

ELEMENTARY SCIENCE PROGRAM
MATH, SCIENCE AND TECHNOLOGY EDUCATION

A Collection of Learning Experiences

**NUTRITION
& DIGESTION**



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NUTRITION AND DIGESTION

GRADE 3

Unit Overview

Students will examine the parts of the USDA Food Pyramid, journal their food choices and analyze those choices, identify the variety of foods to be eaten from each food group, and read and compare food labels for nutritional value. They will also describe and demonstrate the functions of the major parts of the digestive system.

The skills emphasized in the kit are brainstorming, discussing, collecting data, interpreting data, making decisions, generalizing, classifying, measuring, and analyzing.

Scheduling

This unit may take from five to nine weeks to complete depending upon the goals of the teacher and interests of the students. Use of the section included in this manual called More Ideas may extend the time span of this kit.

Materials to be

obtained locally:

colored pencils and/or crayons	notebooks
chart paper	glue
markers	paper towels
scissors	water
carrots	
individually wrapped cheese	
red, yellow & green construction paper	
tape	garbage can
	magazines/sale ads

Samples of foods such as: apples, celery, leafy lettuce, nuts, raisins, cereal, pudding, cheese, fruit leathers, peanut butter, and prepared gelatin squares

Caution

Remind students to wash their hands after handling any of the materials in the kit.

About the Format

Each learning experience is numbered and titled. Under each title is the objective for the learning experience.

Each learning experience page has two columns. The column on the left side of the page lists materials, preparations, basic skill processes, evaluation strategy, and vocabulary. The right column begins with a "Focus Question" which is typed in italicized print. The purpose of the "Focus Question" is to guide the teacher's instruction toward the main idea of the learning experience. The "Focus Question" is not to be answered by the students. The learning experience includes directions for students, illustrations, and discussion questions. These discussion questions can be used as a basis for class interaction.

Background Information

The Food Pyramid has been developed as a way to show the different food groups and how much we should eat from each one to be healthy and strong. It is the USDA (United States Department of Agriculture) recommendation for a healthy diet. It is important to remember that a diet is the food and drink a person eats not just to imply what one does to lose weight. No one group is more important than the other. For good health, we need food from all the groups. The best way to get all nutrients your body needs is to eat a variety of foods.

Milk Group

Milk Group foods like milk, cheese and yogurt provide calcium and eight of the essential nutrients, including protein, phosphorus, vitamins A, D and B₁₂, riboflavin, niacin and potassium. Dairy foods contribute three of the five nutrients that the 2005 Dietary Guidelines identified as low in children's diets — calcium, potassium and magnesium.

- Calcium is essential for strong, healthy teeth and bones. Calcium also helps muscles contract and relax.
- Bone density and strength built during childhood and adolescence needs to last a lifetime. Adequate calcium intake in the younger years — provided by 3 servings of milk, cheese, or yogurt — along with regular physical activity, can help prevent the bone-thinning disease, osteoporosis, later in life — as well as help prevent bone fractures during childhood.
- Vitamin D helps the body absorb calcium and use it to build strong bones.
- Protein helps build muscle and repair body tissue.
- Potassium helps regulate blood pressure.

Foods in the Milk Group include:

- Milk — whole, low-fat, reduced fat, fat-free, flavored and buttermilk
- Yogurt
- Cheese — all types
- Pudding
- Frozen yogurt
- Milkshake

Some foods are made from milk, but we can't count on them to get the large amount of calcium we need. These Extra Foods are in the "Others" category on the Food Pyramid and include:

- Butter
- Cream cheese
- Whipped cream

Meat Group

The Meat Group contains foods from both plants and animals. Meat Group foods provide protein and iron, as well as B vitamins, vitamin E, zinc and magnesium.

- Protein helps build strong muscles and build and repair body tissue.
- Iron, an important part of red blood cells, carries oxygen to all parts of the body.
- B vitamins help the body use energy.

Foods in the Meat Group include:

- Beef, chicken, turkey, duck, goose, pork and fish
- Dry beans, such as pinto beans, kidney beans, lentils and split peas
- Tofu
- Eggs
- Nuts or seeds, such as peanuts, almonds, walnuts and cashews
- Peanut butter and other nut spreads

Vegetable Group

Vegetables provide vitamins A and C, potassium, fiber and other nutrients. Each vegetable contains different amounts of these nutrients so it's important to choose a variety of vegetables each day!

- The deeper the color, the richer the nutrient content.
- Vitamin A helps night vision and helps keep skin and eyes healthy.
- Vitamin C helps help heal cuts and fight infections.
- Potassium helps regulate blood pressure.
- Fiber promotes regular digestion and may reduce the risk for certain cancers and heart disease.

Foods in the Vegetable Group include:

- Any vegetable or 100% vegetable juice.
- Fresh, frozen or canned. Examples include dark green vegetables, starchy vegetables, orange vegetables, and other vegetables, such as, tomatoes, asparagus, brussel sprouts and eggplant.
- Vegetables processed into other foods, such as tomato salsa and tomato sauce.
- Juices such as tomato, vegetable or carrot juice.

Fruit Group

Fruits provide vitamins A and C, potassium and fiber. The amount of these nutrients in each fruit variety varies. For example, strawberries, oranges and grapefruits are excellent sources of vitamin C, while cantaloupe and apricots are excellent sources of vitamin A. Eat a variety to get the vitamin A, vitamin C and fiber needed daily. All fruits are naturally low in fat.

- Vitamin A helps night vision and helps keep skin and eyes healthy.
- Vitamin C helps heal cuts and fight infections.
- Potassium helps regulate blood pressure.
- Fiber helps promote regular digestion and may reduce the risk for certain cancers and heart disease.

Foods in the Fruit Group include:

- Any fruit or 100% fruit juice.
- Fresh fruits, such as apples, kiwifruit, pears and bananas.
- Dried fruits, such as raisins, apricots, mangos and prunes.
- Frozen fruits, such as strawberries, blueberries, raspberries and melons.
- Canned fruits, such as applesauce, fruit cocktail, apricots and pineapple.

Grain Group

Grain Group foods provide complex carbohydrates and fiber. Two categories make up the Grain Group — whole grains and refined grains. Whole grains include the entire grain kernel:

- The protective outer layers or **bran**.
- Inside the seed or **endosperm**.
- The grain's "small powerhouse" or **germ**.

Refined grains, such as white rice, pasta or white bread, have the bran and germ removed to give them a finer texture. Many refined grains are "enriched" to replenish the B vitamins — niacin, thiamin, folic acid and riboflavin, and the iron removed during processing. Fiber and other trace nutrients, however, are not added back after processing.

- Complex carbohydrates are an important source of energy.
- B vitamins help our body release and use energy. B vitamins also help to keep our blood, skin and nervous system healthy.
- Iron, an important part of red blood cells, carries oxygen to all parts of the body.
- Fiber helps promote regular digestion and may reduce the risk for certain cancers and heart disease.

USDA recommends that people of all ages eat whole grains for at least half of their daily Grain Group servings. Use the ingredient list and the % Daily Value (%DV) on the Nutrition Facts label for choosing whole grains more often:

- Read the ingredient list, not just the product description. Products described as multi-grain, stone-ground, 100% wheat, cracked wheat, seven-grain or bran on the package are often not whole-grain products.
- Look for whole grain as the first ingredient on the label and the word "whole" before the type of grain, such as whole wheat, whole oats, whole rye, or whole grain corn. Other whole grains to look for are brown rice, graham flour, oatmeal or bulgur.
- Read and compare Nutrition Facts labels and select the food that has a higher percent %DV for fiber. For example, compare whole -wheat spaghetti and refined spaghetti, whole -wheat English muffins and white English muffins, or white and brown rice.
- Foods that have 10% DV Total Fiber per serving are a "good source," and foods that provide 20% DV Total Fiber are an "excellent source."

Foods from wheat, corn, oats, buckwheat, barley, rice and rye in the Grain Group include:

- Breads — all types, white, wheat, and rye; buns; rolls; English muffins and bagels
- Cereals — hot and ready-to-eat
- Rice — all types
- Pasta — all types including spaghetti, macaroni and noodles
- Tortillas, crackers, pancakes waffles, biscuits, corn bread, bulgur and other foods made from flour and grains

"Others" Category

"Others" are Extra Foods. They don't have enough nutrients to fit into the Five Food Groups. "Others" foods provide the body with proportionately few nutrients compared to calories and should not replace foods from the Five Food Groups. Eating too many Extra Foods can be a problem if:

- Children fill up on them and do not have room to eat Five Food Group foods.
- Children take in more calories than they need. Active children can consume "Others" in moderation, as long as they eat the recommended amounts of foods from the Five Food Groups. This is true for adults, as well.

Foods in the "Others" Category:

- Fats and spreads
- Candy
- Cookies
- Cakes
- Chips and other salty snacks
- Condiments
- Soft drinks

Calories

A calorie is a unit of energy. When you hear something contains 100 calories, it's a way of describing how much energy your body could get from eating or drinking it. Your body needs calories for energy. Eating too many calories and not burning enough of them off through activity can lead to weight gain. Most foods and drinks contain calories. Some foods, such as lettuce, contain few calories. (A 9 - ounce lettuce salad contains only 40 calories.) Other foods, like peanuts, contain a lot of calories. (A half of a cup of peanuts has 427 calories.) By reading the nutrition label, one can find out how many calories are in a particular food.

How Many Calories Do Kids Need?

Some people watch their calories if they are trying to lose weight. Most kids don't need to do this, but all kids can benefit from eating a healthy, balanced diet that includes the right number of calories. Kids come in all sizes and each person's body burns energy (calories) at different rates, so there isn't one perfect number of calories that a kid should eat. The recommended range for most school-age kids is 1,600 to 2,500 per day. When they reach puberty, girls need more calories, but they tend to need fewer calories than boys. As boys enter puberty, they will need as many as 2,500 to 3,000 calories per day. But whether they are girls or boys, kids who are active and move around a lot will need more calories than kids who don't.

Most kids don't have to worry about not getting enough calories because the body and feelings of hunger help regulate how many calories a person eats. If you eat more calories than your body needs, the leftover calories are converted to fat. Too much fat can lead to health problems. Children and their parents should check with their doctor if they are concerned about their weight, as only your doctor can say if you are overweight. Often, kids who are overweight can start by avoiding high-calorie foods, such as sugary sodas, candy, and fast food, and by eating a healthy, balanced diet. Exercising and playing are really important, too, because activity burns calories.

Serving Size and Portion Size

The My Pyramid for Kids provides food group serving recommendations in “ounces” and “cups”. Recommendations for the grain group and meat group are provided in ounces, while the milk group, vegetable group and fruit group are in cups. The serving size that is equal to an “ounce” or “cup” are provided for each food group. For example, 1 ½ ounces of cheese or 8 fluid oz. of yogurt count as 1 cup from the milk group, 1 slice of bread or ½ cup of cooked pasta counts as a serving from the grain group. My Pyramid for Kids shows common serving sizes for a number of different foods within each group. Serving sizes are also listed on the Nutrition Facts Panel of the nutrition label on products, along with the calorie and nutrient content for a serving. Serving sizes on food labels may be different from the My Pyramid for Kids servings. For example, serving sizes for beverages is 1 cup, whether its fruit juice, milk, or soda. This allows you to use the nutrition label to compare similar foods. While the nutrition label tells us what people might typically eat, it is not a recommendation for how much we should eat. The number of servings in a package is also listed on the nutrition label. Students need to keep in mind that many packages that look like single servings often contain two or more servings.

Portion size is the amount we eat at a meal or snack. Portion sizes can be bigger or smaller than My Pyramid for Kids Serving Size equivalents. Research shows that Americans are eating larger and larger portions, which may contribute to the current epidemic of obesity. As an example, a typical bagel today may count as two or three servings from the Grain Group. My Pyramid recommends 6 oz. from the Grain Group for the average American, so with today’s portions it’s easy to eat more than we need.

Reading Labels

Serving Size – Tells you what is considered one serving of the product. Every other nutrient on the label is based on this amount. It is the amount people usually eat. If the serving size is ½ cup and you eat one whole cup, you’ll need to double the calories, grams of fat, and other nutrients to learn what you actually got in the serving.

Calories – A unit of energy. Calories in food come from carbohydrates, protein and fat.

The **list of nutrients** and amounts in each serving includes: total fat, saturated fat, cholesterol, sodium, total carbohydrates, dietary fiber, and protein.

