Fiber

*Fill Up On Fiber!*

*Grade: 9-12*

**I. Nutrition Education Objective:**

Goal 1: Students will comprehend concepts consistent with USDA guidance related to eating and physical activity for good health.

Objective: As a result of Pennsylvania’s SNAP-Ed plan, students will know, understand, analyze and apply concepts, as developmentally appropriate, that are consistent with USDA guidance about the benefits of:

1. Eating foods that are high in fiber.

Goal 2: Students will apply skills consistent with USDA guidance related to eating and physical activity for good health.

Objective: As a result of Pennsylvania’s SNAP-Ed plan, students will be able to:

1. Assess personal health practices.

**II. Pennsylvania Educational Standards:**

A. 10.1 Concepts of Health  
B. 10.2 Healthful Living  
C. 11.3 Food Science and Nutrition

**III. Outcomes:**

A. Students will explain the importance of and sources of fiber in the diet.  
B. Students will discuss the difference between whole grains and refined grains.  
C. Students will read food labels to distinguish between whole grains and refined grains.  
D. Students will state how much fiber they need daily.  
E. Students will explain the health consequences of not getting enough fiber.

**IV. Materials:**

A. Laptop/Projector with PowerPoint presentation  
B. Visuals: Whole Grain Poster, Food Labels  
C. Handouts: “Fiber Assessment”, “Get More Fiber!”  
D. Food Tasting  
E. Reinforcement that conveys the appropriate nutrition message.  
F. Supplies: Pencils, Handwipes  
G. Caregiver Newsletter: “Grains & Your Health”  
H. Extension lesson for the teacher

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V. Procedure:

   A. Introductory
      1. Introduction of lesson topic and educator presenting lesson
      2. Review of last lesson, if applicable
      3. Brief introduction about the workshop and its importance to high school students:
         Fiber is an important nutrient that we need to be healthy, but most Americans don’t
         get enough. Today we will learn about fiber, its health benefits, and its sources.

   B. Developmental:
      1. Slide 1: Fill Up On Fiber!
      2. Slide 2: Project Sponsors
      3. Slide 3: What is Fiber?
         a. Ask students: “What is fiber?” Solicit responses. Fiber is the part of plant foods
            our bodies can’t digest, and getting enough is important to keep our bodies
            healthy. Most Americans do not get enough fiber, so it is important to understand
            why fiber is good for you and how to incorporate it into your daily meals and
            snacks.

      4. Slide 4: Why Is Fiber Important?
         a. Fiber helps to maintain a healthy digestive system. Ask students: Do you know
            where digestion takes place in our bodies? Discuss student responses. Digestion
            occurs mostly in the intestines, with a little in the stomach. Fiber helps move
            digesting food through the intestines. It promotes healthy bowel movements by
            adding “bulk” to our stools and preventing constipation.
         b. Fiber helps to maintain a healthy body weight by slowing stomach emptying and
            promoting feelings of fullness. This can help prevent overeating.
         c. Additionally, fiber may help prevent several diseases (which will be discussed on
            a future slide).

      5. Slide 5: Not All Fiber Is Created Equal
         a. There are two types of fiber that we need in our diet: insoluble fiber and soluble
            fiber
         b. Insoluble fiber is the type that keeps you “regular.” During digestion, it absorbs
            water, causing the food in the digestive tract to expand. The expansion of digested
            food adds bulk to your stools. When the stools expand and put pressure on the
            intestinal walls, it causes your intestines to contract, which helps food pass more
            quickly through the digestive tract. Insoluble fiber helps prevent constipation and
            maintain a healthy digestive system. It is found in foods such as whole grain
            products, vegetables, and nuts.
         c. Soluble fiber dissolves in water and turns it into a gel-like substance, and slows
            the rate of digestion. Soluble fiber is what may help lower cholesterol, which can
            reduce the risk of heart disease. It is found in foods like oats, peas, beans, apples
            (w/ skin), and citrus fruits.
d. Our diet requires both types of fiber, but we need more insoluble fiber. Most foods have a mix of the two types of fiber.

