

DRAFT

**Grade 4
Unit 4**

FOOD AND NUTRITION

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I. Grade Level: 4

II. Unit Title: Food and Nutrition

III. Unit Length: 4-5 Weeks

IV. Major Unit Goal/Learning Outcome:

The learner will be able to:

- recognize and defend the requirement of energy for organisms to grow
- identify how calories can be used to compare the chemical energy of foods
- explain living organisms get energy and nutrients from food
- classify starches and sugars as carbohydrates
- establish that different components make up food

V. Objectives in RBT Tag Chart

Unit Title: Food and Nutrition		Number of Weeks: 6
Number	Competency or Objective	RBT Tag
4.01	Explain why organisms require energy to live and grow.	B-2
4.02	Show how calories can be used to compare the chemical energy of different foods.	C-3
4.03	Discuss how foods provide both energy and nutrients for living organisms.	B-4
4.04	Identify starches and sugars as carbohydrates.	C-2
4.05	Determine that foods are made up of a variety of components.	A-2

VI. ELD/EC

VII. Materials and Equipment:

Lesson One

- Chart of the food pyramid
- Baby pictures of your students
- Pictures of malnourished children

Lesson Two

- Walnut
- Needle
- Cork
- 1 liter of water
- Saucepan large enough to hold 1 liter of water
- Ringstand [something to sit the saucepan on so you can burn the walnut under it]
- A match or lighter
- Chart of the Food Pyramid (Be certain this is a copy of the “new” pyramid, 2006)

Lesson Three

- Pint jars with lids for each group
- Samples of food from each of the five food groups
- Poster of the food pyramid
- Water,
- Poster Paper
- Markers

Lesson Four

- Six cans of soda
- Aquarium
- Glucose testing strips [9 strips for each group you have]
- Bananas
- Milk
- 3 different kinds of apples
- Table sugar
- Oranges
- Maple syrup
- Honey
- Paper plates
- Small paper cups

Lesson Five

- George Washington’s Breakfast by Jean Fritz
- Tincture of iodine
- Food samples [banana, apple, boiled egg, potato, white bread, cheese, Corn starch, butter, granulated sugar, and crackers]
- Paper plates
- Medicine Dropper
- Paper and markers

Lesson Six

- One tablespoon of: peanut butter, butter, potato chips, bologna, cheese, applesauce, grapes (crushed), and bread broccoli.
- Paper towels or brown paper bags
- Nutrient labels from a variety of foods
- Poster board
- Magazines
- Newspapers
- Glue sticks
- Markers

VIII. Big Idea

Students in elementary school should have a variety of experiences that provide initial understandings for various science-related personal and societal challenges. Central ideas related to health, populations, resources, and environments provide the foundations for students' eventual understandings and actions as citizens.

Teachers should be aware of the concepts that elementary school students have about health. Children link eating with growth, health, strength, and energy, but they do not understand these ideas in detail. They understand connections between diet and health and that some foods are nutritionally better than others, but they do not necessarily know the reasons for these conclusions. <http://www.nap.edu/readingroom/books/nses/6c.html#ls>

From food, people obtain energy and materials for body repair and growth. Children should explore ways in which good health can be promoted. Here, they can begin to understand some of the evidence, though not in great detail.

By the end of the 4th grade, students should know that

- Food provides energy and materials for growth and repair of body parts. Vitamins and minerals, present in small amounts in foods, are essential to keep everything working well. As people grow up, the amounts and kinds of food and exercise needed by the body may change.
- The indigestible parts of food are eliminated.

These Benchmarks were found under “The Human Organism” for Science Benchmarks 2061

http://www.project2061.org/publications/bsl/online/ch6/ch6.htm#E_E

X. Global Content

NC SCOS Grade 4	21 st Century Skills	Lesson
	Communication Skills	
4.01,4.03,4.05	Conveying thought or opinions effectively	Lessons 1, 3, and 5
4.03,4.05	When presenting information, distinguishing between relevant and irrelevant information	Lessons 3 and 5
4.03,4.05	Explaining a concept to others	Lessons 3 and 5
4.02	Interviewing others or being interviewed	Lesson 4
	Computer Knowledge	
4.03, 4.04, 4.05	Using word-processing and database programs	Lessons 3, 4 and 5
4.03, 4.04, 4.05	Developing visual aides for presentations	Lessons 3, 4 and 5
4.03, 4.04	Using a computer for communication	Lessons 3 and 5
	Learning new software programs	
	Employability Skills	
4.01, 4.03, 4.05	Assuming responsibility for own learning	Lessons 1, 3 and 5
4.03, 4.05	Persisting until job is completed	Lessons 1, 3 and 5
4.02, 4.05	Working independently	Lessons 2 and 5
4.02	Developing career interest/goals	Lesson 2
	Responding to criticism or questions	
	Information-retrieval Skills	
4.01,4.02 ,4.03, 4.05	Searching for information via the computer	Lessons 1,2,3,4 and 5
4.01, 4.02, 4.03,4.04, 4.05	Searching for print information	Lessons 1,2,3,4and 5
4.01, 4.04	Searching for information	