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
% Daily Value*	
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g

Calories from Fat should be not more than 30 percent of your total daily calories. So, make most of your food choices low fat. To know if a product contains 30 percent or less fat and is a smart choice, multiply the number of calories from fat by three. If the result is less than or equal to the total calories, the product is acceptable.

Percent Daily Values tell you if a food is high or low in specific nutrients. If a food has a DV of 20 percent or more, it’s considered high in that nutrient. Low means 5 percent or less. Choose foods with low DV’s for fat, cholesterol and sodium and high DV for fiber vitamins and minerals.

The daily values that have been set for certain nutrients are listed on larger packages for both a 2,000 and 2,500 calorie diet. This information is based on current dietary guidance and can help you understand the basics of a good diet and plan healthy meals.

Ingredients on a Food Label will be listed in descending order of weight. The list is required on all foods, even standardized ones such as mayonnaise and bread. The sources of some ingredients, such as certain flavorings, will be stated by name to help people better identify ingredients that they avoid for health, religious, or other reasons.

Digestive System

The digestive system consists of several organs and body parts that aid in the digestion of food. Our body needs food for fuel and energy, and the digestion system helps break food down into small pieces so the body can use it. The food goes through many changes, both physical and chemical, as it travels through the digestive system.

Mouth

Even before you eat, when you smell food, see it, or think about it, digestion begins. **Saliva** begins to form in your mouth. The food goes through a chemical change as the saliva breaks down carbohydrates into smaller molecules of sugar. The enzymes, which are proteins that speed up chemical reactions, in saliva help with this process. Saliva is also used to moisten food so it can easily slide through the esophagus.

The food starts to undergo physical changes as the teeth rip, tear, chew, and grind it into smaller pieces. We have different types of teeth that are used in different ways to aid in the digestion of food. **Canine teeth** are sharp and pointy and are used for cutting and tearing food; **incisors** are big, flat wedge shapes that are used for biting off food; **bicuspid** are teeth with two points on them and are used for grinding; and **molars** are flat and square shaped that are also used for grinding.

The **tongue** helps us move our food around in the mouth before swallowing it, and it tells us what the food tastes like. It also shapes the food into a ball called bolus, which the tongue pushes toward the back of your throat and into the opening of your esophagus, the second part of the digestive tract.

Esophagus

The **esophagus** is like a stretchy pipe that's about 10 inches (25 centimeters) long. It moves food from the back of your throat to your stomach. Also, at the back of your throat, is your windpipe, which allows air to come in and out of your body. When you swallow the mashed-up food or liquids, a special flap called the **epiglottis** flops down over the opening of your windpipe to make sure the food enters the esophagus and not the windpipe. If you've ever drank something too fast, started to cough, and heard someone say that your drink "went down the wrong pipe," the person meant that it went down your windpipe by mistake. This

happens when the epiglottis doesn't have enough time to flop down, and you cough involuntarily to clear your windpipe.

Once food has entered the esophagus, it doesn't just drop right into your stomach. Instead, muscles in the walls of the esophagus move in a wave motion to slowly squeeze the food through the esophagus. This takes about 2 or 3 seconds. This process is known as **peristalsis**.

Any swelling or irritation to the esophagus is known as esophagitis (esophageal inflammation.) This is usually caused by stomach acid that has flowed backwards from the stomach to the esophagus (acid reflux). You may have problems swallowing or feel a burning sensation when you eat.

Stomach

Your stomach is attached to the end of the esophagus. It's a stretchy sack shaped like the letter J. It has three important jobs:

- to store the food you've eaten
- to break down the food into a liquid mixture
- to slowly empty that liquid mixture into the small intestine

The stomach is like a mixer. It churns and mashes together all the small balls of food that came down the esophagus into smaller and smaller pieces. It does this with help from the strong muscles in the walls of the stomach and **gastric juices** that come from the stomach's walls. In addition to breaking down food, gastric juices also help kill bacteria that might be in the eaten food. A **gastric ulcer**, also known as a stomach ulcer, is a raw, eroded area in the lining of the stomach. A gastric ulcer develops when the stomach acids and digestive juices injure the stomach's lining of protective mucus.

The **small intestine** is a long tube that's about 1 1/2 inches to 2 inches (about 3.5 to 5 centimeters) around, and it's found beneath your stomach. The tube connecting the stomach to the small intestine is known as the **pyloris**. If you stretched out an adult's small intestine, it would be about 22 feet long (6.7 meters). The small intestine breaks down the food mixture even more so your body can absorb all the vitamins, minerals, proteins, carbohydrates, and fats. The small intestine can help extract these nutrients with a little help from the **pancreas, liver, and gallbladder**.

Those organs send different juices to the first part of the small intestine. These juices help to digest food and allow the body to absorb nutrients. The pancreas makes juices that help the body digest fats and protein. A juice from the liver called **bile** helps to absorb fats into the bloodstream. And the gallbladder serves as a warehouse for bile, storing it until the body needs it.

Your food may spend as long as 4 hours in the small intestine and will become a very thin, watery mixture. It's time well spent because, at the end of the journey, the nutrients from your food can pass from the intestine into the blood. Once in the blood, your body is closer to benefiting from the complex carbohydrates in the food.

Liver

The nutrient-rich blood comes directly to the liver for processing. The liver filters out harmful substances or wastes, turning some of the waste into more bile. The liver even helps figure out how many nutrients will go to the rest of the body, and how many will stay behind in storage. For example, the liver stores certain vitamins and sugars your body uses for energy.

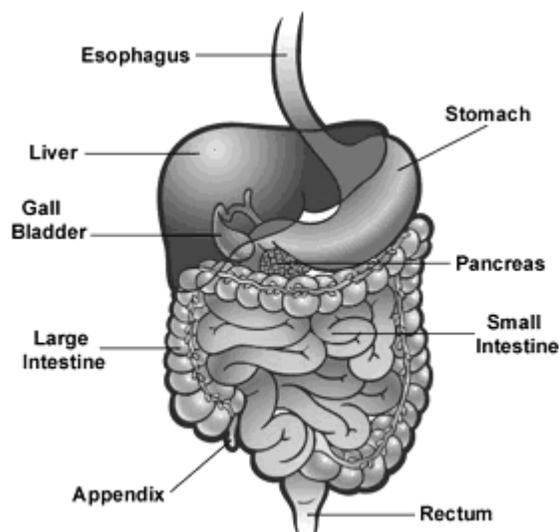
Large Intestine

At 3 or 4 inches around (about 7 to 10 centimeters), the **large intestine** is fatter than the small intestine and it's almost the last stop on the digestive tract. It would measure 5 feet (about 1.5 meters) long if you spread it out.

The large intestine has a tiny tube with a closed end coming off it called the **appendix**. The appendix is part of the digestive tract, but it doesn't seem to do anything, though it can cause big problems, because it sometimes gets infected and needs to be removed.

After most of the nutrients are removed from the food mixture, there is waste left over that your body can't use. This waste needs to be passed out of the body. Before it goes, it passes through the part of the large intestine called the **colon**, which is where the body has a final chance to absorb the water and some minerals into the blood. As the water leaves the waste product, what's left gets harder and harder as it keeps moving along, until it becomes a solid. It's called stool or a bowel movement.

The large intestine pushes the stool into the **rectum**, the very last stop on the digestive tract. The solid waste stays here until you are ready to go to the bathroom. When you go to the bathroom, you are getting rid of this solid waste by pushing it through the **anus**. You can help your digestive system process food by drinking water and eating a healthy diet that includes foods rich in fiber. High-fiber foods,



like fruits, vegetables, and whole grains, make it easier for stool to pass through your system.

More Information about Digestive System Organs

Organ	Location	Size	Function	Vital Organ (Yes/No)??
Mouth	Center of face below nose and above chin.	32 teeth in the average adult's mouth work to mechanically break down the food.	Entryway for food into the body, to begin mechanical digestion through chewing. Saliva, excreted into the mouth from adjacent salivary glands, is slightly acidic and is used to soften and begin chemically breaking down the food.	Yes
Esophagus	Directly behind the trachea and pierces the diaphragm on its way to the stomach.	10 inches (25 centimeters) long	Moves food from the back of your throat to your stomach.	Yes
Stomach	Located directly under the diaphragm. Connected to the esophagus and the duodenum (the first part of the small intestine).	12 inches (30.5 cm) long and is 6 inches. (15.2 cm) wide at its widest point. Its capacity is about 1 qt (0.94 liters) in an adult.	Stores the food you've eaten, breaks down the food into a liquid mixture, slowly empties that liquid mixture into the small intestine.	Yes
Pancreas	Positioned horizontally along the posterior curvature of the stomach.	6 in. (12.5 cm) long and 1 in. (2.5 cm) thick	Contains enzyme producing cells that secrete two hormones. The two hormones are insulin and glucagon. Insulin and glucagon are secreted directly into the bloodstream, and together, they regulate the level of glucose in the blood. Produces the body's most important enzymes. The enzymes are designed to digest foods and break down starches.	Yes

Gall Bladder	Located just below the liver and is attached to it by tissues.	3 to 4 inches (7.6 to 10.2 cm) long and about 1 inch (2.5 cm) wide.	Active storage shed, which absorbs mineral salts and water received from the liver and converts it into a thick, mucus substance called "bile," to be released when food is present in the stomach.	No
Liver	Under diaphragm near stomach and intestines.	Largest gland in the body, weighing 3 lb (1.36 kg).	Filters out harmful substances or wastes, turning some of the waste into more bile. The liver helps figure out how many nutrients will go to the rest of the body and how many will stay behind in storage. The liver stores certain vitamins and a type of sugar your body uses for energy.	Yes
Appendix	Coming off large intestine, tiny tube with a closed end.	Averages 10 cm in length, but can range from 2-20 cm. The diameter of the appendix is usually less than 7-8 mm.	Has no function in modern humans; however it is believed to have been part of the digestive system in our primitive ancestors.	No
Small Intestine	Begins at the pyloric sphincter and coils through the central and lower part of the abdomen where it eventually opens into the large intestine by way of the ileocecal sphincter.	1 1/2 inches to 2 inches (about 3.5 to 5 centimeters) around, 22 feet long (6.7 meters)	Breaks down the food mixture even more so your body can absorb all the vitamins, minerals, proteins, carbohydrates, and fats.	Yes
Large Intestine	Begins with the ileocecal sphincter and coils up the right side of the abdomen, across the back and down the left side of the	3 or 4 inches around (about 7 to 10 centimeters), 5 feet (about 1.5 meters) long	Substances which have not been absorbed in the small intestine enter the large intestine in the form of liquid and	Yes

	abdomen where it connects to the rectum.		fiber. The first half of the colon absorbs fluids and recycles them into the blood stream. The second half compacts the wastes into feces, secretes mucus which binds the substances, and lubricates it to protect the colon and ease its passage.	
Rectum	Forms the lowest portion of the large intestine and connects it to the anus.	The last 20 cm (8 in) of the large intestine.	The last stop on the digestive tract, the solid waste stays here until it is ready to be expelled from the body.	Yes

Learning Experience 1 – Getting Started

Objective: Students will brainstorm/share their ideas/attitudes about the foods they eat.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

Colored pencils/crayons*

*provided by teacher/student

For the class:

Book - Gregory, the Terrible Eater by Sharmat Mitchell

Preparation:

Read background information on p. 3-9.

Basic Skills Development:

Discussing
Brainstorming

Evaluation Strategy:

Students will begin to examine the foods they eat and their attitudes about food.

Vocabulary:

food
diet
nutrition
attitude

What are our attitudes about food?

This learning experience helps students begin thinking about the concept of food and the foods they often eat and like to eat.

Read the book, Gregory, the Terrible Eater, by Sharmat Mitchell. Discuss with students the characters in the book and their attitudes about the foods they are eating.

Discussion Questions:

Why were Gregory's parents so frustrated with him?

What are some of the foods Gregory liked?

What is some of the "junk" we eat in our diet?

What happened when he ate too much junk?

What do you think is the final message of the book?

Ask students to go to the Activity Sheet for Learning Experience 1 in the Nutrition and Digestion Student Activity Book. On the Activity Sheet, there are a variety of items that get students to begin thinking about what they already know about the concept of food in general and the foods they eat. Ask students to complete the "brainstorm" on their own then share their

Learning Experience 1 – Getting Started, cont.