6. Slide 6: Fiber and Disease Prevention
   a. Obesity: As we discussed earlier, fiber helps us to feel full faster and makes it less likely that we’ll overeat.
   b. Type 2 Diabetes: Since fiber promotes a feeling of fullness and helps to prevent overeating, it can help to maintain a healthy body weight. Maintaining a healthy body weight can reduce the risk for Type 2 Diabetes.
   c. Diverticulitis: Getting enough fiber helps to keep us “regular” and prevents constipation. If we don’t eat enough fiber, we can cause too much pressure in our colon. This pressure causes small pockets to start forming in the intestines, called diverticula. The problem with diverticula is that food particles can get stuck in them and can become inflamed and infected, which is called diverticulitis. This can be very painful, and can turn into a serious problem. Since fiber helps moves everything through the intestines, it can help prevent diverticula from forming.
   d. Colon cancer: We can get cancer in all different parts of the body, and one common location for cancer is the colon. “Colon” is another word for part of our intestines. A high-fiber diet can reduce the risk of colon cancer. The exact reason is not known, but since fiber moves food through the digestive system more quickly, it may dilute cancer-causing agents and get them out of our bodies faster.
   e. Heart Disease: After hearing those commercials on TV about how the fiber in cereal may lower cholesterol, you have probably wondered how that works. We all have cholesterol in our blood, but too much of it can lead to clogging and hardening of the arteries. Over time, this can lead to heart disease, which can include a heart attack or stroke. Eating soluble fiber can lower the amount of cholesterol in your blood, which may decrease your risk of heart disease.

7. Slide 7: How Much Fiber Do You Need?
   a. Males 14-50 years old need about 38 g/day
   b. Females 9-50 years old need about 25 g/day
   c. On average, we need about 14g of fiber per 1000 calories. Do you remember what your daily calorie needs are that we figured out during the energy balance lecture? Do the math and see how much fiber you need compared to the recommended intake. If students have not covered the energy balance lesson yet, show them an example with an average 2000 calorie requirement: 2 x 14 = 28 grams/day of fiber.

8. Slide 8: Sources of Fiber
   a. The major sources of fiber in our diet are whole grains, fruits, vegetables, beans, nuts and seeds.

9. Slide 9: High-Fiber Fruit
   a. This is a list of fruits that are high in fiber.
Ask the Students: Which of these do you like to eat, and could you add them to your diet?

10. Slide 10: High-Fiber Vegetables
   a. This lists some vegetables that are high in fiber. There are more vegetables that are also high in fiber but are not shown here.
      Ask the students: What are some other vegetables that you think are high in fiber?

   a. Beans, nuts, and seeds are great sources of fiber too.
      Ask the students: What food group do these foods belong to?

12. Slide 12: High-Fiber Grains
   a. This is a list of high-fiber grains.
      Ask the students: Do you notice anything similar about the names of some of the grains? (“Whole” is listed in the names of many of the grains.)

13. Slide 13: Fiber and Whole Grains
   a. One of the best sources of fiber is whole grains. Unfortunately, a lot of us aren’t sure what a whole grain is. Common misconceptions include: thinking that wheat bread or brown bread is always a whole grain, thinking that “multi-grain” means whole grain,
   b. When a grain is harvested, it has three layers: the bran, the germ, and the endosperm. Each one has important nutrients. We need all 3 layers together to get enough fiber and nutrients. To be considered a whole grain, a food must contain all three parts of the grain kernel.