	using community members	
	Language Skills - Reading	
4.05	Following written directions	Lesson5
	Identifying cause and effect relationships	Lessons 3 and 5
4.03, 4.05	Summarizing main points after reading	Lessons 3 and 5
4.03, 4.05	Locating and choosing appropriate reference materials	Lessons 1 and 3
4.01,4.03	Reading for personal learning	
	Language Skill - Writing	
4.01	Using language accurately	Lesson 1
4.03	Organizing and relating ideas when writing	Lesson 3
4.03	Proofing and Editing	Lesson 3
4.02	Synthesizing information from several sources	Lesson 2
	Documenting sources	
	Developing an outline	
	Writing to persuade or justify a position	
4.03	Creating memos, letters, other forms of correspondence	Lesson 3
	Teamwork	
4.04	Taking initiative	Lesson 4
4.01, 4.02, 4.03, 4.05	Working on a team	Lessons 1,2,3, and 5
	Thinking/Problem-Solving Skills	
4.02, 4.04	Identifying key problems or questions	Lessons 2 and 4
4.01,4.03,4.04, 4.05	Evaluating results	Lessons 3,4,and 5
4.02,4.03	Developing strategies to address problems	Lessons 2 and 3
4.01, 4.03	Developing an action plan or	Lessons 1 and 3

XI. Vocabulary

Calcium – A mineral needed to build and maintain bones and teeth. It also helps to regulate body processes such as blood clotting, muscle contraction and relaxation. Foods in the Milk group are good sources of calcium.

Carbohydrates – Starches and sugars are carbohydrates. Grains, fruits, and vegetables are good sources of carbohydrates.

Cholesterol – a waxy substance found in animal cells and tissues. Some cholesterol is needed for the body to function properly, but too much cholesterol may cause thickening and hardening of the arteries.

Combination Food – Food that contains two or more of the five food groups.

Energy – Energy is needed for growth, for physical activity, and for maintaining body processes. Food provides energy to the body from proteins, carbohydrates, and fats.

Fat – One of the three major nutrients. It can be found in body tissues of animals and in some plants. It serves as a carrier of the fat-soluble vitamins A,D, E, and K.

Food – Material that may contain carbohydrates, fats, protein, and vitamins and minerals. Foods provide an organism with the energy it needs to live and grow.

Food Groups – System of classifying foods that translates nutrient recommendations into useful, daily eating patterns. Based on their nutrient content, foods are grouped into one of Five Food Groups: Milk, Meat, Fruit, Vegetable, or Grain; or into the “Others” category.

Fruit and Vegetable Groups – Foods from these groups are good sources of vitamin A and vitamin C. Fresh, frozen, canned, dried, and pureed fruits and vegetables and their juices are included in these groups.

Glucose – A sugar found in plants, fruits, and blood. It is a source of energy for living things.

Grain Group – Foods from this group are good sources of carbohydrates, thiamin, niacin, and iron. Barley, buckwheat, corn, oats, rice, rye, wheat, and the breads, cereals, pastas, and other products made from grains are included in this group.

Ingredient – One of the substances that makes up a compound or mixture.

Iodine – An element consisting of blackish-grey crystals.

Iron – A mineral that is an important part of hemoglobin the red blood cells. This nutrient helps the body resist infection. Foods in the meat Group and grain Group are good sources of iron.

Leader Nutrients – Ten nutrients are used to classify foods into one of the Five Food Groups. The leader nutrients are: protein, carbohydrates, fat, vitamin A, vitamin C, thiamin (B1), riboflavin (B2), niacin, calcium, and iron.

Meat Group – Foods from the Meat Group are good sources of protein, iron, niacin, and thiamin. Meat, fish, poultry, eggs, legumes, and nuts are included in this group.

Milk Group – Food from the Milk Group are good sources of calcium, riboflavin, and protein. Milk, cheese, yogurt, ice cream, ice milk, and other foods made from milk are included in this group.

Minerals – Nutrients from the earth that occur in small amounts in foods and beverages. Minerals are needed for cell structure and in regulating body processes. Calcium and iron are examples of minerals.