Page 2

knowledge/ideas with the class. Students can use colored pencils/crayons to decorate the sheet, as well.

Learning Experience 2 – Food Pyramid

Objective: Students will examine the parts of the new USDA My Pyramid for Kids. Students will identify the food groups on the pyramid and the importance of daily physical activity as part of good health.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

Colored Pencils*

For the class:

1 set of measuring cups

1 MyPyramid for Kids Poster by the USDA

*provided by teacher/student

Preparation:

Read background information on p. 3-9.

Basic Skills Development:

Classifying

Interpreting Data

Brainstorming

Discussing

Evaluation Strategy:

Students will identify the parts of the My Pyramid for Kids and begin to apply it to their daily diets.

Vocabulary:

food pyramid

sugar

grain

serving

milk

portion

meat

vegetable

fruit

physical activity

wide

narrow

healthy

oil

fat

What are the main parts of the new USDA My Pyramid for Kids?

Session 1

Hang the My Pyramid for Kids poster provided by the USDA (United States Department of Agriculture) in the classroom where students can see it. Ask students to describe what they see. They should mention the colored stripes, colored stripes of different widths, pictures of food, stairs, etc. Discuss with students that everyone needs food to live and grow, but eating foods high in sugar and fat does not allow us to eat the foods that are high in nutrients. As a class, you are going to discuss the parts of the food pyramid on the poster and how it will help us choose healthier foods.

Use the sheet, A Close Look at MyPyramid, on page 24 of this Teacher's Guide to take students through the different parts of the food pyramid that are crucial to understanding how it works. Each portion of the A Close Look at MyPyramid sheet has an Activity Sheet that goes with it. (page 1 –foods in each group; page 2- group stripes; page 3- physical activities). You may want to first go over how to read the pyramid as a whole, then go through each

Learning Experience 2 – Food Pyramid, cont.

Page 2

part and examine it more closely. Begin by discussing each food group shown on the pyramid. Ask students to identify the foods they know that are shown on the poster. If students don't know what "grains" are, discuss how they come from plants like wheat, corn, and oats. We use grains to make bread, cereal, corn muffins, etc. Popcorn is in the grain group, as well.

Point out to students the thin yellow stripe in the pyramid. It represents oils, which is not considered a food group, however are often found in foods like nuts or fish or added to foods as soft margarine or salad oil. Note to students how thin the stripe is. For most people, it is important to limit the amount of oils they eat.

Discussion Questions:

What are some other foods that we know from each food group?
What are some healthy food choices from the food groups?

Ask students to go to page 1 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book. On page 1 of the Activity Sheet, there are foods listed in groups of four. Three foods in each set belongs to the same group and the fourth does not. Read the names of the four foods to the students. Students are to listen to the four foods and raise their hands when they know which food doesn't belong in the group. Ask students to explain why the food doesn't belong. Students can then get into groups of two and come up with their own group listing and ask the class to identify which food should not be in their group.

Answers to page 1 of the Students Activity Book:

- Yogurt, American cheese, carrots, milk
- Turkey, potato chips, pork chops, hamburger
- Grapefruit, crackers, rye bread, dinner roll
- Orange juice, soft drink, apple juice, banana
- French fries, fried chicken, fish sticks, fried egg
- Frozen yogurt, buttermilk, 2% reduced fat milk, milk chocolate candy bar
- Orange, fruit cocktail, muffin, cantaloupe

Learning Experience 2 – Food Pyramid, cont.

Page 3

- Celery, coleslaw, cheddar cheese, lettuce
- Apple, strawberries, banana, squash
- Corn on the cob, corn flakes, spinach, salad
- Chocolate milk, chocolate pudding, chocolate cake, chocolate milkshake
- Peanut butter, shrimp, raisins, sunflower seeds
- Fried egg, hard cooked egg, scrambled egg, egg noodles
- Whole wheat bread, mashed potatoes, cauliflower, zucchini
- Pancake, English muffin, tortilla, cookie
- Peach, potato, pear, pineapple
- Mozzarella cheese, cottage cheese, oatmeal, frozen yogurt
- Green beans, green pepper, green peas, green grapes
- Waffle, watermelon, white bread, rice
- Biscuit, bagel, broccoli, bran flakes

Session 2

Ask students if they know why the food group stripes are wider at the bottom of the My Pyramid for Kids than at the top. Every food group has foods that fall into the bottom and the top of the pyramid. Therefore, every food group has foods that you should eat more often than others; these are at the bottom of the My Pyramid for Kids. The wider stripes at the bottom remind you to eat more of these healthier foods. Explain that the food at the bottom of the pyramid provide vitamins and minerals without a lot of solid fat or added sugar. Examples could include: a slice of whole wheat bread, a piece of fruit, steamed vegetables, fat free milk, or baked chicken. Students should realize that they should choose these foods most often because it is important to eat the nutrients the body needs without eating too much fat or sugar. Foods with higher amounts of solid fat and added sugar are in the narrower top area of the pyramid. Tell students that occasionally everyone can enjoy these foods (cake, chips, fried foods). But eating too many of the foods from the top of the pyramid could lead to weight gain. Listed in the following chart are some examples. In the grains group, for example, whole wheat bread would be found at the wider part of the grain stripe on the pyramid because it is a healthier choice. However, the doughnut, also in this category, would fall in the narrower area of the grain s tripe. This tells us that

Learning Experience 2 – Food Pyramid, cont.

Page 4

when we eat a doughnut it should be sparingly and not often. The chart found below is found on page 2 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book. Explanations of why the foods have been placed in each category are found in the completed chart below. These explanations are the points the teacher may make to the class about each group. On student charts, there are spaces where they are to think of examples of foods that would be considered appropriate for the wider area of the pyramid and narrower end of the pyramid. Discuss their ideas as a class.

Food Groups	Wider Area	Narrower Area
Grains	Whole wheat bread	Doughnut
<i>Explanation:</i>	<i>Whole wheat bread is a whole grain food with little fat.</i>	<i>Doughnuts are fried and have lots of fat and added sugar.</i>
Vegetables	Baked sweet potato	French fries
<i>Explanation:</i>	<i>Baked sweet potato is an orange vegetable full of vitamins and minerals and it doesn't need butter or sugar to taste good.</i>	<i>French fries are also potatoes, but they are fried and have a lot of fat.</i>
Fruits	Peach	Peach pie
<i>Explanation:</i>	<i>Fresh peaches are in their most natural form and have a lot of vitamins and minerals.</i>	<i>A slice of peach pie has less than one peach and has a lot of added sugar and fat.</i>
Milk	Lowfat frozen yogurt	Ice cream
<i>Explanation:</i>	<i>Both lowfat frozen yogurt and ice cream are desserts made from milk. The lowfat frozen yogurt is usually made from fat-free milk.</i>	<i>Ice cream is often made with cream, which is higher in fat.</i>
Meat and Beans	Baked fish	Fried fish
<i>Explanation:</i>	<i>Fish has lots of protein. The amount of fat in baked fish is less because of how it is cooked.</i>	<i>The fried fish is much higher in fat because of how it is cooked.</i>

Session 3

Ask students why they think there are stairs on the poster next to the pyramid ? The stairs represent physical activity. Part of being healthy is keeping physically

Learning Experience 2– Food Pyramid, cont.

Page 5

active. There are several activities shown on the poster that qualify as ways to stay physically active. Ask students to think about some ways they stay active. On page 3 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book, a graphic organizer is shown that asks students to list different ways that they can stay active. Students are to get into groups of three or four and discuss the different activities that could fall into each category. The categories are sports activities (soccer, basketball), hobbies (dance, karate), and everyday activities (yard work, walking). Have groups share their ideas for activities with the class.

As a review, students will now recreate the My Pyramid for Kids to keep as a reference. Remind students that they will use this copy of the pyramid throughout the unit. Using the wall poster, guide students in coloring in their food pyramid on page 4 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book. Have students color the stripes to match the colors on the poster. Review each food group as they color in their stripes. Write in the name of each group in the boxes below each stripe on the pyramid. Below these boxes is an area in which students can write information about the category on the pyramid that represents “oils”. The “oil drop” at the beginning of this row shows students where to write this information.

Session 4

Discuss with students how each food group provides different nutrients and no single food group can supply all the nutrients our body needs. Each food group provides a unique set of nutrients and all the foods in each group have similar nutrients. For example, foods in the Milk Group provide calcium, protein, and riboflavin, while foods in the vegetable group provide vitamins A and C. That’s why it’s important to eat from all the food groups to get the 40+ nutrients our bodies need each day.

Point out to students on the poster where it shows “serving size” for each food group. Although “serving size” and “portion size” are often used interchangeably, there is a difference and knowing the difference helps compare what to eat according to the My Pyramid for Kids recommendations.

Discuss serving size first. The My Pyramid for Kids provides food group recommendations in “ounces and “cups”. Recommendations for the grain group and meat group are provided in ounces, while the milk group, vegetable group and fruit group are in cups. The serving size that is equal to an “ounce” or “cup” are provided for each food group. For example, 1 ½ ounces of cheese or 8 fluid oz. of yogurt count as 1 cup from the milk group, 1 slice of bread or ½ cup of

Learning Experience 2 – Food Pyramid, cont.

Page 6

cooked pasta counts as a serving from the grain group. My Pyramid for Kids shows common serving sizes for a number of different foods within each group. The amount we need from each Food Group depends on our age, gender, and physical activity level. Students can go to www.MyPyramid.gov and click on My Pyramid Plan to find the amounts that are right for them. A variety of choices based on their age, gender, and activity level are found on page 5 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book. Go over the choices with students and discuss how age, gender, and especially activity level seem to affect the serving sizes for each group. Students can then circle the box that seems to include the information that fits them best. If the student's information is not provided in the boxes, then going to the website listed above will be necessary. You may want each child to go to the website so he/she can print out a personalized plan to use. Remind students that the poster of My Pyramid for Kids is based on an 1800 calorie diet. But as students can see, some people need more or less calories based on their age, gender, and activity level. Students will use their personal information when recording information on their Food Journal in the next Learning Experience.

Serving sizes are also listed on the Nutrition Facts Panel of the nutrition label on products, along with the calorie and nutrient content for a serving. Serving sizes on food labels may be different from My Pyramid for Kids servings. For example, serving sizes for beverages is 1 cup, whether its fruit juice, milk, or soda. This allows you to use the nutrition label to compare similar foods. While the nutrition label tells us what people might typically eat, it is not a recommendation for how much we should eat. The number of servings in a package is also listed on the nutrition label. Students need to keep in mind that many packages that look single servings often contain two or more servings.

Portion size is the amount we eat at a meal or snack. Portion sizes can be bigger or smaller than My Pyramid for Kids Serving Size equivalents. Research shows that Americans are eating larger and larger portions, which may contribute to the current epidemic of obesity. As an example, a typical bagel today may count as two or three servings from the Grain Group. My Pyramid recommends 6 oz. from the Grain Group for the average American, so with today's portions it's easy to eat more than we need. Go over the servings from each group and show students using measuring cups what a serving size would look like. Compare 1 cup to ½ cup servings, etc. Students can then make a mental image and use it to compare what they actually eat daily.

Learning Experience 2 – Food Pyramid, cont.

Page 7

Session 5:

Have students work in groups to research the food groups. Have each group choose 1 food group to research and write a song, rap, or poem about that food group and present it to the rest of the class.

A Close Look at MyPyramid For Kids

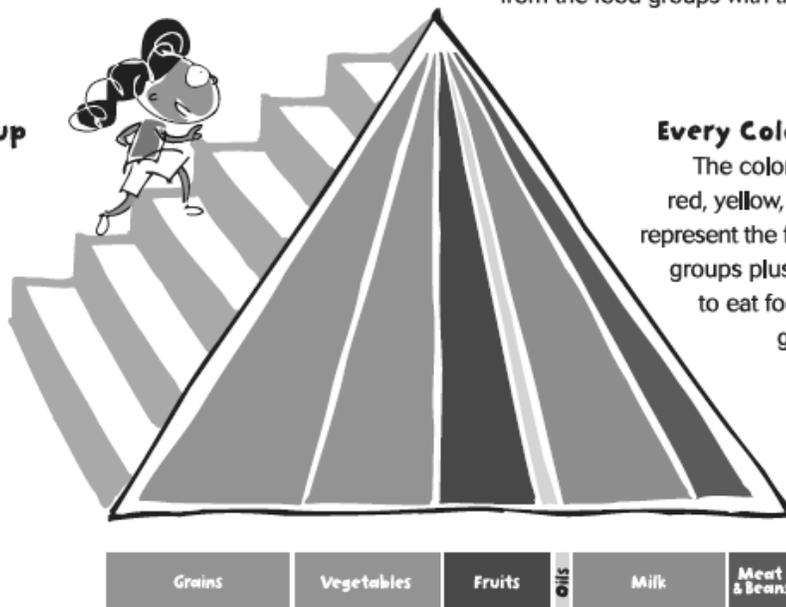
MyPyramid for Kids reminds you to be physically active every day, or most days, and to make healthy food choices. Every part of the new symbol has a message for you. Can you figure it out?

