

COVER SHEET

Lesson #4: Helping Your Body Use Its Fuel

Lesson Objective: Students will understand how digestion works, why we digest our food and how eating a wide range of colorful foods provides many nutrients.

Classroom Lesson Outline:

1. Introduction (5 min)
 - a. Review of serving sizes
 - b. Definition of digestion
2. Key concepts learned (20 min)
 - a. Our digestive system
 - b. Importance of chewing food
 - i. Chewing activity with food sample
 - ii. Three reasons chewing properly is important
 - c. The stomach
 - i. the stomach's job is to liquefy food
 - ii. Sugar cube activity
 - d. Small intestines
 - i. Absorption
 - e. What do fruits and vegetables do for our bodies
 - i. Phytonutrients (fight – o – chemicals)
 - ii. Antioxidants
3. Review (2-3 minutes)



Recommended Reading (Provided in training packet)

- Fruits and Vegetables by Color
- Digestion – “Kids Health” article

California State Standards met by grade

3rd grade:

Life sciences

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:
 - c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

4th grade:

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:
 - a. Students know plants are the primary source of matter and energy entering most food chains.

5th grade

Life sciences

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
 - c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.

SCRIPT

Lesson #4: Helping Your Body Use Its Fuel

 Docent note: As docent does review, assistant hands out activity sheet

In our last lesson we talked about eating the right amount of food for our bodies by paying attention to serving sizes.


Question: Did anyone use the tools I taught you to estimate serving sizes? (i.e.: the tennis ball for a serving of fruit, palm for a serving of protein...)

Question: Who remembers the definition of a serving size?

Answer: A serving size is the measured amount of food recommended for us to eat. This is usually different from the portion we are served, especially at restaurants.

We also talked about choosing a variety of colorful, whole foods, close to their source, to ensure you are getting the appropriate balance of nutrients every day. By trying to eat foods that represent all the colors of the rainbow, you will get a variety of different nutrients.


Nutrients are the vitamins, minerals, proteins, fats and carbohydrates found in our foods. Although you cannot see these nutrients, your body is designed to find these nutrients and use them for energy to help you think, move, grow and keep your immune system strong.

 Docent note: Assistant starts handing out food sample now.

Question: Who knows which system in our body breaks down our food so we can use the nutrients? (3rd grade can be given clues — skeletal? respiratory? digestive?)

Answer: The digestive system.

Today's lesson is about digestion. Digestion is the process that allows our bodies to use nutrients and energy we get from our food.

 Docent note: Write on board: Digestion = process that allows your body to use nutrients and energy from your food.

We will also talk about the importance of eating fresh fruits and vegetables, carbohydrate fuels, because they are packed full of the nutrients your body is searching for when it digests your food.

We all know food is our fuel, and its nutrients give our bodies the energy we need to operate. Before the body can absorb and use all the nutrients, food must be broken down into smaller parts through digestion.

Digestion is a process that goes through many steps.

Look at the diagram on your handout and let's follow the path food travels through our digestive system.

Let's pretend you are about to eat a delicious meal. Close your eyes and imagine you just walked into the kitchen. You are really hungry, your stomach is growling and you smell wonderful aromas.

Question: As you imagine your favorite food, do you notice any signals your body is giving you? (Maybe you feel something in your mouth? In your stomach?)

Answer: Your mouth may start to water, your stomach may growl, you may suddenly feel hungry.

Believe it or not, this is the beginning of digestion. It starts before you even taste your food. It starts with your eyes, your brain and even your nose. When you see, smell or even think about something delicious your mouth starts to water or salivate. This salivating is the first step in digestion and it prepares your body to start the process.

Let's say your food is sitting in front of you. You take a bite...

Question: What happens next?

Answer: Chewing! Chewing your food thoroughly is very important.

Question: Raise your hand if you pay attention to chewing each bite of food as you eat.

Usually we don't pay attention to the act of chewing. We chew automatically while we eat, talk with family or friends, watch TV or just zone out. Chewing is a really important part of digestion. Pay attention while you chew your bites of food.

Let's do an activity. In front of you are three different foods. Please don't touch them yet.

We are going to practice chewing these foods more than you normally would. In fact, a good rule of thumb is to chew each bite 10 to 20 times!

Before you start eating look at the activity sheet. Fill in the section of the chart that asks you to estimate the number of chews you think it will take to break down each food. Write down your guess of how many chews you think it will take to liquefy each different food.



Docent note: Give students a minute to fill this out on the activity sheet.

Now it is time to begin eating. On your plate are three different foods. Start with the carrot and count how many times you chew a bite to make it very mushy and soft before you swallow. Write the number of chews on the activity sheet and continue with each food until you sample them all.



Docent note: Call on 1 to 2 students to share how many chews they estimated and their actual answers. Repeat this process for each food. WATCH YOUR TIME HERE – ONLY TAKE A COUPLE OF ANSWERS PER FOOD.