Niacin - A vitamin that helps maintain healthy skin, the nervous system, and the digestive tract. Foods in the Meat Group and Grain Group are good sources of niacin.

Nutrient – A chemical substance in food that works together with the body's own chemicals to provide energy; to build, repair and maintain body tissues; and to regulate body processes.

Nutrition – The way the body uses food for energy, maintenance, and growth.

“Others” Category – Foods not included in the five food groups because of their low nutrient content. Some of these foods are sweets, fats and oils, chips and related products.

Protein – Protein is needed to build and maintain body tissue, to regulate body processes, and to supply energy. The best sources of protein are foods from the Milk Group and Meat group.

Riboflavin (Vitamin B2) – Riboflavin is essential for healthy skin and good vision in bright light. Foods in the Milk Group are good sources of riboflavin.

Starch – A carbohydrate that is made and stored in plants.

Thiamin (Vitamin B1) – A nutrient that is essential for the use of carbohydrates for energy. It is needed for maintaining normal appetite, muscle tone, and nervous system functioning. Foods in the Meat Group and the Grain Group are good sources of thiamin.

Vitamin A (Retinol) – A nutrient that is essential for the growth of all cells and for maintaining the mucus membranes that line the eyes, respiratory tract, and digestive tract. Vitamin A helps eyes adapt to changes in light intensity – making night vision possible. Foods in the Fruit Group and Vegetable Group are good sources of vitamin A.

Vitamin C (Ascorbic Acid) – A nutrient that is necessary for the formation of connective tissues that bind body cells together. It also helps to heal wounds and bones and helps maintain the elasticity and strength of blood vessels. Foods from the Fruit Group and Vegetable Group are good sources of vitamin C

Vitamins – They enable the body to use food to grow and be healthy. They are essential for good health.

Water – Water is a part of all body tissues and fluids. It is the most abundant substance in the body. Water is essential for maintaining body

temperature, respiration, and the chemical reaction that enable the body to digest and use food.

Lessons and Objectives:

Lesson 1: "Let's Eat!" Mastering the Food Pyramid	4.01
Lesson 2: "That's How Many Calories?"	4.02
Lesson 3: "You Are What You Eat!"	4.03
Lesson 4: "Carbohydrates-Nature's Energy Food"	4.04
Lesson 5: Starches as Carbohydrates	4.04
Lesson 6: Food Labels- Guides to Healthful Living	4.05

Lesson 1: “Let’s Eat!” Mastering the Food Pyramid

Time: 7 class periods

Objective:

4.01 Explain why organisms require energy to live and grow.

Materials:

- Chart of the food pyramid
- Baby pictures of your students
- Pictures of malnourished children

Teacher Notes:

In order to live and grow, living organisms require energy to make and repair new cells. They get this energy from food, water, and oxygen. If an organism eats too little, it will not grow and be healthy. If an organism eats more than its body can use as energy, the extra food will be stored as fat.

Engage:

Several weeks before you plan to introduce this unit, have each student bring in a baby picture. When you are ready to begin the unit, make a bulletin board of the baby pictures. Number the pictures and have the students try to match each picture to a classmate.

Then lead a discussion on what the students know about how their body grows. You might ask questions like:

1. Are you the same size you were in your baby picture?
2. How can you tell that you have grown?
3. Do you know what helps your body grow?
4. Do you know what could prevent your body from growing?

Explore:

Our bodies are always changing. In order to grow, our cells need nutrients. We get these nutrients from the food we eat. If we eat a balanced diet, our bodies will grow and repair itself. If our body does not get the nourishment it needs, then it will start to break down and possibly die.

Let the students chart their growth over a time period of one month. Have them weigh and measure their height once a week. At the end of the unit let the students analyze their data to see if they have grown any during the

month. After you finish the unit, the students might like to continue charting their growth.

In order to get energy to live and grow, your body needs nutrients from many sources. The best way to make sure your body gets these vital nutrients is to eat a balanced diet. We have an excellent tool to help us eat correctly. It is the Food Pyramid.

Begin this lesson with a picture or pictures of malnourished children. Ask your students why they think these children look like they do. What could they do to improve their health? What can you do to make sure that your body gets everything it needs to live and grow?

Point to the chart of the Food Pyramid you have displayed on the board. Tell the students that they are going to learn how to use the Food Pyramid to help them choose the foods that will enable their body to grow and repair itself. If you have access to computers, the students will enjoy doing their research on the web site:

kidshealth.org/kid/stay_healthy/food/pyramid.html. If you don't have access to computers and the internet, you will need to print the information from the website and give it to your students.