Be Physically Active Every Day

The person climbing the stairs reminds you to do something active every day, like running, walking the dog, playing, swimming, biking, or climbing lots of stairs.

Choose Healthier Foods From Each Group

Why are the colored stripes wider at the bottom of the pyramid? Every food group has foods that you should eat more often than others; these foods are at the bottom of the pyramid.



Eat More From Some Food Groups Than Others

Did you notice that some of the color stripes are wider than others? The different sizes remind you to choose more foods from the food groups with the widest stripes.

Every Color Every Day

The colors orange, green, red, yellow, blue, and purple represent the five different food groups plus oils. Remember to eat foods from all food groups every day.

Make Choices That Are Right for You

MyPyramid.gov is a Web site that will give everyone in the family personal ideas on how to eat better and exercise more.

Take One Step at a Time

You do not need to change overnight what you eat and how you exercise. Just start with one new, good thing, and add a new one every day.



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Learning Experience 3 – Food Journal

Objective: Students will journal the foods they eat during one day and organize their information into appropriate food groups and serving sizes.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

For the class:

1 set of measuring cups

Chart paper*

Markers*

*provided by teacher/student

Preparation:

Read background information on p. 3-9.

Basic Skills Development:

Discussing

Collecting Data

Classifying

Measuring

Analyzing

Evaluation Strategy:

Students accurately journal their food choices and organize their information into appropriate food groups/serving sizes.

Vocabulary:

journal

serving

calorie

combination

goal

physical activity

What do we eat daily?

Session 1

Ask students to review the My Pyramid for Kids poster and handout that they created on page 4 of the Activity Sheet for Learning Experience 2 in the Nutrition and Digestion Student Activity Book based on the poster.

Ask students to go to the Activity Sheet for Learning Experience 3 in the Nutrition and Digestion Student Activity Book. On page 1 of the Activity Sheet, there some nutrition tips to discuss with the students based on the pyramid and healthy eating.

Discussion Questions:

What are the names of other grains besides wheat? (oats, rye, corn)

Name some dark green and orange vegetables. (broccoli, dark green leafy lettuce, romaine lettuce, squash, carrots, pumpkin, sweet potatoes)

Name some milk products.

(cheese, yogurt, ice cream)

Do you think most kids get 60 minutes of physical activity daily? Why or why not?

Before students write their food choices on a food journal or analyze their food choices in the

Learning Experience 3 – Food Journal, cont. Page 2

next Learning Experience, they need to be aware of the combination foods they eat that may fall into several food groups. Write the words “Combination Foods” on the chalkboard. Have students decide what the term means. Define for the class. These are foods that combine 2 or more foods from the five food groups.

Recreate the chart shown below on chart paper or on the chalkboard. Listed in the food column on the chart are examples of combination foods. Have student groups work together to identify ingredients in each food and the food group/category which each ingredient belongs. The same chart is found on page 2 of the Activity Sheet for Learning Experience 3 in the Nutrition and Digestion Student Activity Book for group use. Have student groups share their ideas and complete the chart with the class.

Food	Grain	Vegetables	Fruit	Milk	Meat/Bean	Others
Bean Burrito	Tortilla	Lettuce, tomato		Monterrey jack cheese	Refried beans	
Peanut Butter and Jelly Sandwich	Whole wheat bread				Peanut butter	Jelly
Cheeseburger	Bun	Lettuce, tomato		Cheddar cheese	Beef patty	Ketchup mustard
Pizza	Pizza crust	Pizza sauce		Mozzarella cheese	Pepperoni	
Cheese Sandwich	Bread			American cheese		
Chef salad		Lettuce, tomato, carrot		Swiss cheese	Turkey, ham	Salad dressing
Sub Sandwich	French bread	Lettuce, tomato		Provolone cheese	Ham, salami	Mayo
Sundae			Strawberries	Frozen yogurt	Nuts	

Session 2

On page 3 of the Activity Sheet for Learning Experience 3 in the Nutrition and Digestion Student Activity Book, the My Pyramid Food Journal is shown. Go over the various parts of the chart. For this Learning Experience, students are to complete the “Goal” column and “Write in Your Food Choices for Today” column. The teacher may want to fill out these columns partially or completely and then share their model with students. First, students are to think back to page 5 of the Activity Sheet for Learning Experience 2. The information that fit their age, gender, and activity level is to be used for this food journal. In the “Goal” column of the chart, ask student to write their personal information for calories, servings for food groups, and activity level. Then ask students to fill out the “Food Choices” column with all the foods and the amounts that they eat/ate for breakfast, lunch, dinner, and snacks for the day. They will only be able to fill out

Learning Experience 3 – Food Journal, cont.

Page 3

a portion of the chart and then will complete the rest at home. Explain to students that they need to be as accurate as possible as they will analyze their food choices in the next Learning Experience. Students should also be accurate in listing their serving size for the foods they eat. They should think about the portions they have eaten and then decide how many servings that would include. Review serving sizes (cups, ounces) with students. Students should also remember to write in any condiments, oils, dressings they have added to their foods. These items will fit into the “Others” category and will be discussed in Learning Experiences 4 and 5. Finally, remind students to list the amount of physical activity and time spent on each activity. The physical activity must be what they do in addition to their regular daily routines.

Learning Experience 4 – Analyze Food Choices

Objective: Students will analyze their food/physical activity choices and write how they will improve their choices.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

Notebooks*

*provided by teacher/student

Preparation:

Read background information on p. 3-9. A model of the two paragraphs to be written by students may be necessary for students to complete the assignment completely.

Basic Skills Development:

Interpreting Data
Making Decisions

Evaluation Strategy:

Students will analyze their food and physical activity choices based on their personal goals and write descriptive paragraphs on how they will improve their choices.

Vocabulary:

analyze
paragraph
recommend
summarize

What are my food choices on a daily basis?

After students have completed the “Goal” and “Food Choices” columns of their food journal, students are to analyze their choices by looking back on what their daily servings should be based on age, gender, and physical activity. Then on their food journal complete the column titled “List Each Food Choices In Its Food Group”. For this column, students are breaking apart their food choices for each meal and snack and putting it in the correct food group category along with the serving amounts they ate. Some foods they eat will not fit into any group. These would be part of the “Others” category and are mainly fat or sugar (soda, butter.) Students are to write these foods on the back of their food chart.

Ask students to go to the Activity Sheet for Learning Experience 4 in the Nutrition and Digestion Student Activity Book. On the Activity Sheet, there is another chart listing the food groups. This chart allows students to pull the necessary information out of their food journal to analyze their food choices. Students are to again write in the daily servings recommended for their age, gender, and physical activity level

Learning Experience 4 – Analyze Food Choices

Page 2

in the second column. Then they are to record the actual amounts of food eaten from each group and their actual activity level for the day. Students are to then compare the recommendations to their actual results.

Have students summarize their results by writing a two paragraph essay answering the following questions:

Paragraph 1 – How did I do in each food group?

Paragraph 2 – How can I improve my eating habits? Give examples.

Students can then share their essays with the class or with their small groups.

Learning Experience 5 – What is in our Food?

Objective: The students will identify the function/purpose of nutrients found in foods and categorize food items that are healthy to eat.

Materials:

For each student:

Nutrition and Digestion Students Activity Book

For each pair of students:

11"X17" piece of black construction paper cut in half lengthwise
Red, yellow, and green construction paper*
Glue*
Scissors*

For the class:

Kids Discover Nutrition Magazine
Chart paper/chalkboard*
Book - Food and Digestion by Steve Parker
Magazines/sale ads*
Food and Nutrition Book by Foss

*provided by teacher

Preparation:

Read background information on p. 3-9. If you're making a class size chart, make the template on chart paper or on the board ahead of time. Cut 11" X17" black construction paper in half. The paper will be slightly skinnier than 6", but this is close enough.

Evaluation Strategy:

Students will create a chart to identify the function/purpose of nutrients and create a traffic light to categorize foods.

Basic Skills Development:

discussing
Identifying
categorizing

What is actually in the foods we eat?

Session 1

As an introduction to healthy eating and understanding what our body needs, read the Kids Discover magazine called Nutrition. Have students fill out the page for Learning Experience 5 in the Nutrition and Digestion Student Activity Book. They will fill in the chart as you read the magazine aloud. Discuss their answers after you have read the magazine. You can make a class size version of this chart on the board or on chart paper.

Session 2

Start by reading pages 4-11 from the book Food and Digestion by Steve Parker. Some of this is a review from the previous lesson, but it helps for students to hear it more than once. Students will then make a traffic light similar to the one shown on page 7 in the Food and Digestion book. The students have a traffic light along with descriptions in their Nutrition and Digestion Student Activity Book. They will use this as a guide in making a large traffic light out of construction paper. Have the students cut out the circle pattern from their Nutrition and Digestion Student Activity Book, and have them trace 1 circle each out of red, yellow, and

Learning Experience 5 – What is in our Food?

Page 2

Vocabulary:

Nutrients
Iron
Vitamin A
Carbohydrates
Calcium
Protein
Sodium chloride
Vitamin D
Antioxidants
Vitamin B
Lycopene

green construction paper. They will then glue them in place on a large sheet of black construction paper to create a traffic light. Have students cut pictures of food out of magazines, print them off the computer, or simply draw pictures of food on each color of the traffic light. They will use the descriptions provided in the Nutrition and Digestion Student Activity Book as a guide in knowing where to place the pictures they find.

Discussion Questions:

What types of food did you put on your red light? (*sweets, candy, cake, etc.*)

Why do you think we need to eat more foods that are in the green light? (*They contain the nutrients our bodies need.*)

Extension Activities:

Read pages 1-5 in the Food and Nutrition Book by Foss about fats in foods and pages 22-25 about vitamins. You can also read pages 38-40 for fun facts about food. Have your students make the Healthy Trail Mix that is found on page 39.

Learning Experience 5 – What is in our Food?

Page 3

Answer Key for page 1 of Learning Experience 5 in the Nutrition and Digestions Student Activity Book.

Nutrient	What it does for your body
Iron	Helps make hemoglobin, which makes red blood cells.
Vitamin A	Necessary for healthy vision.
Carbohydrates	Give the body energy.
Calcium	Helps build strong bones and teeth.
Protein	Helps every cell grow.
Sodium chloride	Regulates blood pressure and water in the body.
Vitamin D	Helps the body absorb calcium.
Antioxidants	Guard against damage by free radicals.
Vitamin B	Needed to make the genetic materials DNA and RNA.
Lycopene	Protects against heart disease and certain cancers.

Learning Experience 6 – Variety of Foods

Objective: Students will identify the variety of different foods that can be eaten from each food group and name foods that can be eaten in place of the foods in their “others” category on their food chart.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

Notebooks*

*provided by teacher/student

Preparation:

Read background information on p. 3-9. Students may need to refer to the paragraphs they wrote in Learning Experience 4 to help them complete p. 2 & 3 of the Activity Sheet for Learning Experience 6.

Basic Skills Development:

Discussing
Generalizing
Interpreting Data
Making Decisions

Evaluation Strategy:

Students will accurately identify a variety of foods from each food group and analyze their food choices for ways they can add variety to their diets.

Vocabulary:

variety
diet
nutrients

Why should we eat a variety of foods?

Session 1

Discuss with students that we need to eat a “variety” of different foods to have a nutritional diet. Discuss the word “variety” and ask students to come up with different examples of “variety” (variety of subjects in school, variety of choices of activities, etc.) Explain that the same is true for nutrition or good health; we need to eat a variety of different foods. Each food group provides us with a different set of nutrients.

