WASHINGTON STATE UNIVERSITY
KING COUNTY EXTENSION

Outline of Lesson
Fiber: It Keeps Things Moving
Unit 1, Lesson 7
Grade 1-3

Lesson Time: **50 – 60 Minutes**

Lesson Outline:

1. **Digestion**
   - Follow the path food takes in our bodies

2. **Critical Thinking Activity: Fiber Relay Race**
   - Learn the importance of fiber in digestion

3. **Function of Fiber**
   - Function, sources and nutritional value of fiber

4. **Garden Observation**
   - Go outside and see how the garden is growing

Student Learning Objectives:

By the end of this lesson students will:

- Understand the functions of the digestive system.
- Understand the functions of fiber in our bodies.
- Identify at least 3 foods that are good sources of fiber.

References:

- University of California Cooperative Extension, San Mateo County. TWIGS: Teams With Intergenerational Support Gardening and Nutrition curriculum. 1997.
- Fortin, Francois and D'Amico, Serge. The Visual Food Encyclopedia: The Definitive Practical Guide to Food and Cooking. MacMillan, 1996.
- Duyff, Roberta Larson. American Dietetic Association: Complete Food and Nutrition Guide, 2nd ed. John Wiley & Sons, 2002.
- Evers, Connie Liakos. How to Teach Nutrition to Kids. 24 Carrot Press, 1995.

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Overview (for Teacher)

Pre-Class Preparation	None
Teacher Involvement During Class 	• Assist during Fiber Relay Race. • Assist in clean-up. • Assist in behavior management of students.
Post-Class Teacher Responsibilities	None
Vocabulary	**Absorb-** to soak something up, like a sponge soaks up water. **Fiber-** a part of foods found in whole grains, beans, fruits and vegetables that passes through the body but is not digested.
Critical Thinking Activity	Fiber Relay Race
Supplementary Activities	Student Assessment
Web Resources	• Fiber: www.kidshealth.org/kid/word/f/word_fiber.html • Fiber content in foods: www.wehealny.org/healthinfo/dietaryfiber/fibercontentchart.html
Suggested Books for Reading in the Classroom	• Inglis, Jane. Fiber. Carolrhoda, 1993. (Grade 3) • Frost, Helen. Digestive System. Pebble Books, 2000.

EALR & GLE Alignment

EALR	GLE	Lesson Applications
Science 1.2 Understand how components, structures, organizations, and interconnections describe systems	1.2.1 Understand that things are made up of parts that go together	• Digestion • Critical Thinking Activity: Fiber Relay Race
Health and Fitness 1.4 Understand the relationship of nutrition and food nutrients to physical performance and body composition 2.1 Recognize patterns of growth and development 3.3 Use social skills to promote health and safety in a variety of situations	1.4.1 Identify the nutrients provided by a variety of foods and describe how bodily functions and physical performance are affected by food consumption 2.1.1 Describe the influence of nutrition on health and development 3.3.1 Express emotions constructively and form safe and respectful relationships	• Digestion • Critical Thinking Activity: Fiber Relay Race • Function of Fiber • Critical Thinking Activity • Critical Thinking Activity (in teams)
Communication 1.1 Focus attention 1.2 Listen and observe to gain and interpret information 3.1 Use language to interact responsibly and effectively with others 3.2 Work cooperatively as a member of a group	*GLE not available at this time	• Digestion • Critical Thinking Activity • Critical Thinking Activity • Critical Thinking Activity (in teams)