Using the internet site or the information you provided to the students, have them answer these questions:

- 1. What are the six food groups according to this food pyramid?*
- 2. How do you eat a balanced diet?*
- 3. Why are some of the bands on the pyramid skinnier than others?*
- 4. How might eating apples be good and bad for you?*
- 5. Do all children need the same amount of calories each day? Why or why not?*
- 6. How many ounces of grains do you need each day?*
- 7. How many cups of vegetables do you need each day?*
- 8. How many cups of fruit do you need each day?*
- 9. How many cups of milk or other calcium-rich foods do you need each day?*
- 10. How many ounces of meats, beans, fish, and nuts do you need each day?*

Explain:

Students can record their answers to the questions in the "Explore" activity in their science notebooks. Within their groups, ask students to then share their answers and discuss differences in students' responses. Ask one

student from each group to then share their groups' discussion with the class.

1. What differences did each group find?
2. Why were there differences of opinion?
3. Do we all eat the same foods each day? Why not?
4. What influences the foods we eat?
5. Do we, as students, need to make better choices of the foods we eat? Why or Why not?

Extend:

Ask students to take a copy of the food pyramid home to share with their parents. Were their parents surprised at the location of foods in the pyramid?

Ask each student to choose recipes from a cookbook at home for tomorrow night's dinner, making sure that the menu includes all parts of the food pyramid.

Evaluate:

Using the information the students have gathered and the food pyramid, ask students design a menu for a day that includes the correct amount of servings from each food group.

Lesson 2: How Many Calories?

Time: 6 class periods

Objective:

4.02 Show how calories can be used to compare the chemical energy of different foods.

Materials:

- Walnut
- Needle
- Cork
- 1 liter of water
- Saucepan large enough to hold 1 liter of water
- Ringstand [something to sit the saucepan on so you can burn the walnut under it]
- A match or lighter
- Chart of the Food Pyramid

Teacher Notes:

Some foods contain more calories than others. Have you ever wondered how to determine how many calories a food may contain?

Engage:

This demonstration involves using an open flame. Check with the guidelines for your school system before you do this demonstration. You may begin this demonstration by leading a discussion about calories. Ask questions to find out what your students already know about calories. You may ask questions like:

- *Have you ever looked at a food label and seen the word calorie?*
- *Do you know how scientists determine how many calories a food contains?*
- *Do you know how your body uses calories?*

[A calorie is the amount of heat needed to raise 1 gram of water 1 degree Celsius. This is a “small calorie”. The large “Calorie” in food calories is equal to 1,000 small calories, and is spelled with a capital “C”.]

You will need to put an unshelled walnut on the point of a needle and place the other end of the needle in a cork so that the cork will support the walnut on the end of the needle. Place the walnut under the ringstand on which you have placed a sauce pan with one liter of water in it. The walnut

should be one inch from the ringstand. Measure, in Celsius, the temperature of the water and record it where the students can see it. When the walnut stops burning, measure the temperature of the water again. Record the temperature of the water. Have the students subtract the temperature of the water before the walnut was burned from the temperature of the water after the walnut was burned. The difference in temperature tells us how much energy was released by the walnut when you burned it. This energy is measured in calories.

Explore:

Have the students make a list of their favorite foods. They should include three foods from each of the sections of the food pyramid. There are many sites on the internet that allow you to research how many calories a food contains. One good one is www.caloriecounter.com. Let the students record how many calories their favorite foods contain. When they record this data, have them also record how much is considered a serving. The amount of a serving might come as a surprise to many students. [This lesson may also be a good time to incorporate a math unit on measurement.]

Explain:

Using the data they collected, have the students make up a menu for a day that contains approximately 1500 calories. The menu should follow the guidelines for servings set by the Food Pyramid Collect the menus the students developed. Ask each group to post their menu on a flip chart. Post the menus for all of the students to review and see if they agree. Discuss any disagreements on total number of calories.

- *Which foods provide lots of calories, but not many nutrients?*

Extend:

Give each student a box of crayons. On the blackboard or whiteboard, assign a color to each of the food groups. [Red – Meat group, Brown – Bread and Grains, Green – Vegetables, Yellow – Dairy, and Purple – Fruits.] Call out a food from the food Pyramid. Have the students hold up the crayon that represents the food group the food belongs to. This is a quick way to evaluate if the students understand which foods belong to which food group. The students might like to take turns calling out foods for their classmates to categorize.

Children today eat lots of fast food. Visit the websites for fast food restaurants to see how many calories are in the food offered on their menus at their restaurants.

Evaluate:

Have the students exchange menus. Have them evaluate another student's menu to see if they planned a meal that was approximately 1500 calories. They should also check to see if the menu follows the guidelines set by the Food Pyramid.