Draw two boxes on the chalkboard. In one box write “This is variety” and include the vegetables:

- carrot
- baked potato
- broccoli

In the second box, write “This is not variety” and include the vegetables:

- baked potato
- mashed potatoes
- French fries

Discuss why the first example provides variety and the second does not.

Learning Experience 6 – Variety of Foods, cont.

Page 2

Repeat using a fruit example:

“This is variety”: apple, orange, strawberries

“This is not variety”: apple juice, applesauce, and apple

Note to students that the milk group is a bit unique because students can drink three glasses of milk a day. Milk provides the complete range of nutrients supplied by this food group.

Point out what each individual group provides:

Milk group: calcium, protein, riboflavin

Vegetable group: Vitamins A & C

Fruit group: Vitamins A & C

Meat group: iron and protein

Some foods in each group are a better source of nutrients than others. In the vegetable group, tomatoes are a good source of Vitamin C, but low in vitamin A. But carrots are a good source of vitamin A, but low in vitamin C. We need to eat a variety of foods within each group to get all the nutrients our body needs.

On page 1 of the Activity Sheet for Learning Experience 6 in the Nutrition and Digestion Student Activity Book, there are three case studies for student groups to read and discuss. Students can refer to any of the previous materials used in this unit to help them formulate solutions for the case studies. After group discussions are complete, discuss answers as a class.

Conclude this session by asking students to look at their food journal and the foods they have eaten in each food group. Students are to decide if they ate a variety from each food group. On page 2 of the Activity Sheet for this Learning Experience, students are to provide some ways they can add more variety to their meals and snacks. If students are not sure of ways they can add variety to a particular food group, they can ask their group members for ideas.

Session 2

Have students examine their food journal again. Have students focus on the items that did not fit into a particular food category. These items are to be put in the “Others” category and should have been listed on the back of their food journal activity sheet. Remind students that:

- Foods like sodas, sweets, and butters are called “Others”.
- “Others” don’t belong in any of the Five Food Groups.
- “Others” foods aren’t bad. They just don’t help us grow and stay healthy.

Learning Experience 6 – Variety of Foods, cont.

Page 3

- It's okay to eat "Others" foods once in a while. But most of the foods you eat for meals and snacks should be part of the Five Food Groups.

Discussion Questions:

What would keep your bones and teeth healthy if you only ate foods from the "Others" category?

What foods would give you strong muscles?

What foods would help heal cuts?

On page 3 of the Activity Sheet for Learning Experience 6, students are to list the foods they have on their food journal that would be considered part of the "Others" category. They are to write these foods in the left hand column of the chart. On the right hand column they are to write in foods they could replace these "Others" foods with to improve eating within other groups. For example, they could replace chocolate chip cookies with a yogurt as a snack and that may improve their serving size in the Milk Group. Students may also refer back to the paragraphs they wrote in the Analyze Food Choices Learning Experience to help them recall in what food groups more servings were needed.

Learning Experience 7 – Reading Labels

Objective: Students will read and compare food labels and analyze their contents for nutritional value.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

For the class:

Book – Food and Nutrition by Foss
5 food packages
1 set of measuring cups

*provided by teacher/student

Preparation:

Read background information on p. 8-9.

Basic Skills Development:

Discussing
Collecting Data
Interpreting Data
Making Decisions

Evaluation Strategy:

Students will compare food labels and analyze their contents to make conclusions about nutritional value.

Vocabulary:

label	carbohydrate
serving	fiber
calorie	sugar
saturated fat	protein
trans fat	nutrient
cholesterol	
sodium	

What is on a Nutrition Label?

Session 1

Read pages 27-29 from the book Food and Nutrition by Foss aloud to the class. Show students the food labels on packages of food items that were provided in the kit. These can be hung on a bulletin board to be on display throughout the unit.

Ask students to go to page 1 of the Activity Sheet for Learning Experience 7 in the Nutrition and Digestion Student Activity Book. On this page, there are a variety of food labels for various foods found in the Milk group. Food labels give us important information about the nutritional value of the foods we are eating. Discuss the following information with students about these various food labels.

- Ask students to look for the words “serving size” on the labels. In the case of milk, the serving size is 8 fl.oz. or 1 cup. While ice cream and cottage cheese servings are ½ cup (show these amounts using the measuring cups provided). Serving size is the amount chosen by the company that packages the food. This amount may be smaller or larger than what you would serve yourself.

Learning Experience 7 – Reading Labels, cont.

Page 2

- Have students find the number of calories in a single serving of food. Each of the first four labels are for 8 fl. oz. of milk, however, the amount of calories are different. Why? Fat and sugar content.
- Point out to students that if they drink 16 fl. oz. of milk that would be 2 servings of milk, therefore they need to double the calories they are taking in.
- Locate the number of fat grams in the various labels. Notice that saturated fat and trans fat are also listed out.
- Note the amount of cholesterol, sodium, carbohydrates, fiber, sugar, and protein.
- Also on the food label, students will find numbers followed by percent signs. This is where calcium is listed for the milk products. They should use the % Daily Value (DV) column when possible. They should remember that 5% DV or less is low, 20% DV or more is high. If the food is not a significant source of a nutrient, it is listed below the Daily Value section of the label.

Ask student groups to practice reading food labels by completing page 2 of the Activity Sheet for Learning Experience 7 in the Nutrition and Digestion Student Activity Book. Have students complete the chart at the top of page 2 of the Activity Sheet, filling in the information from the four nutrition labels of milk. Then students can analyze all the labels and answer the questions at the bottom of the Activity Sheet. Check student group answers and discuss.

Answers to page 2 Activity Sheet:

	Fat-free milk	1% chocolate milk	2% milk	Whole milk
What is the serving size for this item?	1 cup (8 fl oz)	1 cup (8 fl oz)	1 cup (8 fl oz)	1 cup (8 fl oz)
Is the serving size realistic? (Is this how much you would normally eat/drink?)	Answers may vary.			
How many total calories in one serving?	90	170	130	150
How many total grams of fat in one serving?	0	2.5	5	8
What percent of calcium in one serving?	30% DV	30% DV	30% DV	30% DV

Learning Experience 7 – Reading Labels, cont.

Page 3

Based on this information, which type of milk offers the most calcium with the lowest fat? **Fat-free**

Now look at all the labels on the page. Answer these questions:

1. If Michael drinks 8 fluid ounces of 1% chocolate milk and eats 6 ounces of fruit-flavored yogurt, how much calcium has he had? **50% DV**
How many grams of fat? **4 grams**
2. Which food item on the sheet has the least calcium with the highest amount of fat? **Vanilla ice cream**
3. Which food item on the sheet has the most calcium with the lowest amount of fat? **Fat free milk**

Session 2

Now that students have some experience reading nutrition labels on foods, student pairs are to compare and contrast two food labels of similar products. This may be two different kinds of snacks, two different kinds of desserts, two fruits, etc. The food labels are provided in the Nutrition and Digestion Student Activity Book. If students need other labels to look at, they can find them at www.nutritiondata.com. Students are to answer the questions on pages 3 and 4 of the Activity Sheet for Learning Experience 7 in the Nutrition and Digestion Student Activity Book about the food labels on each product. At the bottom of page 4 of the Activity Sheet, a question is posed to the students asking them what product seems to be more nutritional in their category and why. They are to use the information on the label to answer the questions and provide evidence for their decision. Have student pairs then present to the class their final opinion about the products and their explanation of why they felt one of the products was the more nutritional food item.

Session 3:

Using the food labels found in the Nutrition and Digestion Student Activity Book, have students create a menu of what they would eat for 1 day. If students need other food labels to look at, they can find them at www.nutritiondata.com. A template has been created for them to fill out in the Nutrition and Digestion Student Activity Book on pages 5-6 for Learning Experience 7. Students should use the My Pyramid Plan that was created or used in Learning Experience 2 as a guide to know how many servings of each food group they should consume in one day.

Learning Experience 8 - Getting Started With Digestion

Objective: Students will discuss their back ground knowledge of the digestive system.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

For the class:

Book -The Magic School Bus Inside the Human Body by Joanna Cole & Bruce Degen
Chart paper*

*provided by teacher

Preparation:

Read background information on p. 9 - 11.

Evaluation Strategy:

Students will contribute ideas to a KWHL chart on the Digestive System.

Basic Skills Development:

Brainstorming
Writing
Reading
Listening

Vocabulary:

Digestive System

What do we know about the digestive system?

Session 1:

Students are to complete the activity sheet for Learning Experience #8 in the Nutrition and Digestion Student Activity Book. Using the KWHL strategy, students will explore their knowledge of the digestive system and then expand on it throughout the unit. Brainstorm what the students already “**know**” about the digestive system, which they will be studying. Record their ideas on the KWHL chart. Ask students to think about these topics and decide what it is about the digestive system they would like to know more about and record their ideas under the “**want to know**” column. Now that the students have decided what they want to know, they need to think about “**how they are going to find out**” the answers to the questions they have. After the hands-on activities included in this unit, maintaining journals, and discussions, students can then record information in the “**what we learned and still want to learn**” column. This process can be done in cooperative groups where students gather information in small groups and then share their information with the class. You can create a class

Learning Experience 8 – Getting Started, cont.

Page 2

version of this chart using chart paper.

Session 2:

Read The Magic School Bus Inside the Human Body by Joanna Cole and Bruce Degen aloud to the class. This will give the students an overview of what they will be learning about throughout the rest of the unit on the digestive system. The book does discuss other body systems because the food that is digested is used to provide energy for the entire body to use. As you read the book, have the students star or underline the facts on the KWHL chart that are found in the book. The students can also add more information to the chart as it is found in the book.

Discussion Questions:

Why does our body digest food? *(To give our body energy)*

How does food move through the digestive system? *(It is squeezed.)*

Learning Experience 9 - Mouth

Objective: Students will explain and demonstrate how food is digested in the mouth.

Materials:

For Each Student:

Nutrition and Digestion Student

Activity Book

2 sugar cubes

1 small sandwich bag

1 paper cup

Water*

Plastic spoon

1 baby carrot*

2 paper plates

1 sucker

1 slice of individually wrapped cheese*

1 paper towel*

1 6" plate

1 9" plate

Samples of foods such as: apples, celery, leafy lettuce, nuts, raisins, cereal, pudding, cheese, fruit leathers, peanut butter, and prepared gelatin squares*

My Body, My Health Digestive System Journal

For the Class:

Book – What Happens to a Hamburger by Paul Showers

*provided by teacher

Preparation:

Read background information on p. 9-11. You may want to put the sugar cubes in the small sandwich bags ahead of time.

How does the mouth aid in digestion?

Session 1

Begin the Learning Experience by reading the book, What Happens to a Hamburger by Paul Showers. The book has several activities for the students to do. You can either read the entire book first, or have the students do the activities while you are reading the book.

After reading page 10, give each student 2 sugar cubes in a small sandwich bag. Have each student carefully crush the sugar cubes into powder and pour them into a paper cup that is $\frac{3}{4}$ full of water. Stir until the sugar cube has disappeared. Have the students take a sip of water.

Discussion Questions:

Even though we can't see the sugar anymore, is it still in the water? (Yes)
How do we know that? (*We can taste it.*)

After reading pages 11 and 12, give each student a raw carrot and a 6" plate. Have the students take a bite of the carrot, chew it 10 times, and spit it out onto the plate. Have them take another bite of the carrot, chew it 30 times, and spit it out on the other side of the plate.

Learning Experience 9 – Mouth, cont.

Page 2

Evaluation Strategy:

The students will demonstrate and discuss how our teeth, tongue, and saliva aid in digestion.

Basic Skills Development:

Analyzing
Discussing
Listening
Demonstrating

Vocabulary:

Digestion
Saliva
Canine teeth
Incisor
Bicuspid
Molar
tongue

Discussion Questions:

What is the difference between the 2 piles of chewed up carrots? *(One pile has smaller pieces.)*
How does chewing your food more affect the size of the food pieces? *(The more times you chew your food, the smaller the pieces will be.)*

Before reading page 14, give each student 1 sucker to suck on. The students should be able to feel saliva forming inside of their mouths.

Have students fill out the journal for Learning Experience 9 in the My Body, My Health Digestive System Journal.