14. Slide 14: The Whole Grain Kernel
   a. Let’s take a look at a whole grain kernel and each of the three different parts.
   b. The bran helps protect the seed as it grows. It is a hard outer covering that provides protection. This part of the kernel contains fiber, B vitamins, and trace minerals.
   c. The germ provides nourishment for the growing seed. This part of the kernel contains B vitamins, vitamin E, trace minerals, and phytonutrients (phytonutrients are valuable nutrients produced naturally by plants.)
   d. Endosperm is the part of the kernel that provides energy to the growing seed. It contains carbohydrates, protein and some B vitamins.

15. Slide 15: What is a Refined Grain?
   a. A refined grain is a grain that has been milled to remove the bran and the germ. What is the only part of the grain that is left? (Endosperm) If the bran and the germ are removed, what important nutrients will be lost? Removing the bran and germ causes the grain to lose B vitamins, iron, and most importantly for today’s discussion: fiber.
b. Many grains are enriched after the milling process (which means nutrients are added), but only the B vitamins and iron are added back, leaving out the heart-healthy fiber.

c. Foods made with refined grains often contain solid fats and added sugars which may cause a person to consume excess calories which can contribute to weight gain.

16. Slide 16: Fiber and the Food Label
   a. Since fiber is a type of carbohydrate, look for the words “Dietary Fiber” under “Total Carbohydrates.” If there are 3 grams or more per serving, that food is considered a good source of fiber. If there are 5 grams of fiber or more per serving, that food is considered an excellent source of fiber.

17. Slide 17: Fiber and the Food Label
   a. Use the list of ingredients to help determine whether the food is a whole grain product. The whole grain ingredient should be listed first.

18. Slide 18: Whole Grains and the Ingredient List
   a. Whole grains cannot be identified by color. Very often you will find brown breads that are made with refined grains.
   b. When looking for foods with whole grains, the best place to look is on the food label under “Ingredients.” Make sure that the first ingredient listed is a WHOLE grain (e.g. whole wheat flour, whole oat flour, whole grain rice).

   a. By following MyPlate and eating enough fruit, vegetables, whole grains, beans and nuts, you can increase your fiber intake!
   b. Make at least half your grains whole. You can do this by replacing refined grains in your diet with whole grains. Try to choose brown rice instead of white rice, whole wheat bread instead of white or wheat bread, or oatmeal instead of crispy rice breakfast cereal. Remember to look at the Ingredients List for a WHOLE grain listed first.
   c. Fill half your plate with fruits and vegetables. There are lots of ways to add fruits and vegetables to our meals and snacks, including adding fruit to breakfast cereal and adding vegetables to scrambled eggs. You can also have raw vegetables for snack with a low-fat dip.
   d. Mix it together! How many of you eat trail mix? Make a batch for snacking and pack it with a whole grain cereal, nuts, and dried fruit! It's a healthy snack high in not only fiber, but also protein, healthy fats, and essential vitamins and minerals.

20. Slide 20: Can You Eat Too Much Fiber?
   a. It is good to increase fiber intake in your diet, but when increasing fiber too quickly it can cause intestinal gas, abdominal bloating and cramping. Increase fiber in your diet gradually by adding about 5 grams a day for the first week. Increase intake by another 5 grams a day each week until you are consuming the recommended amount.
b. It is also important to get enough water and stay well hydrated. It is recommended that you drink 8-10 glasses of water a day. Fiber works best when it absorbs water, making your stool soft and bulky, preventing constipation.

21. Slide 21: The Bottom Line on Fiber
   a. As you can see, many types of foods contain fiber. As you remember from the MyPlate lesson, your body requires plenty of fruits, vegetables, whole grains, nuts/beans in order to maintain a balanced diet. If you make sure to get enough fresh fruits, vegetables, beans/nuts, and whole grains then you will get the fiber you need!

22. Slide 22: Activities
   a. Fiber Assessment
   b. Get More Fiber!

23. Slide 23: Questions?

VI. Conclusion of the lesson:
   A. Distribute hand wipes.
   B. Provide each student with a taste-test and encourage him or her to make small changes in his or her diet.
   C. Distribute the reinforcement read the message and/or explain the reason why they are getting the reinforcement.
   D. Distribute parent newsletter.
   E. Thank the students for their participation and answer any questions the students have.