Fiber: It Keeps Things Moving

Preparation Outline

Activity Supplies	**Digestion** • 1 carrot • 1 cardboard tube with different colored strings attached to it. Make this model by using a toilet paper cardboard tube, a piece of tape, and 5 pieces of different colored yarn in these lengths (plus 2 inches each for tying): 4 inches (mouth), 10 inches (esophagus), 6 inches (stomach), 17 feet (small intestines), 6 feet (large intestines). Knot strings end to end in the order listed above. Tape the end of the large intestines to the toilet paper roll and wrap all the string around it. **Critical Thinking Activity: Fiber Relay Race** • Staying Fit with Fiber – Food Relay Race worksheet • 1 thin bottle brush or a thick test tube scrubber • Dish soap • 6 – 1 to 1½ foot lengths of clear tubing, approx. ¾ inch lumen (1 per learning team) • 6 plastic bowls (1 per learning team) • 1 small container of water • 6 plastic trays (1 per learning team) • 6 plastic baggies of food: 3 fiber teams; 3 junk food teams. Each baggie for the fiber team should include 2 tablespoons of finely chopped apples, carrots, and whole sunflower seeds. Each baggie for the junk food team should contain ½ of a snack cake with frosting and 3 chips. It is important that the snack cake has frosting. This aids in the sticking of the junk food in the tubes. • Wash cloth and hand towels for clean up **Fiber** • 1 apple • 1 box of apple juice
Overheads	• Digestive Tract • Fiber Relay Race Observations
Student Handouts	None
Teacher Handouts	Student Assessment and Answer Key
Changes for K and ELL Classes	Omit discussion about fiber nutrition concepts
Rainy Day Activity Supplies	None

Fiber: It Keeps Things Moving

Outline	Content
Introduction and Lesson Overview (1 Min)	Today we will learn about our digestive system, how fiber helps our digestive system, and what foods are high in fiber.
Digestion (10 Min) • **Discuss the Digestive Tract:** What happens to our food after we eat it?	• Educator shows carrot: when we eat a carrot, the Vitamin A from the carrot doesn't just magically appear in our eyes. And when we eat seeds, the protein doesn't just go into our mouth and magically appear in our muscle, we have to "digest" our food to get the nutrients to the place we need them in our bodies. • Show overhead of the digestive tract. • The digestive tract breaks down food so we can get the nutrients out of the foods we eat and into our bodies.
• **Follow the path of food**	• Let's follow the path that our food takes. First, our food enters our mouths. (Ask students about the body parts as you move through them on the overhead. Have them tell you what each part does as you move through the digestive tract or explain as below.) • The tongue, teeth and saliva work together to break down food into smaller bits. • After we swallow, the food moves into a long tube called the esophagus. The esophagus squeezes the food down into the stomach. The stomach has muscles and juices that continue to break up the food and prepare it for absorption. • Next our food enters the small intestine. This is where most of our nutrients are absorbed from the food. • Food then moves into the large intestine where any water left over is absorbed. What is leftover is called waste. We remove the wastes from our body when we go to the bathroom. • "If you ate breakfast or lunch today, your body is digesting RIGHT NOW."
• **Digestive System Length**	• Using string, show students how long each part of our digestive system is. (See attached "Digestive Tract Demo" in lesson materials section) • Imagery: walk along the string squeezing to mimic the work of the intestines, and show nutrients coming out of food in the intestines, and into our blood. The blood is what will carry all our nutrients to where they are needed in the body. • What would happen if you did not go to the bathroom? (Our undigested food would build-up in the digestive

	tract, would get a 'stomach' ache)
Critical Thinking Activity: Fiber Relay Race (15-20 Min) 	• Refer to the Educator Worksheet for this activity. (attached in lesson materials section) • If time, have students predict which foods will travel faster. • Educator or teacher can make a chart or tally on the board to show which teams travel most quickly. • Allow 5-10 Minutes to clean up after this activity.

Function of Fiber (10 Min)
 	
• **Sources of Fiber**
	• Fiber is found in the leaves and stems of **ALL** plants and in the pulp and skin of fruits.
	• Brainstorm with the class foods that are high in fiber. Make a list on the board.
	• Some tips to get the most fiber out of your food are:
	  ◦ Eat whole fruits- fiber is removed from fruit juice.
	  ◦ Eat the skins of tomato, potato, pears and apples; the skin is fiber-rich.
	  ◦ The stems of spinach, broccoli, celery and chard are good to eat too, as well as the leaves and florets.
	• Show an apple and a box of apple juice ask the kids "Where is the fiber?" (In the apple only.)
	• Optional: Ask students what will happen if you take an apple and push it through a strainer to make juice? What will come out the bottom? (Juice.) What will be left in the strainer? (Skin, pulp, seeds). What is left in the strainer is the fiber. Reinforce the fact that whole fruits are better than juice because they have fiber.