Discussion Questions:

What did you feel in the inside of your mouth while you were sucking on the candy? *(spit or saliva)*
Why do you think your mouth produces saliva? *(Answers may vary. Finish reading the book to find out why.)*

Session 2

Explain to students that chewing is the first step in the digestion process. We have different types of teeth that are used in different ways to aid in the digestion of food. **Canine teeth** are sharp and pointy and are used for cutting and tearing food; **incisors** are big, flat wedge shapes that are used for biting off food;

Learning Experience 9 – Mouth, cont.

Page 3

bicuspids are teeth with two points on them and are used for grinding; and **molars** are flat and square shaped that are also used for grinding.

Give each student 1 slice of individually wrapped cheese. Have them remove the wrapper, bite down on cheese, but don't eat it. The students should bite hard enough to leave an imprint, but they are not to actually bite off a piece of the cheese. Have them remove the cheese from their mouths and place it on a paper towel. Have students draw the teeth imprint they see on their cheese on the page for Learning Experience 9 in their Nutrition and Digestion Student Activity Book. They will then use the labeled teeth diagram in their activity book as a guide in labeling their own teeth. Students will also write the function for each type of tooth.

Explain to students that they are now going to eat their cheese, but they have to do it by keeping their tongues pushed down on the bottom of their mouths. They are not allowed to move their tongue around while they are chewing the cheese.

Discussion Questions:

Was it hard to eat your cheese without using your tongue? Why? *(Yes, answers may vary.)*

How does our tongue help us digest our food? *(The tongue helps us move our food around in the mouth before swallowing it, and it tells us what the food tastes like.)*

Session 3

Have students recall the different types of teeth and their functions from the previous session. Give each student a 9" plate and samples of foods to eat such as apples, celery, leafy lettuce, nuts, raisins, cereal, pudding, cheese, fruit leathers, peanut butter, and prepared gelatin squares. These are just examples of what you can use. You can choose other food items, but just make sure you include a variety of foods with different textures so that some require more chewing than others, some should require tearing or grinding, and some should include no chewing at all. The students only need to take 1 bite of each food, so you really don't need a lot of each food item. If possible, have each student bring in 1 item to help cut down on the cost of the food. The students will use the information they gather from chewing different foods to create a graph. Have the students fill out the Activity Sheets on pages 2-3 for Learning Experience 9 in the Nutrition and Digestion Student Activity Book.

Learning Experience 9 – Mouth, cont.

Page 4

Discussion Questions:

Did some foods require more chewing than others? Why? *(Yes, they are different textures or some are hard and some are soft)*

Which foods required tearing or grinding? *(celery, fruit leathers, nuts, apples)*

Did any foods require no chewing at all? Why not? *(pudding, peanut butter, gelatin because they are like a thick liquid)*

Learning Experience 10 – Peristalsis and the Esophagus

Objective: The students will be able to demonstrate the movement of food through the esophagus, which is known as peristalsis.

Materials:

For each student:

My Body, My Health Digestive System Journal

For the class:

Book – Food and Digestion by Steve Parker

Blueprint for Health Digestive System Poster

For each group of 4 students:

1 stethoscopes

4 crackers

4 cups

Water*

1 2 ft. piece of pipe insulation

1 tennis ball

*provided by teacher

Preparation:

Read background information on p. 9-11.

Evaluation Strategy:

Students will demonstrate how food moves through the esophagus by squeezing a ball through plastic tubing. Students will also discuss the sounds the esophagus makes while digesting food.

Basic Skills Development:

Listening

Manipulating Materials

Observing

Vocabulary:

Esophagus

Peristalsis

How does the esophagus aid in digestion?

Start by reading pages 14-17 in the book Food and Digestion by Steve Parker. You will only read the sections called “The gut, a digestive tube” and “Squeezing and Pushing” for this learning experience. Review with students what the esophagus is and locate it on the Blue Print for Health Digestive System Poster. Have students recall the function of the esophagus and the term “peristalsis.”

The next two activities will be done in stations. The students will work with a partner at each station. Explain the directions of how to do each activity to the entire class, and then break them up into pairs to do the activities.

Activity/Station 1:

Explain to the students that after your food has been swallowed, it passes through the esophagus into the stomach. The students will then demonstrate this action in the following activity.

Have students stand and hold up a section of the pipe insulation which will represent the esophagus. Put a ball into one end of the tube. Students will then take turns squeezing the ball down the tube as it passes by

Learning Experience 10 – Peristalsis and the Esophagus, cont.

Page 2

them. This action is known as peristalsis, and this is how our food is pushed through the esophagus and throughout the rest of the digestive system. Then have students fill out the page for Learning Experience 10 in their My Body, My Health Digestive System Journal.

Discussion Questions:

How did the ball get to the end of the tube? (*by squeezing it*)

How do you think our food moves down our esophagus? (*The muscles in the esophagus squeeze the food.*)

What is this process called? (*peristalsis*)

Activity/Station 2:

Students will work in pairs to listen to their partners esophagus work. One student will hold the end of the stethoscope to his/her throat while chewing and swallowing a cracker and drinking some water. The other student puts the stethoscope in his/her ears and listens to the partner's esophagus working. Then have the students trade jobs so each person has a chance to listen to the esophagus working. Then have students fill out the page for Learning Experience 10 in their My Body, My Health Digestive System Journal.

Discussion Questions:

How do we know the esophagus is working? (*We can hear it.*)

What sounds did you hear?

Learning Experience 11: Stomach

Objective: The students will identify the parts and function of the stomach.

Materials:

For each student:

Nutrition and Digestion Student

Activity Book

My Body, My Health Digestive System
Journal

For the class:

Book – Food and Nutrition by Foss
Blueprint for Health Digestive System
Poster

Model of stomach

For each pair of students:

2 crackers

2 plastic jars with lids

Water*

*provided by teacher

Preparation:

Read background information on p.10.

Evaluation Strategy:

The students will demonstrate how the stomach works and label the parts of it on a diagram.

Basic Skills Development:

Observation

Interpreting Data

Discussing

How does the stomach aid in digestion?

Session 1

Start by reading pages 6, 7, and 9 in the book Food and Nutrition by Foss as an introduction to the stomach and a review of the previous parts of the digestive system.

Using the model of the stomach and the script provided, explain to students the parts and functions of the stomach and how they aid in digestion. Have the students label the parts of the stomach on the page for Learning Experience 11 in the Nutrition and Digestion Student Activity Book.

Session 2

Review with students what the stomach is and locate it on the Blueprint for Health Digestive System poster.

Students already discussed how the different types of teeth are used in digestion, but now they will discover why we need the teeth to break apart our food to make digestion in the stomach easier. The students will do an experiment with crackers to see the importance of chewing food into smaller pieces. Have each pair of students crush 1 cracker in their hands and put it in 1 plastic jar, then have them place 1 whole cracker in the other plastic jar. Fill both jars half way with water.

Learning Experience 11 – Stomach, cont.

Page 2

Have the students shake both jars for 5 seconds. Have the students fill out the Activity Sheet for Learning Experience 11 in the Nutrition and Digestion Student Activity Book.

Discussion Questions:

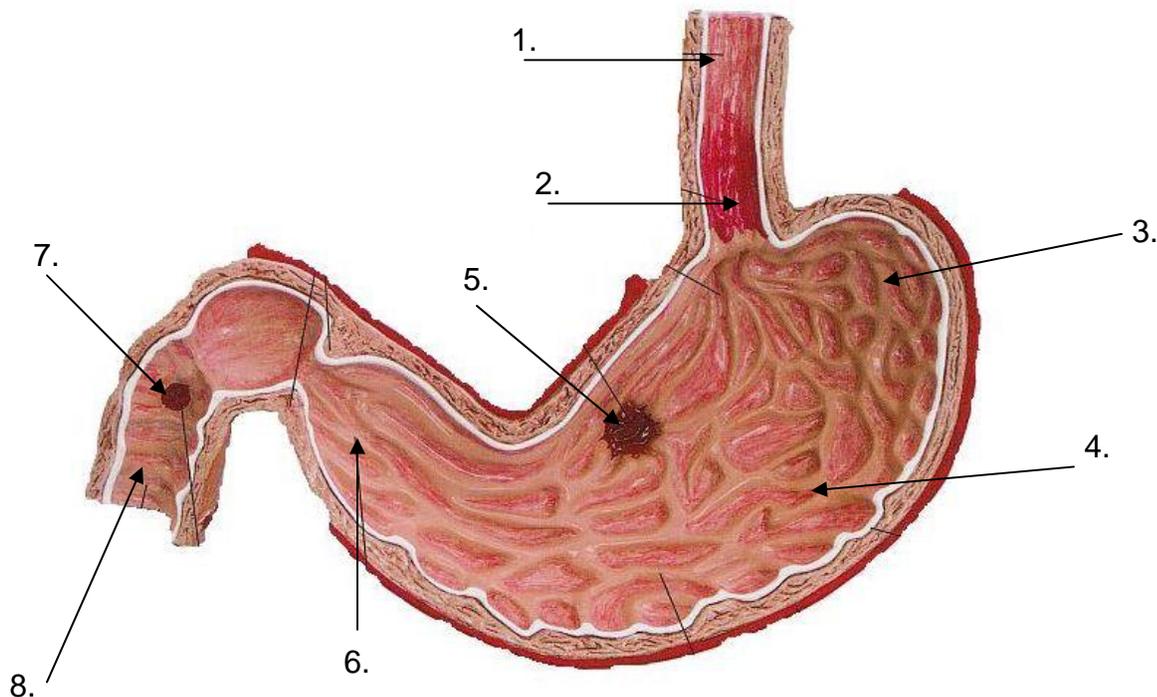
What is the difference between the jar with the whole cracker and the jar with the crushed cracker after you shook it for 5 seconds? (*The crushed cracker broke down easier than the whole cracker.*)

Why is chewing important? (*It makes digestion in the stomach easier.*)

What does the water represent in the stomach and what is its purpose? (*Our stomachs have juices or acids that break food up into smaller pieces.*)

Script for Stomach Model:

The diagram below is labeled along with a number. Refer to the descriptions below that describe more about the parts and disorders of the stomach.



1. **Esophagus** –A tube that connects the back of the throat to the stomach. It uses a process called peristalsis to squeeze food into the stomach.

2. **Esophagitis (esophageal inflammation)** – Any swelling or irritation to the esophagus. This is usually caused by stomach acid that has flowed backwards

Learning Experience 11 – Stomach, cont.

Page 3

from the stomach to the esophagus (acid reflux). You may have problems swallowing or feel a burning sensation when you eat.

3. **Fundus** – This is the upper portion of the stomach and gathers gases that are produced by chemical digestion. It also stores undigested food for up to 1 hour.

4. **Body of Stomach**

5. **Gastric ulcer** – A small hole that has formed in the stomach. A burning feeling or pain in the stomach, and appetite and weight loss are all symptoms of having an ulcer. Some ulcers are caused by contaminated food and water. Others are caused by improper diet, smoking, or drinking a lot of alcohol. Ulcers can lead to bleeding or tears in the stomach. In children, ulcers are usually caused by medications. If this happens, stop using the medicine, and make sure you only use medications that are prescribed by your doctor. Your doctor knows your medical history, so it is very important that you never take someone else medications!

6. **Pylorus** – This is where the main part of digestion occurs in which the food is churned or mixed with gastric juices. The stomach squeezes together using peristalsis which causes the food to get squashed into smaller pieces.

7. **Duodenal ulcer** – A small hole that has formed in the duodenum. This is the most common type of ulcer.

8. **Duodenum** – This is actually the first part of the small intestine. This is the next part of the journey for our food when it leaves the stomach. At this point, the food is called chyme, and it is very acidic. Chemicals in the duodenum help to neutralize the food so it doesn't eat away at the intestines.

Learning Experience 12 – Intestines: Small and Large

Objective: The students will describe and demonstrate the function of the Intestines.

Materials:

For each student:

Nutrition and Digestion Student Activity Book

For the class:

Book – Food and Nutrition by Foss

For each pair of students:

1 coffee filter
2 plastic tumblers
Water*
Sugar
Cocoa
1 plastic spoon

*provided by teacher

Preparation:

Read background information on p. 10 – 11.

Evaluation Strategy:

Students will demonstrate the function of the intestine by filtering a mixture through a coffee filter.

Basic Skills Development:

Listening
Manipulating materials
Analyzing

Vocabulary:

Small intestine
Large intestine
Villi
absorb

How do the small and large intestines aid in digestion?

Start by reading page 8 in the Food and Nutrition by Foss.