Lesson 3: You are What You Eat

Time: 5 class periods

Objective:

4.03 Discuss how foods provide both energy and nutrients for living organisms.

Materials:

- pint jars with lids for each group
- samples of food from each of the five food groups
- poster of the food pyramid
- water,
- poster paper
- markers

Teacher Notes:

Living organisms grow and develop. In order to grow and develop, they turn food into energy. The energy your body uses to move and do things like walk, run, and lift things is chemical energy. Chemical energy comes from the food you eat. Chemical energy is stored in the particles that make up food. Large particles of food must be broken down into very small particles before they can be absorbed into the body. Digestion is the breaking down of food so it can be used by the body to make energy that is required for the body to live and grow.

Engage:

Play a game of Simon Says. Have your students run in place, do jumping jacks, and just move around to use up some energy. Then engage the students in a discussion of why they were able to play the game. Some question you might ask:

- How do you feel when you haven't eaten for several hours?
- Do you feel tired?
- What makes you feel better?
- Did you know that food is what gives you energy to move and do things?
- Do you know how food changes into energy in your body?
- Let's see if we can find out how that happens?

Provide each group of students with a pint jar with a lid. Try to put the students into five groups. Have the students put one half cup of water in

the jar. Give each group of students a food to put in the jar with the water. Give the students about one half cup of the food you chose for their group. Try to use a food from each of the food groups that make up the food pyramid.

Have the students put the food you have given them into the jar and caution them to screw the lid on tightly. Then instruct them to shake the jars and observe what has happened to the food. Have them shake the jars again. Observe how the food has changed. Ask what part of the body the jar is representing. The student should conclude that the jar is like the stomach. Have a poster of the five food groups displayed in the room. Let each group show the jar they worked with and tell into which food group they think their food belongs. The students should notice that some of the foods dissolved more than others. Discuss if this happens in our stomachs. How would this information help us decide what kinds of food to choose to eat?

Explore:

In order for food to give us energy, it has to be broken down into tiny particles. This process is accomplished by our digestive system. Have your students research the digestive system. This can be done in several ways. Part of our goal for this unit is to use technology. There are several very good internet sites that can be used to research this topic.

- www.kidshealth.org/kid/body/digest
- www.yucky.discovery.com/flash/body/pg000126.html
- www.library.thinkquest.org/5777/dig3.htm

Using your search engine, you will be able to find many sites. Search with “kids digestive systems”. You should preview the sites before you let your students work with the sites. Some of the sites include other body systems and they get very graphic with material you may not think is appropriate for fourth graders.

If you do not have access to the internet, then do the research using encyclopedias, books or textbooks.

The parts of the digestive system that should be researched.

1. Mouth
2. Esophagus
3. Stomach
4. Liver
5. Small intestine
6. Large intestine

Assign each child one part of the digestive system to research. Give the students a time to have their research completed. After the research is completed, form groups consisting of students with information on each part of the digestive system.

Explain:

Each group will consist of a student who researched the mouth, one who researched the esophagus, one who researched the stomach etc. There should be six students in each group. Tell them that they will be giving a group presentation on the digestive system and how it changes food into energy for us to live and grow. Give each group a large piece of paper. The paper should be large enough for one of the students to lie on the paper while the other students trace his or her body. The students may then make a graphic of the digestive system to use in their presentation. Encourage creativity in the presentations. The students may incorporate music, poetry, costumes and more art work.

Extend:

Students can make models of the organs that make up the digestive system out of clay.

Working with your music teacher, have the students use the music to one of their favorite songs to write new lyrics to the song. The new lyrics should tell how our bodies use foods to provide energy and nutrients to our bodies.

Evaluate:

Have the students write a paragraph in which they explain the process the body uses to change food into energy so that the body can live and grow.

Lesson 4: Carbohydrates – Nature’s Energy Food

Time: 6 class periods

Objective:

4.04 Identify sugars as carbohydrates.

Materials:

- 6 cans of soda
- Aquarium
- Glucose testing strips [9 strips for each group you have]
- Bananas
- Milk
- 3 different kinds of apples
- Table sugar
- Oranges
- Maple syrup
- Honey
- Paper plates
- Small paper cups

Teacher Notes:

Sugars are sweet substances made by green plants and are used mainly by people to get energy. Sugar belongs to a larger group of substances called saccharides or carbohydrates. Sugar can be found naturally in many foods. Glucose can be found in apples, grapes, raisins, bananas, and corn. Sucrose can be found in sugar beets and sugar cane. Fructose can be found in apples, pears, and peaches. Lactose can be found in milk. Glucose is a major source of energy for our bodies. Our cells first go to glucose to get energy. Then they go to fats. Lastly they go to proteins.