• **Purpose of Fiber** 	• Tell kids that in short, fiber helps us poop. • Fiber is the part of these foods that our bodies **DO NOT** break down or absorb. It goes through our bodies, scrubbing as it goes. It picks up bits and pieces of other foods that are not absorbed and toxins that could make us sick, and sweeps them out of our bodies. • It helps 'scrub' our intestines clean so food does not get stuck and rot there. That's why we call fiber our body's scrub brush!
• **Nutritional Value of Fiber**	• Since fiber doesn't break down, our bodies have to work harder to get the nutrients out of these foods and into our bodies. This means that foods with fiber take more time for the body to digest. • The nutrients from fibrous foods go into the body more slowly, a little bit at a time. This means that foods with fiber can give us energy for a long time. • Foods with fiber help us to feel full longer, and have

	more energy to play! • Fiber also soaks up water in our intestines, so we need to make sure we are drinking plenty of water to help fiber do its job. This will help us go to the bathroom easily (and avoid constipation).
Garden Observation (15 Min) 	• Take students outside to observe the garden. What is growing? Harvest, taste, weed, and water as necessary. (If harvesting, have students WASH HANDS first.) • **Optional:** bring magnifying glasses for students to use in observations.
Review and Reflection	• **Plant Part Learning Contract:** Hang contract in front of class. Review which parts of the plant fiber is found in, and why fiber is good for our bodies.