VII. Extension lessons:
   A. Use Whole Grain Extensions or activities from the Fiber Activity Packet
Fiber Assessment

**Directions:** Look at the list of foods below. Put a check in the box for foods that you already eat on a regular basis. Then take a second look at the list and see which foods you would be willing to eat. Look for foods that are higher in fiber.

**Recommendations:** Males: about ___ grams/day and Females: about ___ grams/day

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Serving</th>
<th>Grams of Fiber per serving</th>
<th>Foods I eat now</th>
<th>Food I can start to add to my diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bran cereal (high fiber)</td>
<td>½ cup</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raisin bran cereal</td>
<td>1 cup</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baked beans</td>
<td>½ cup</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lentils</td>
<td>½ cup</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or pinto beans</td>
<td>½ cup</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mini-shredded wheat cereal</td>
<td>24 biscuits</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chickpeas</td>
<td>½ cup</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole wheat pasta</td>
<td>1 cup</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn on the cob</td>
<td>1 medium ear</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oatmeal</td>
<td>1 cup</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pear (with skin)</td>
<td>1 medium</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple (with skin)</td>
<td>1 medium</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>½ cup</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baked potato (with skin)</td>
<td>1 medium</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White beans</td>
<td>½ cup</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole grain bread</td>
<td>1 slice</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooked carrots</td>
<td>½ cup</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td>1 medium</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td>1 medium</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>¼ cup</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Popcorn</td>
<td>3 cups</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td>½ cup</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown rice or wild rice</td>
<td>1 cup</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaghetti or other pasta</td>
<td>1 cup</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fruits and vegetables</td>
<td>½ cup</td>
<td>1 or 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*If you are not consuming a lot of fiber currently then you need to start adding more high fiber foods to your diet. **Be sure to start slowly.** Only add about 5 additional grams of fiber to your diet each week until you reach the recommendations listed above.*
Directions:

1) Listed below is an example of the meals and snacks that could be eaten for one day.

2) Circle foods in each meal that you think provide fiber.

3) To add more fiber to this day, make changes to each of the meals and snacks by replacing low-fiber foods with high-fiber foods. Make at least two changes to the meals and one change to snacks.

Breakfast

1 cup of orange juice

1 white English muffin with 2 eggs

Snack

1 small bag of pretzels

Lunch

Turkey sandwich with 2 pieces of white bread and a slice of cheese

1 ounce of almonds

Chocolate bar

Dinner

Bean burrito made with a white flour tortilla, black beans, white rice, and cheese (no vegetables)

Glass of 1% milk

Dessert

Vanilla ice cream

Drexel University, HS Fiber Lesson Plan, revises 7/14, page 8
Answers will vary. Below are suggested changes to the meals & snacks.

**Breakfast**

1 cup of orange juice *(Substitute with whole fruit)*

1 white English muffin with 2 eggs *(Substitute with WHOLE grain bread or whole grain English muffin)*

**Snack**

1 small bag of pretzels *(Substitute carrot sticks or whole grain pretzels)*

**Lunch**

Turkey sandwich with 2 pieces of white bread and a slice of cheese *(Substitute 2 pieces of whole grain bread, add veggies like lettuce and tomato)*

1 ounce of almonds

Chocolate bar) *(Add dried fruit and small amount of chocolate chips to almonds to make a trail mix)*

**Dinner**

Bean burrito made with a white flour tortilla, black beans, white rice, and cheese (no vegetables) *(Substitute a whole wheat tortilla, brown rice, add vegetables such as corn)*

Glass of 1% milk

**Dessert**

Vanilla ice cream *(Make a fruit and yogurt parfait with low-fat vanilla yogurt, fresh fruit, and low-fat granola)*