Engage:

To get the students interested in learning about sugars as carbohydrates, try this demonstration. Ask the students if they know the difference between a diet soda and a regular soda. They should know that the regular soda has sugar in it and a regular soda does not. A regular can of soda may contain as much as 8 teaspoons of sugar. Sugar weighs more than water. Therefore a regular soda will weigh more than a diet soda. You will need 6 cans of soda and an aquarium that is 3/4 filled with water. Each pair of sodas should contain 1 regular can and 1 diet can of the same

flavor and brand. Ask the students what they think will happen when you put the cans of soda in the aquarium. As you place the cans in the aquarium let the students observe that the regular sodas sink further down in the water. The weight of the sugar in the regular sodas causes them to sink more.

Let the students compare the ingredients in the sodas. Corn syrup will be the main difference. It is glucose. Tell them that they will conduct an investigation to see which foods contain glucose.

Explore:

You will need to provide glucose testing strips, the kind diabetics use to test their glucose levels. These can be purchased at the drugstore. [They may be called TES-Tape.] You will also need ripe bananas, milk, 3 different kinds of apples, table sugar, oranges, maple sugar, honey, paper plates and small cups. Put small amounts of each of these foods into small cups. [Prepare enough samples for each group to have one of each of the 9 samples.]

Have the students gather 9 glucose strips and a sample of each of the foods on a paper plate. Each group should make a chart listing each of the food samples. Have the students touch each of the food samples with the glucose testing strip. As they test each food, they will then record on their chart the color of the glucose testing strip.

Explain:

After the students have gathered their data, discuss these questions.

1. *Which foods contain glucose or simple sugar?*
2. *How did you determine that these foods contained glucose? [Dark green is a sign of glucose or simple sugar.]*
3. *Were some of the green colors darker than others?*
4. *What do you think the darker color means?*
5. *Did all of the food test positive for glucose?*
6. *Which foods did not contain glucose?*

Extend:

There may be students in your class or members of your student's families that deal with diabetes. Students can research this disorder. As they research, they can determine what causes a person to develop diabetes. They can also research how people manage the disorder.

A doctor or nurse can come to your class and discuss how your body uses sugar to give you energy.

Evaluate:

Have the students bring in food ingredient labels from five different foods. Have them identify the sugars that are present in the five samples they chose. [Sugars include honey, corn sweeteners, brown sugar, and any words that end in “ose”.]

Lesson 5: Starches as Carbohydrates

Objective:

4.04 Identify starches as carbohydrates.

Time: 5 class periods

Materials:

- George Washington's Breakfast by Jean Fritz
- Tincture of iodine
- Food samples [banana, apple, boiled egg, potato, white bread, cheese, Corn starch, butter, granulated sugar, and crackers]
- Paper plates
- Medicine Dropper
- Paper and markers

Teacher Notes:

Our body needs a constant supply of energy to keep working. Starches and sugars in foods provide our body with most of the energy it needs to grow and repair. Carbohydrates are made up of two groups. They are starches and sugars. Starches are broken down by our bodies and turned into sugar. It takes starches longer to digest than sugars. Sugars can be broken down into sucrose, lactose, fructose, glucose, and other sugars. Our bodies use sugars to get quick energy. Glucose is a major source of energy for our bodies. It can pass directly from our small intestines into our bloodstream.

Engage:

Lead the students in a discussion of what carbohydrates are. They probably are familiar with the word carbohydrates because of the popularity of low “carb” diets. They have more than likely heard their parents discussing carbohydrates. Ask them what kinds of foods they think are considered as carbohydrates? What do you think makes a food a carbohydrate? What are some of your favorite foods that contain carbohydrates? [As you lead the discussion, try to help the students discover that starches and sugars make foods carbohydrates.]

Read the book George Washington's Breakfast by Jean Fritz. After reading the book, have the students decide which foods they think contained carbohydrates.