Lesson Materials

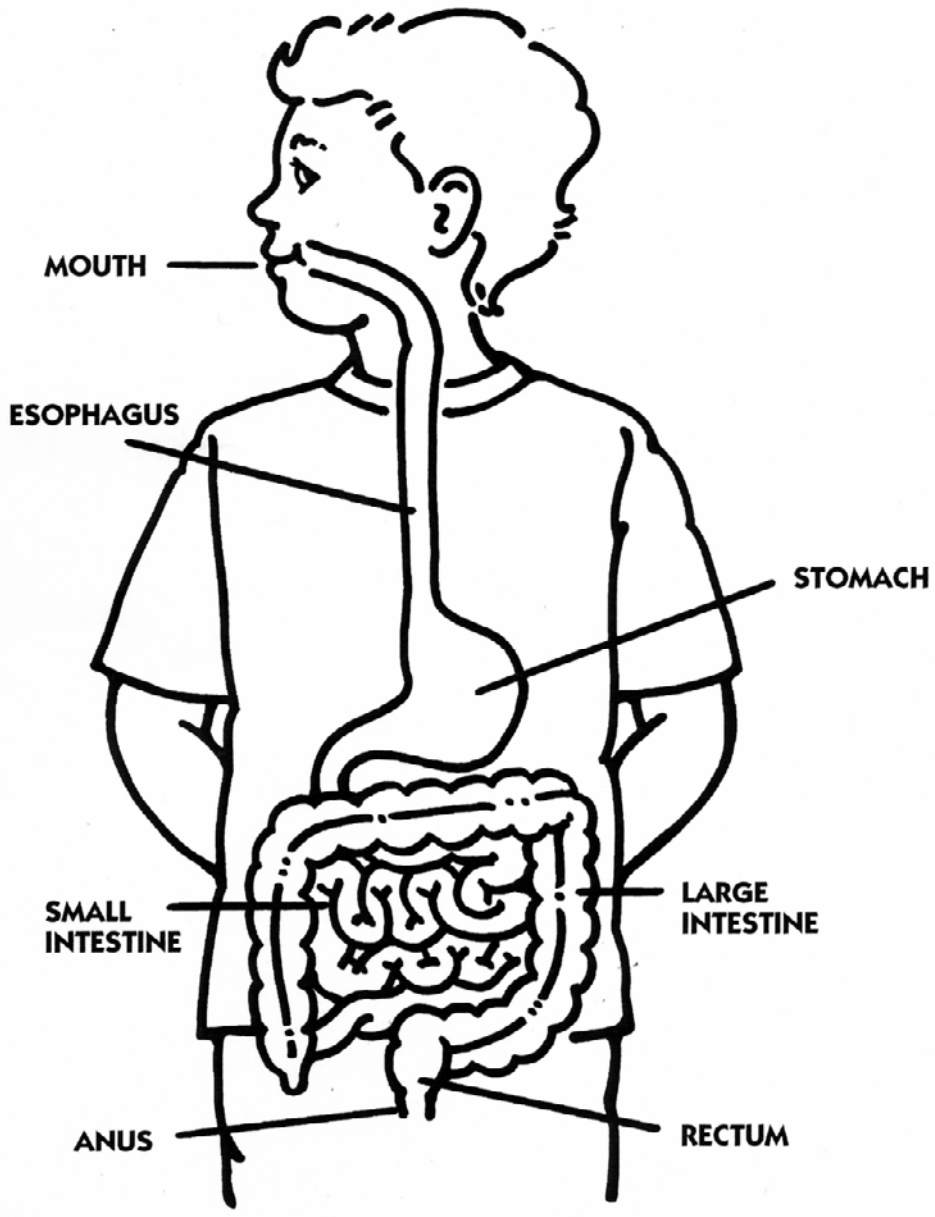
Fiber: It Keeps Thing Moving

- **Digestive Tract Diagram**
- **Food Relay Race Educator Worksheet**
- **Food Relay Race Observations**
- **Digestive Tract Demo Instructions**

Supplementary Activities

- **Student Assessment grade 1**
- **Assessment Key**
- **Student Assessment grades 2-3**
- **Assessment Key**

DIGESTIVE DIAGRAM



Enlarge and reproduce for educational use.

Reproduced from: Evers, Connie Liakos. How to Teach Nutrition to Kids. 24 Carrot Press, 1995.

EDUCATOR: Staying Fit with Fiber - FOOD RELAY RACE

This activity is designed to help students understand the value of eating foods high in fiber. It demonstrates the differing rates of food movement through the digestive tract for diets that are high or low in fiber. During the activity students will simulate the processes involved in digestion. Tell students that this is a demonstration only and the process is more complicated in your body, but this simplified activity will help show us how fiber and water work in the digestive system.

Materials for each team (of 4 students)

1 bag of chopped fiber rich foods (carrots, jicama, sunflower seeds)

OR

1 bag of chopped junk food (snack cakes, potato chips)

1 large bowl

1 cup of water

1 plastic tube

Half of the groups get a bag of junk food, half get a bag of food that is high in fiber.

Swallow – Students empty cut up food from baggies into their bowl (the baggie represents the mouth where food is chopped up by our teeth and the bowl is our stomach). (Digestion starts in the mouth)

Break down – Students use a few tablespoons of water to moisten and break down the food like stomach acid and other digestive juices. Use a finger or stick to stir.

Digest – We are ready to move the food from the stomach into the intestines. One team member will hold the intestine model (clear plastic tube) horizontally so that the tubes openings are pointing up and form a wide U shape. The other team member will start feeding the food into ONE END ONLY. (This will take some time for all students to fill their tubes.) Ask students to wait patiently and hold their tubes carefully until everyone is done.

GO! - Now we race to see who can empty all of their food into the bowl the quickest and cleanest. Kids will twist and flex the tube to simulate the muscular actions of intestines. They may not shake or poke the tubes.