Explain to students that our bodies don't need everything that is contained in the food we eat. The intestines filter out the parts that we don't need. The small intestine is a 20-foot long tube. Its juices break food into smaller pieces, and the villi (which are tiny and hair like) act like doors that allow food and nutrients to be absorbed into our bloodstream. The rest of the food that doesn't go through the villi is then squeezed into the large intestine. The large intestine takes out the water and other liquids the body needs and squeezes the leftovers (waste) out of the body through the anus.

Students will demonstrate the function of the intestines by using a coffee filter and a liquid mixture. Have each pair of students form a funnel shape with their coffee filter and place it over a plastic tumbler. Have them create a liquid mixture in another plastic tumbler by filling $\frac{1}{4}$ of the cup with water and mixing in 1 teaspoon of sugar and 1 teaspoon of cocoa. Stir the

Learning Experience 12 – Intestines, cont.

Page 2

solution until it is thoroughly mixed. Have the students pour the mixture into the plastic tumbler through the coffee filter. Make sure one of the students is holding the coffee filter in place. Have the students record what happens on the page for Learning Experience 12 in the Nutrition and Digestion Student Activity Book.

Discussion Questions:

What happened when you poured the mixture in to the cup? (*Only the liquid went into the cup. The cocoa stayed in the coffee filter.*)

How is this related to how our intestines work? (*The intestines also filter out the things we need.*)

Learning Experience 13 - The Digestive System

Objective: The students will be able to describe and act out the digestion process and calculate the total length of the digestive system. The students will also describe some disorders of the digestive system.

Materials:

For each student:

Nutrition and Digestion Student Handbook

My Body, My Health Digestive System Journal

For the class:

Book – Food and Digestion by Steve Parker

Inflatable torso model

Book – Guts Our Digestive System by Seymour Simon

1 Large sandwich bag

Newspapers*

1 Paper bag

1 small sandwich bag

1 bag of small chocolate candies

Tape*

1 sponge

2 spray bottles filled with water

Food Coloring

Garbage can*

Butcher paper/newsprint

8 Namecards/Scripts

For each group of 4 students:

4 different colors of yarn

1 straw

1 small sandwich bag

1 measuring tape

Crayons, scissors, glue*

*provided by teacher

Preparation:

Read background information on p. 9-11. You will need to prepare the bag of food for the skit ahead of time. Put small chocolate candies into a small

How does food move through the digestive system?

Session 1:

Read pages 18-33 in the book Food and Digestion by Steve Parker. Have students locate each part of the digestive system on the inflatable torso model as it is discussed in the book. Make sure you remove the heart and lungs so the digestive system can be seen. Also, have students label the digestive system diagram on the page for Learning Experience 13 in the Nutrition and Digestive System Student Handbook.

Session 2:

Read Guts Our Digestive System by Seymour Simon as a review of the digestive system. Then, using the name cards/script provided, students will act out the digestive system. You will need 8 students to act out the parts, and the rest of the class will act as cells in the body. They will eventually be included when the blood has to carry nutrients to the cells. Have the students who are playing the main roles stand in a line in the following order: Mike Molar, Susie Saliva, Erin Esophagus, Steve Stomach, Sally Small Intestine, Bobby Blood, Lisa Large Intestine, and

Learning Experience 13 – The Digestive System

Page 2

sandwich bag and seal it. You should have enough candies to give each student who is not playing one of the main characters 1 candy. Place this bag along with torn up pieces of newspaper inside the paper bag. Then place the paper bag along with torn up pieces of newspaper in the large sandwich bag, and seal the bag. You will also have to use the food coloring to color the water that goes into the spray bottles. Fill $\frac{1}{4}$ of each bottle with water and put 4-5 drops of food coloring in it. Each bottle should have different colored water in it.

Evaluation Strategy:

Students will label a diagram of the digestive system. They will also act out the digestive process along with describing disorders of the digestive system.

Basic Skills Development:

Listening
Following Directions
Role-playing

Vocabulary:

Molar
Saliva
Esophagus
Stomach
Blood
Large intestine
Small intestine
Rectum

Rory Rectum. Place a garbage can at the end of line next to Rory Rectum. Give each of the main characters a name card that has his/her speaking part and actions printed on the back. Start the skit with Mike Molar and end with Rory Rectum. The main characters will pass the bag of food to the next person in line after they have completed their task and said their lines. This can be done several times so students can take turns playing different parts. Have students fill out the page for Learning Experience 13 in the My Body, My Health Digestive System Journal.

Discussion Questions:

Where does physical breakdown of food occur in the digestive system? (*in the mouth by the molars or other teeth*)

Where does chemical breakdown of food occur in the digestive system? (*in the mouth with saliva and in the stomach with stomach acid and juices*)

How do the nutrients we need get to the rest of the body? (*The blood transports them throughout the body.*)

Session 3:

As a culminating activity for the parts of the digestive system, have students work in groups of 4 to create a life size poster of the digestive system. Have the

Learning Experience 13 – The Digestive System

Page 3

students trace one of the group member's body onto butcher paper or newsprint. Have them color, cut out, and glue down the digestive system parts found on the page for Learning Experience 13 in the Nutrition and Digestion Student Activity Book in the proper place on the body cutout. Students will then follow the directions on how to assemble the poster so it has 3-D parts on it along with descriptions of the functions for each part. Students will also calculate the total length of the digestive system.

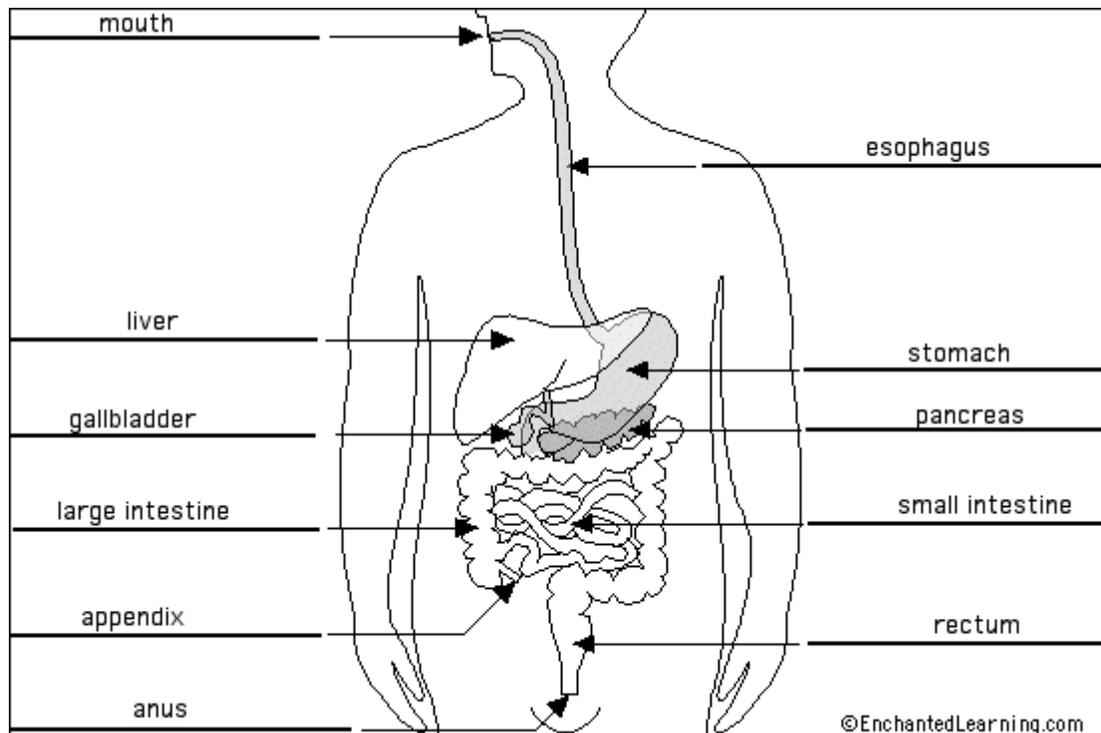
Discussion Questions:

What is the total length of the digestive system? (900 cm)

What is the longest part of the digestive System? (small intestines)

What is the irony in the answer to the previous question? (*The name of the longest part means the opposite!*)

Answers to page for Learning Experience 13 in the student activity book.



Learning Experience 13 – The Digestive System

Page 4

Answers to page 7 in the Student Activity Book

Esophagus -		___25___ cm
Stomach -		___25___ cm
Small intestines-		___700___ cm
Large intestines-	+	___150___ cm
<hr/>		
		___900___ cm

My digestive system is ___900___ cm long!

Name _____

Date _____

Nutrition and Digestion Assessment

Directions: Read each question and circle the correct answer.

1. Which is not a name of a food group?
 - a. fruit
 - b. snacks
 - c. milk
 - d. grain

2. Which food does not belong in the same food group as the others listed?
 - a. orange juice
 - b. apple juice
 - c. soft drink
 - d. banana

3. Susie ate hash browns for breakfast, French fries for lunch, and a baked potato for dinner. Is she eating a variety of foods from the vegetable group?
 - a. yes
 - b. no

4. Every food group has foods that fall into the wider area of the stripes and the narrow area of the stripes on the My Pyramid for Kids. Which food item listed below would fall into the wider area of the stripe for the fruit group.
 - a. peaches
 - b. peaches cobbler
 - c. both a and b
 - d. neither a or b

Use the labels below to answer questions 5 -7.

Broccoli, ½ c cooked

Nutrition Facts	
Serving Size 78 g	
Amount Per Serving	
Calories 27	Calories from Fat 3
% Daily Value [*]	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat	
Cholesterol 0mg	0%
Sodium 32mg	1%
Total Carbohydrate 6g	2%
Dietary Fiber 3g	10%
Sugars 1g	
Protein 2g	
Vitamin A 24% • Vitamin C 84%	
Calcium 3% • Iron 3%	
<small>*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.</small>	
NutritionData.com	

Corn, sweet ½ c

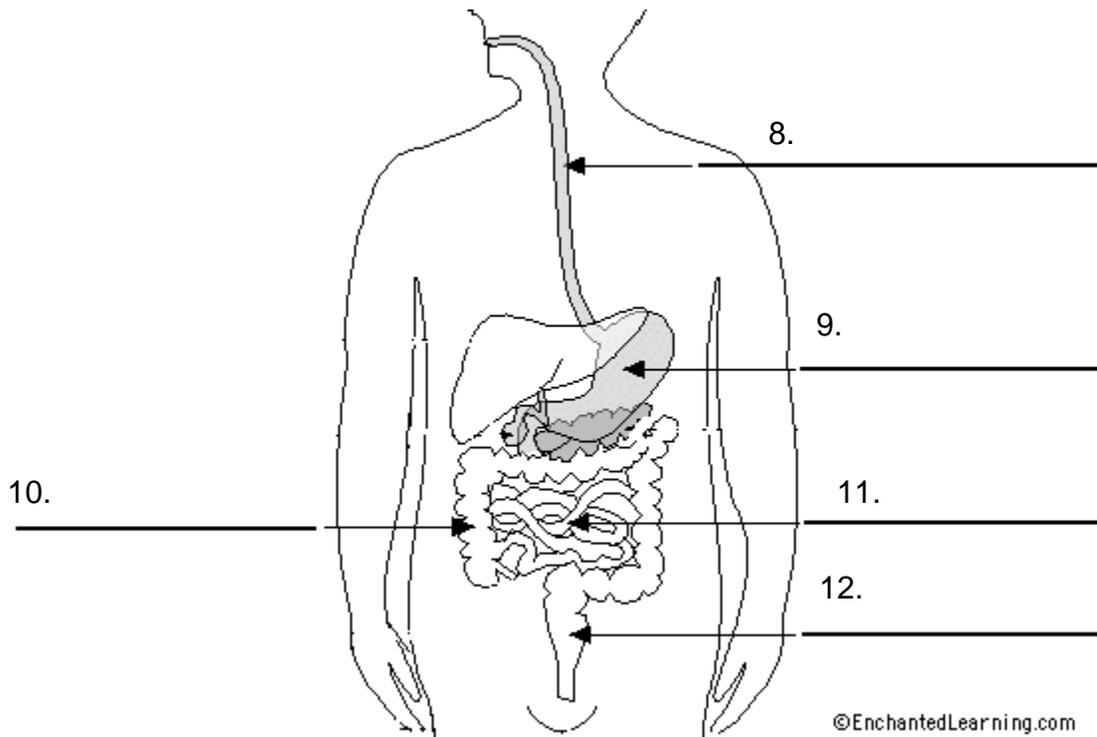
Nutrition Facts	
Serving Size 105 g	
Amount Per Serving	
Calories 83	Calories from Fat 4
% Daily Value [*]	
Total Fat 1g	1%
Saturated Fat 0g	0%
Trans Fat	
Cholesterol 0mg	0%
Sodium 286mg	12%
Total Carbohydrate 20g	7%
Dietary Fiber 2g	8%
Sugars 4g	
Protein 3g	
Vitamin A 2% • Vitamin C 14%	
Calcium 1% • Iron 2%	
<small>*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.</small>	
NutritionData.com	

5. How many total calories are in 1 serving of broccoli?
 - a. 3
 - b. 105
 - c. 78
 - d. 27

6. Which vegetable has more grams of fat per serving?
 - a. broccoli
 - b. corn
 - c. they both have the same
 - d. none of the above

7. What percent of calcium is in one serving of corn?
 - a. 3%
 - b. 14%
 - c. 2%
 - d. 1%

Label the diagram below for questions 8-12 using the word box provided.