Explore:

Starches are found in wheat, oats, corn, rye, potatoes, and rice. Starch will turn a bluish-black color when it comes in contact with iodine. Tell the students that there is a test to see if a food contains starch. Tell them that they are going to conduct the test today. They will do this by placing iodine on samples of food. Tincture of iodine can be purchased at a pharmacy. [Be sure to buy iodine that is not decolorized. Decolorized iodine will not give the results we want]. The iodine you buy will probably be 4.4% solution. Dilute the iodine by mixing 10 ml (1/3 oz) of iodine with 250ml (8 oz) of water. Store the solution in a brown bottle to prevent light from causing it to weaken. Iodine is poisonous and it stains whatever it touches. Keep this in consideration when deciding if you will administer the iodine to the food or if you think your students are mature enough to do it themselves. Give each group a paper plate and a medicine dropper. Each group will need a thin slice of banana, apple, potato, white bread, cheese, boiled egg white, and butter. They will also need a small amount of cornstarch, granulated sugar, and a cracker. Have the students arrange the samples of food on their plate. Using the medicine dropper apply some of the iodine solution to the food samples. Let the samples sit for a few minutes. Have the students examine the food samples. Have the students make a chart to show the results of their investigation. The title can be RESULTS OF TEST FOR STARCH. The chart should contain all the foods the students tested with the iodine solution. There should be three columns. One labeled turned bluish-black, one labeled turned brown, and one labeled no results. The students should then chart the results of their investigation. Some of the samples should have turned a bluish-black color. These are the foods that contain starches.

Explain:

Display the charts from each group and compare the results. From the charts decide which foods contain starches.

Extend:

Have the students write down everything they eat in a day. Then have the students analyze their choices. See if they are eating an appropriate amount of carbohydrates. Why would this be important for their bodies to function properly?

Evaluate:

Have the students research starches and how they affect the body. They should make a list of foods that are considered starches. If possible, have them use the internet to do this. Then have the students write a paragraph to tell how they will use the information they have learned about starches as carbohydrates to help them monitor their food choices.

Lesson 6: Food Labels – Guide to Healthful Living

Time: 5 class periods

Objective:

4.05 Determine that foods are made up of a variety of components.

Materials:

- One tablespoon of: peanut butter, butter, potato chips, bologna, cheese, applesauce, grapes (crushed), and bread broccoli.
- Paper towels or brown paper bags
- Nutrient labels from a variety of foods
- Poster board
- Magazines
- Newspapers
- Glue sticks
- Markers

Teacher Notes:

In order for our bodies to grow properly we need a variety of nutrients. These nutrients are starches, sugars, fats, proteins vitamins and minerals. When our bodies are deprived of certain nutrients, diseases will result. This lesson will help students determine that foods are made up of several nutrients, all of which help our bodies function properly.

Engage:

One way to introduce nutrients is to do a simple fat test. Ask the students if they have ever eaten foods that left a greasy taste in their mouths. That greasy taste is a nutrient called fat. Ask them if they think fat is good for their bodies. You will probably get a range of answers. Our bodies need some fat to function properly, but too much fat can cause problems. See if they can identify some of the problems caused when too much fat is consumed. Get small samples of foods. Some should contain lots of fat like peanut butter, butter, potato chips, bologna, and cheese. Also have foods like applesauce, grapes, bread, broccoli, and etc. that are very low in fat content. Put small amounts of the foods on paper towels or brown paper bags. Let the student predict which foods they think will contain fat. Let the samples sit over night. The next day, have the students observe which foods left fat deposits on the paper.

Lead a discussion of how this information can help them make good food choices.

Explore:

Using food labels from an assortment of foods from all the food groups, have the students make a list of nutrients contained in the food. Research the nutrients they find listed on the labels. Included in the research should be which foods the nutrients can be found in, and what each nutrient does to keep the body healthy. Be sure to include technology when researching these nutrients. Use whatever resources are available to you in your school.

These nutrients should be covered.

1. Proteins – *Proteins are necessary for growth and tissue repair. Foods such as meats, fish, poultry, milk, eggs, beans, peas, nuts, bread, and cereals are good sources of proteins.*
2. Carbohydrates – *Starches and sugars make up carbohydrates. They give the body most of its energy. Carbohydrates make up almost one half of the calorie intake for most people. Protein can also be found in carbohydrates in such foods as rice, wheat, corn, and potatoes. Sugars provide energy but no nutrients. Sugars are empty calorie foods. Sugars lead to tooth decay and should be a limited part of a healthy diet.*
3. Fats and Oils – *These are a concentrated source of energy. An oil is a liquid fat. Fats work with vitamins to keep your body healthy. Fats also cushion vital organs. They make up part of all body cells, and they help to maintain body temperature. Fats remain longer in the stomach and therefore you will not get hungry as quickly if you eat fats. Saturated fats are usually in solid form and come from animals. These fats can raise the level of cholesterol in the blood. Cholesterol is a waxy substance that is produced naturally by the body. It helps your body digest food.*
4. Minerals – *These are neither animal nor vegetable. They are inorganic. Some of the minerals your body needs are iron, calcium, phosphorus, sodium, potassium, iodine, magnesium, zinc, and copper. Most minerals are easily obtained by eating a good balanced*

diet. Sometimes it is hard to get enough iron, and you will need to take a supplement.