After a while, offer more water to students who are stuck. Water should help the food to move more smoothly. Tell them that drinking water will have a similar effect in our bodies. Fibrous foods should win. Make sure that the teams with junk food hold up their tubes and tell the kids that this is what can happen if this is the kind of food you eat all day. Your insides will not be clean and healthy and they can even get clogged up by these kinds of foods. Have a brief discussion about the results and/or fill out “Food Relay Race Observations” on the overhead.

Food Relay Race Observations

1. Which foods moved through the tube the quickest? Why?

2. Which foods moved through the tube the slowest? Why?

3. Why are foods with fiber good for us?

4. List 3 foods that are high in fiber:

5. List 2 foods that are low or have no fiber:

Digestive Tract Demo

The roll of string represents the lengths of the different parts of the digestive system. Start by pulling the loose-ended blue string and explain to the students what each different color represents.

1. The mouth is approximately 10cm or 4 inches. (blue string)
2. The esophagus is approximately 25cm or 10 inches. (black string)
3. The stomach is approximately 15cm or 6 inches. (white string)
4. The small intestine is approximately 500cm or 17ft long (red string)
5. The large intestine (including the rectum and to the anus) is approximately 150cm or 5 ft. (grey string)

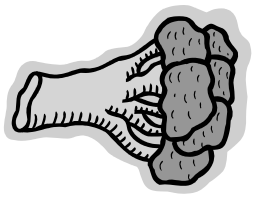
Note: These measurements are approximate for an adult.

Student Assessment: Grade 1

Fiber: It Keeps Things Moving

Name:_____ Date:_____

Circle three foods that are high in fiber



Broccoli

Ice cream cone

Celery

Apple with skin

Milk

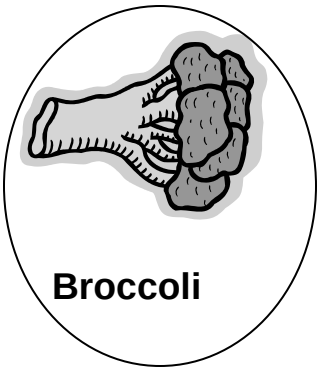
Draw yourself eating two foods that have fiber.

Assessment Key: Grade 1

Fiber: It Keeps Things Moving

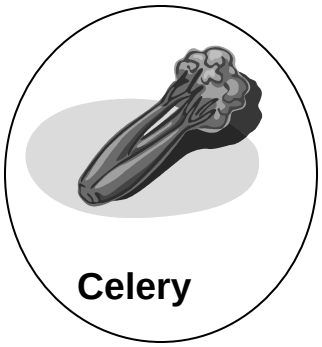
Name:_____ Date:_____

Circle three foods that are high in fiber



Broccoli

Ice cream cone



Celery

Apple with skin

Milk

Draw yourself eating two foods that have fiber.

Any two high fiber foods

Student Assessment: Grades 2-3

Fiber: It Keeps Things Moving

Name:_____ Date:_____

List three foods that are high in fiber

1. _____
2. _____
3. _____

Where is fiber found? (Please write a complete sentence)

_____

_____

_____

True or False (circle the right answer)

T F Dry beans and seeds have lots of fiber.

T F Fruit juice has more fiber than whole fruits.

T F Your tongue is not part of your digestive system.

T F The esophagus squeezes the food down into the stomach.

T F Fiber can be called the body's scrub brush.

Assessment Key: Grades 2-3

Fiber: It Keeps Things Moving

List three foods that are high in fiber (possible answers)

1. **Answers will vary but should go along with lesson.**
2. **Fresh fruits such as apples, oranges, strawberries, etc.**
3. **Vegetables, seeds, nuts, brown rice, whole wheat bread, etc.**

Where is fiber found? (Please write a complete sentence)

Fiber is found in the leaves and stems and seeds of all plants and in the pulp and skin of fruits.

True or False (circle the right answer)

T **Dry beans and seeds have lots of fiber.**

F **Fruit juice has more fiber than whole fruits.**

F **Your tongue is not part of your digestive system.**

T **The esophagus squeezes the food down into the stomach.**

T **Fiber can be called the body's scrub brush.**