Word Bank

mouth

pancreas

stomach

liver

Appendix

large intestine

esophagus

anus

small intestine

gall bladder

rectum

Match each word with its definition.

13. _____ stomach

14. _____ small intestine

15. _____ peristalsis

16. _____ saliva

17. _____ esophagus

18. _____ large intestine

19. _____ molar

20. _____ mouth

a. digestion begins here

b. moistens food and uses chemical digestion to break food apart

c. used for grinding food

d. a wave-like squeezing motion

e. absorbs nutrients for the body

f. absorbs water for the body

g. a stretchy, muscular sack

h. squeezes food into the stomach

Nutrition and Digestion Assessment Key

1. b
2. c
3. b
4. a
5. d.
6. b.
7. d.
8. esophagus
9. stomach
10. large intestine
11. small intestine
12. rectum
13. g
14. e
15. d
16. b
17. h
18. f
19. c
20. a

MORE IDEAS

Language Arts

- Create an ad campaign for vegetables. Research vegetables and why they are a nutritious choice. Create a poster to share with the class.
- Choose 10 nutrition words and create a word splash. Ask students to write a creative story about what they have learned and share stories.

Book Suggestions:

Good Enough to Eat by Lizzy Rockwell

Eat Healthy, Feel Great by William Sears

The Digestive System by Darlene Stille

Where Does Your Food Go? by Wiley Blevins

Math

- Brainstorm a list of fruits and vegetables with the class. At the end of the week, students share with a partner the fruits and vegetables they ate. Create a graph of favorites eaten by the class.
- Use the nutritional information provided by fast food restaurants and chart fat grams of fast food items. Pick out smart choices.
- Circle combination foods on the school menu and survey favorites and graph results.

Physical Education

- Ask students to bring in a game that they play within their families or neighborhood. Ask them to share it with the class during recess time to encourage physical activity.
- Show students how to use a pedometer and the number of steps it calculates.
- Take students heart rates and breathing rates after a period of exercise. Then compare to resting heart rates. Discuss how raising our heart rate helps keep our bodies healthy.

Social Studies

- Passports are used when traveling to other countries. Make tasting passports that are stamped when trying a new food.
- Identify foods eaten on Thanksgiving and discuss foods eaten on different holidays, especially from different countries.
- There are a variety of foods from different countries that are popular in the United States (Italy, Mexico, China). List the combination foods from each country and the ingredients.

Health

- Visit the cafeteria and ask staff to show students where to find foods from each food group in line.
- Go on a scavenger hunt in a grocery store for food group foods.
- Evaluate the weekly lunch menu and where the food items fall in the My Pyramid for Kids.
- Divide class into pairs and assign each group a specific nutrient we get from food (protein, carbohydrates, fat, calcium, fiber). Give each group a file folder for students to fill with information explaining food sources and function of the nutrient assigned. Magazine pictures and drawings can be included. Place folders in a Resource Center.

INQUIRY AND PROCESS SKILLS

Classifying	Arranging or distributing objects or events in classes according to some method of system.
Collecting Data	Obtaining visible or measurable information which illustrates a specific situation.
Communicating	Displaying or transmitting information to others.
Generalizing	Drawing general conclusions from information.
Formulating Hypotheses	Constructing a proposition or assumption of what is thought likely to be true based on reasoning, which serves as a tentative testable theory.
Identifying Variables	Recognizing characteristics of objects or events, which are constant or change under different conditions.
Inferring	Making a statement based on reasoning to explain an observation.
Interpreting Data	Analyzing information that has been collected and organized and describing apparent patterns or relationships for information.
Making Decisions	Choosing an alternative from among several and basing the judgment on defensible reasons.
Manipulating	Handling or treating materials from among several and basing the judgment on defensible reasons.
Measuring	Making quantitative observations by comparing to a standard.
Observing	Becoming aware of an object or event by using any of the senses to identify properties.
Predicting	Making a forecast or estimate of what future events may occur.
Replicating	Performing acts that duplicate demonstrated symbols or patterns.
Using Numbers	Stating and applying mathematical rules or formulas to calculate or compute quantities for basic measurements.

GLOSSARY

Absorb	to take in or suck or swallow up
Analyze	to find out what something is made up of by identifying its parts.
Antioxidants	guard against damage by free radicals
Appendix	a small tube that is closed at one end and projects from the pouch marking the beginning of the large intestine in the lower right side of the abdomen
Attitude	an opinion or general feeling about something.
Bicuspid	teeth with two points on them and are used for grinding
Blood	the red fluid that circulates in the heart, arteries, capillaries, and veins and that brings nourishment and oxygen to and carries away waste products from all parts of the body
Calcium	is used by the body to help build strong bones and teeth
Calorie	a unit of energy-producing potential in food, equal to one large calorie. This energy, if not used, is converted to fat and stored.
Canine	sharp and pointy teeth and are used for cutting and tearing food
Carbohydrate	Gives the body energy
Cholesterol	a waxy substance that is present in animal cells and tissues, is important in bodily processes, and may be related to the abnormal thickening and hardening of arteries when too much is present
Combination	an association of different things or

	factors, or the act of mixing them.
Diet	the food that a person usually consumes.
Digestion	the process of breaking down food into smaller pieces so the body can use it
Duodenal ulcer	a raw area in the lining of the upper part of the small intestine, the duodenum, caused when the lining of the stomach is eaten away by stomach acid and digestive juices
Duodenum	the first part of the small intestine extending from the opening from the stomach into the small intestine to the jejunum
Esophagitis	the swelling of the lining of the esophagus
Esophagus	the passage down which food moves between the throat and the stomach.
Fat	nutritional component of food, a water-soluble substance, solid at room temperature, that belongs to a group of chemicals that are main components of food derived from animal tissue, nuts, and seeds.
Fiber	substances that are found in grains, fruits, and vegetables, and aid digestion. This largely indigestible plant matter is considered to play a role in the prevention of many diseases of the digestive tract.
Food	material that provides living things with the nutrients they need for energy and growth.
Food pyramid	A picture to help you have a healthy diet. A chart, drawn in the shape of a

	pyramid, summarizing daily nutritional recommendations.
Fruit	an edible part of a plant, usually fleshy and containing seeds.
Function	an action or use for which something is suited or designed.
Fundus	the left portion of the stomach's body
Gall bladder	a small muscular sac on the right underside of the liver, in which bile secreted by the liver is stored until needed for the digestive process.
Gastric ulcer	also known as a stomach ulcer, is a raw, eroded area in the lining of the stomach. A gastric ulcer develops when the stomach acids and digestive juices injure the stomach's lining of protective mucus.
Goal	something that somebody wants to achieve.
Grain	cereal crops.
Healthy	helping to maintain or bring about good health.
Incisor	big, flat, wedge shaped teeth that are used for biting off food
Iron	is used by the body to help make hemoglobin, which makes red blood cells.
Journal	written daily record of personal experiences.
Label	information given about an item to give instructions about it or identify it.
Large intestine	the last part of the intestine which is

	wider and shorter than the small intestine, which consists of the cecum, colon, and rectum, and which absorbs water from the material left over from digestion and prepares the feces for release from the body
Liver	a large organ that secretes bile and causes changes in the blood (as by changing sugars into glycogen) The liver is reddish brown, multilobed, and in humans is located in the upper right part of the abdomen
Lycopene	Protects against heart disease and certain cancers
Meat	the flesh of an animal that is considered edible, especially that of a mammal or bird, or a nut
Milk	a white fluid produced by cows, sheep, or goats and used by human beings as a drink, in cooking, and to make products such as butter and cheese.
Molar	flat and square shaped teeth that are used for grinding
Mouth	food and voice organ in people and animals, the opening in the head and its surrounding lips, gums, tongue, and teeth, through which food is taken in and through which sounds come out.
Narrow	having a small width, especially in comparison to height or length.
Nutrient	a substance that provides nourishment, the component in food that keeps a human body healthy and help it to grow.
Nutrition	the process of absorbing nutrients from food and processing them in the body in order to keep healthy or to grow.

Oil	a liquid fat, obtained from plant seeds, animal fats, mineral deposits, and other sources, that does not dissolve in water and will burn.
Organ	a complete and independent part of a plant or animal that has a specific function.
Pancreas	a large organ lying near the stomach. It secretes juices into the small intestine and the hormones insulin, glucagon, and somatostatin into the bloodstream.
Paragraph	a piece of writing that consists of one or more sentences, begins on a new and often indented line, and contains a distinct idea or the words of one speaker.
Peristalsis	the squeezing motion by which food and waste products of digestion are forced through parts (as the esophagus and intestine) of the digestive system
Physical activity	relating to the body involving energetic physical movement or exercise.
Portion	an amount of food for one person.
Protein	as in meat, fish, milk, and eggs, supplying all the amino acids that are needed by the human body but cannot be made by it, helps every cell grow
Pylorus	the opening from the stomach into the intestine
Recommend	to suggest something as worthy of being accepted, used, or done.
Rectum	the end of the large intestine that links the colon to the anus
Saliva	used to moisten food so it can easily slide through the esophagus

Saturated fat	a fat in which the carbon atoms are fully hydrogenated, found in animal products. A diet heavy in saturated fat is thought to raise cholesterol in the bloodstream.
Serving	quantity of food provided served to one person.
Small intestine	the part of the intestine between the stomach and the large intestine, where digestion of food and most absorption of nutrients takes place.
Sodium	a soft silver white metallic element that reacts readily with other substances and is essential to the body's fluid balance.
Sodium chloride	Regulates blood pressure and water in the body
Stomach	an organ resembling a sac in which food is mixed and partially digested. It forms part of the digestive tract and is situated between the esophagus and the small intestine.
Sugar	a sweet-tasting substance, usually in the form of tiny hard white or brown grains.
Summarize	to give a shortened version of something that has been said or written, stating its main points.
Tongue	a fleshy movable muscular part of the bottom of the mouth that has sensory organs (as taste buds) and small glands and functions especially in taking and swallowing food and in human beings as a speech organ
Trans fat	an unsaturated fat formed during the hydrogenation of vegetable oils to produce margarine. Trans-fatty acids

	are viewed as a health risk because they raise cholesterol levels.
Variety	the quality of having different forms or types
Vegetable	a plant with edible parts, especially leafy or fleshy parts that are used in foods.
Villi	one of the tiny finger-shaped processes of the mucous membrane of the small intestine through which digested food is absorbed
Vital	extremely important and necessary, required for the continuation of life.
Vitamin A	a vitamin found especially in green and orange vegetables (as carrots or spinach) and animal products (as egg yolk, butter, or liver) and are needed especially for good vision
Vitamin B	a vitamin needed to make the genetic materials DNA and RNA
Vitamin D	a vitamin needed for normal bone and tooth structure, and found especially in fish-liver oils, egg yolk, and milk or are produced in response to ultraviolet light
Wide	having a relatively large distance or space between one side or edge and the other

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Websites

<http://www.mypyramid.gov/>

http://www.foodscience.psu.edu/outreach/fun_food_science.html

<http://www.cfsan.fda.gov/~dms/educate.html>

http://www.dairycouncilofca.org/activities/pyra_main.htm

<http://www.innerbody.com/text/card10-new2.html>

<http://www.brainpop.com/health/digestivesystem/digestivesystem>