 4**). Encourage them to refer to the articles and the charts posted in the classroom.

Lesson 5: Healthy Eating for the Circulatory System: Good Fats/Bad Fats

Engage:

Divide the class into groups of three or four students. Give each group six plastic straws and tell students they will be conducting an experiment about nutrition and the heart. Ask if they can guess what the straws represent. (Hint: What does the heart use to transport blood to the body? *[Arteries.]*)

Have students hypothesize what problems could arise with the arteries (*they can become blocked with plaque*). Explain that nutrition can affect the build-up of plaque in the arteries, and one of the key elements is the amount and type of fats we eat. This experiment will compare how different kinds of fats might build up in the arteries.

Explore:

1. Have each group pre-label their straws with the names of the fats. Have them put their group name on their paper plate.
2. Have each group hypothesize which fats they think will clog the arteries and which they think won't clog the arteries. Have one student record the working hypothesis in each group.
3. Have students take turns filling their straws with the fats by carefully sucking some into the straw, without swallowing any. Holding a finger over one end of the straw, cap the open end with a gumdrop, then cap the other end. Place the straw on the paper plate.
4. When all groups have finished, have them put the paper plates in a safe place to keep overnight. (The place should be cool, but not refrigerated.)
5. The next day, have each group examine their straws and record which ones still contain liquids and which straws now have solid or sticky fats inside. Compare results.

Explain:

Ask: **“Which fats are better for heart health?”** (*Olive oil and canola oil—the less saturated oils.*) **“Which fats might contribute to a build-up of plaque in**

the arteries?” (Lard, shortening, margarine, butter—the more saturated or solid fats.)

Extend:

Have each group of students research a different kind of fat: saturated fats, poly-unsaturated fats, mono-unsaturated fats, and trans-fats. Have them read and/or conduct Web research to determine what foods are in the category of fats they are researching. (Good sites are www.familydoctor.org and www.kidshealth.org.) Have each group post a list in the classroom and indicate whether the fats are considered harmful or beneficial. **(Point out, however, that even beneficial fats still shouldn't be consumed in excess. Calories from fat should be less than 30% of the total calorie intake for a day.)**

Evaluate:

1. Have each group (or student) write a lab report of the experiment, including the following:
 - the question
 - the methodology
 - the results
 - the conclusions

2. Have each group present their reports while the rest of the class evaluates each report's thoroughness.

Missouri Standards:

Health and Physical Education Frameworks:

II. Health Maintenance and Enhancement

B. Nutrition Principles and Practices

What All Students Should Know:

3. Choose my Plate (www.choosemyplate.gov) is a visual tool representation of daily nutrient needs and the food groupings that can provide them.

What All Students Should Be Able To Do:

a. Organize the foods into groups with similar nutrient composition.

What All Students Should Know:

8. Food labels can be analyzed to determine calories and nutrients in a product plus serving size, types of ingredients, and nutritional value.

What All Students Should Be Able To Do:

a. Analyze food labeling information to determine calories, nutrients and serving size in a product.

Figure 1:

Food Journal Analysis

Day:

	Grains (cereal, bread, crackers, pasta, rice, etc.)	Fruits & Vegetables	Dairy (milk, cheese, yogurt, ice cream, etc.)	Meat, eggs, poultry, fish, beans	Nuts, seeds, nut butters, oils	Other (snack foods, chips, candy, cookies, etc.)
Breakfast						
Lunch						
After school						
Dinner						
Before bed						
Other						

Figure 2

EATING A HEART-HEALTHY DIET

What you eat directly affects your heart! To maintain a healthy heart and cardiovascular system, your heart must remain strong, and your arteries must remain flexible and clear to transport the blood in your body. The food we eat can keep our arteries clear and flexible, but if we eat a diet that is not healthy, eventually arteries can clog, becoming stiff and brittle. Your diet can directly affect your **cholesterol** and **blood pressure**, each of which are important for heart health.

Cholesterol is something we all have—our liver actually produces it. But cholesterol is also found in many of the foods we eat—particularly meats, dairy products and eggs. (Vegetables, fruits, and whole grains don't contain cholesterol.) There are two types of cholesterol—LDL, which is considered harmful, and HDL, which is considered good for the body. (If you have trouble remembering which is good or bad, think L for lousy—LDL cholesterol is lousy for the body.)

Having too much LDL cholesterol can contribute to **plaque** building up in the arteries. Over time, plaque build-up narrows the arteries and causes **atherosclerosis**, or hardening of the arteries. The arteries are then no longer clear and flexible, but become clogged and brittle.

Although some people appear to inherit problems with high cholesterol, eating a heart-healthy diet is one way to help keep cholesterol under control. The heart-healthy diet below gives tips for eating foods that help lower LDL cholesterol while raising HDL cholesterol. In addition, a heart-healthy diet is good for overall health and wellness.

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Some of the most harmful saturated fats are found in stick margarine (which has had the fat altered to hold its shape) and packaged baked goods such as cakes, cookies, and donuts. Often these products have **trans-fats**, a form of saturated fat that is particularly harmful to the body. Another food extremely high in saturated fat and trans-fats is French fries. A steady diet of hamburgers, French fries and sodas is a prescription for obesity and heart disease!

In summary, a **heart-healthy diet** is **high in fiber** from **whole grains, fruits, and vegetables**. It is also **low in saturated fats** (red meat and high-fat dairy products.) A heart-healthy diet also includes low-fat dairy products, as well as other sources of lean protein such as fish and beans. Fats are included in the form of nuts, seeds, olive oil, and canola oil. Foods likely to be high in trans-fats such as French fries, packaged bakery goods, and other sugary snacks should be kept to a minimum.

Figure 3:

Food Label Analysis

Product Name:

Type of food—what is the major food group?	
Does the food contain any whole grains ? What are they?	
How much fiber does the food contain? What do you think provides the fiber?	
How much fat does the product contain? How much saturated fat ? Are there any trans-fats listed? How much?	
How many carbohydrates does the product contain? How much sugar ?	
How much protein does the product contain? What do you think provides the protein?	

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Figure 4: Elements of Heart Healthy Diet.

Figure 5: Elements of Heart Healthy Diet Sample Answers