5. *Vitamins - Vitamins can be either fat-soluble or water-soluble. The fat-soluble vitamins are vitamins A, D, E and K. They can be stored in the body for a long period of time. Vitamin A is needed for strong bones, good vision, and healthy skin. It is found in dark green and yellow fruits and vegetables. Vitamin D helps calcium and phosphorus to form straight, strong bones and teeth. With direct sunlight on the skin, the body can produce Vitamin D. Vitamin E helps to protect vitamin A and red blood cells. Vitamin K is made by bacteria in the intestinal tract. Water soluble vitamins are Vitamin B and Vitamin C. Vitamin N helps maintain healthy skin and a well functioning nervous system. Vitamin C, or ascorbic acid, is need for building the connective tissue that holds body cells together. It is also essential for healthy teeth, gums, and blood vessels.*
6. *Water – Water is needed to carry nutrients to all parts of the body. It helps regulate body temperature and to eliminate wastes. Water makes up 60% of an adult’s body weight.*

Explain:

After the students have researched the nutrients, place them in groups and assign each group a nutrient. Provide each group with poster paper, magazines, newspapers, glue sticks and markers. On the poster paper each group should include the name of the nutrient they were assigned, and what the nutrient does for the body to keep it healthy. The rest of the poster should be a collage of foods that contain the nutrient. When each group is finished, let each group present their poster to the class. The collages can then be displayed in the classroom.

Extend:

Water makes up a lot of the food we eat. It is not considered a nutrient, but your body must have it to function properly. You can do a test similar to the fat test at the beginning of this unit to show the students how food dries up when the water is removed. Some of their cereals contain dried fruit that rehydrates when they add milk to the cereal. You can also bring in powdered milk, dried fruits such as apples, raisins, cranberries, and etc. As a tie-in to Social Studies you can discuss how the early settlers in North

Carolina used the drying method to preserve their food before they had refrigeration.

This is some interesting data on the water content of food fourth graders like to eat.

Lettuce.....	95%
Yogurt.....	90%
Pizza.....	50%
Carrots.....	90%
Apples.....	85%
Bread.....	35%

Evaluate:

Cut tag board in the shape of a deck of cards. Let the students make a set of cards with the nutrients and what they do for your body. The students can play concentration to help them remember what the nutrients do to keep their bodies healthy. After the students have played the game several times, you can give a test to see if they remember what the nutrients do for our bodies.

Assessment Questions

- (4.01) In order to live and grow, living organisms require energy to make and repair new cells. This energy comes from _____.
- a. food, shelter, and water
 - b. food, water, and oxygen**
 - c. food, oxygen, and shelter
 - d. water, oxygen, and shelter
- (4.01) If an organism eats more than its body can use as energy, the extra food will be stored in the body as _____.
- a. food
 - b. blood
 - c. fat**
 - d. oxygen
- (4.01) The best way to make sure your body gets all the important nutrients it needs is to use the _____ as a guide for eating.
- a. Food Pyramid**
 - b. Newspaper
 - c. Cook Book
 - d. Magazine
- (4.02) The amount of chemical energy in foods is measured in or by _____.
- a. inches
 - b. centimeters
 - c. energy
 - d. calories**
- (4.02) Which of these foods would give you more energy?
- a. lettuce 0 calories
 - b. meat 250 calories
 - c. corn 90 calories
 - d. cake 500 calories**

(4.03) _____ is the breaking down of food so it can be used by the body to make energy.

- a. calories
- b. digestion**
- c. energy
- d. nutrients

(4.03) The _____ absorb nutrients from food and sent the nutrients to the blood.

- a. small intestines**
- b. stomach
- c. large intestine
- d. esophagus

(4.04) Sugars belong to a larger group of substances called

- _____.
- a. nutrients
 - b. calories
 - c. carbohydrates**
 - d. vitamins

(4.04) What do carbohydrates provide our bodies with?

- a. oxygen
- b. blood
- c. energy**
- d. protein

(4.05) Which of the following is are nutrients needed for growth and tissue repair?

- a. proteins**
- b. carbohydrates
- c. vitamins
- d. water

(4.05) An inorganic nutrient that is neither animal nor vegetable is

- _____.
- a. fats
 - b. vitamins
 - c. **minerals**
 - d. carbohydrates

(4.05) What carries nutrients to all parts of the body, regulates the body temperature and helps eliminate wastes?

- a. nutrients
- b. **water**
- c. fats
- d. carbohydrates