Question: Which foods took the most time to chew?
Answer: Carrots – hard and crunchy, cranberries – chewy

Question: Which food took the least time to chew?
Answer: Kiwi – soft


We need to chew the foods we eat well in order for our bodies to digest and then use the nutrients.

Let's look at three reasons why it is important to chew your food well.


First, your teeth grind up your food into smaller pieces.

Second, your saliva moistens and softens the food so we can swallow without choking.

And finally, by chewing and mixing food with the enzymes in our saliva, we begin the digestive process.

 *Docent note: if they ask, an enzyme is something that speeds up a chemical reaction that breaks down our foods..*

Look back at the digestion diagram.

 *Docent note: Assistant hands out sugar cube and water cups*

We know food goes into our mouth and we chew it. Then the food travels down our throat through a tube.


Question: Who can tell me what this tube in our throats is called?
Answer: It is an esophagus. Your esophagus is not really a tube, it is actually a muscle a little shorter than a ruler, about 10 inches long.

Question: If we don't chew up our food well, what can happen in the esophagus?
Answer: The food can get stuck, and choking may happen.

Question: After the food passes through the esophagus, where does it travel next?
Answer: The stomach.

The stomach is a large muscle that squeezes together or contracts to mash up the food. Like the mouth, the stomach releases fluids that mix with the food to help digest it into even smaller particles.

The two fluids are stomach enzymes and stomach acid. It is the stomach's job to turn food into a thick liquid.

 *Docent note: : Start sugar cube activity. Students should each have a cup with water and a sugar cube.*

Let's do an activity that helps show how the stomach does its job. Each of you is receiving a sugar cube and a cup of water.

Pretend the cup is your stomach and the sugar cube is a piece of food you didn't chew up very well. The water is the stomach's enzymes and acid. Place the sugar cube into your cup.

Question: Did it turn into liquid?

Answer: No! Your stomach muscles need to do a lot of work now to break down the food.

Use your finger to mix the sugar cube and water. As you stir, the sugar cube melts. This is similar to how your stomach digests food – it churns the food and mixes it with the acid and enzymes turning it into a thick liquid.


The sugar cube was easy to dissolve.

Question: What do you think your stomach has to do to digest something hard, such as an un-chewed piece of carrot?

Answer: It would take a long time to break it down; your stomach would have to work really hard...

Question: If you gulp down food without chewing properly, what might you feel as your stomach struggles to digest the food?

Answers: Stomachache, cramps, bloating, heartburn.

 *Docent note: Open discussion: cramps, bloating, gas, indigestion, heartburn are all side effects of not chewing effectively*

So, now we know it is your stomach's job to turn the solid food into this thick liquid form.

Once the food leaves the stomach it enters the small intestine.


Now that your food is in a liquid form, it is ready to pass to the small intestine where, with the help of the liver, gallbladder and pancreas, the small intestine completes digestion and our body can absorb the nutrients.

Find the small intestine on your diagram. It is the long tube that loops around inside the belly.

Question: Who wants to take a guess at how long your small intestine is if you were to unwrap it and spread it out?

Answer: 22 feet long – that is about the length of three of the tables you are sitting at pushed together.

So, the whole point of digestion is to break food down the foods we eat into smaller and smaller parts to enable our bodies to absorb and use the nutrients.

 *Docent note: You are changing direction here from digestive system to the importance of nutrients in whole foods that are close to the source.*

Question: Why do you think whole foods are important to the digestion process?

Answer: They contain the nutrients (vitamins, minerals, proteins, fats and carbohydrates) our bodies are looking for.


The easiest foods for our bodies to digest are whole fruits and vegetables. These whole foods follow a natural path through our bodies. Our bodies recognize them as an excellent source of nutrients, such as the vitamins and minerals. They are foods that keep us well and energized.

Question: Raise your hand if you have heard you should eat 5 or more servings of fruits and vegetables per day.

The reason you hear this is because colorful fruits and vegetables contain the nutrients that fight disease. That is really important.

Besides being packed with an amazing variety of vitamins and minerals, they also contain two other parts.

1. Fruits and vegetables contain **phytonutrients**. These fight off disease and are what make fruits and veggies brightly colored. This is easy to remember if you spell it the way it sounds:

 *Docent note: Write both words on the board: **phytonutrients** = **fight** - **o** - **nutrients***

Write the word phytonutrients on your handout on the first blank line.

An important phytonutrient you may have heard of is antioxidants.

2. Fruits and vegetables are loaded with **antioxidants**. These substances cruise through your body gobbling up the harmful molecules.

 *Docent note: Write **antioxidants** on the board.*


Write the word antioxidant on your handout on the second blank line.

Remember these two words and what they mean. When you go home today ask your parents what these two compounds do and you may surprise them by knowing more than they do!

So fruits and vegetables are the best way to keep disease away and keep you feeling great.

When you choose foods to eat, think of making a rainbow on your plate. Choose foods that are colorful and come straight from nature.

Your snack sample today was very colorful.

 *Docent note: If you have time discuss examples of different colors of fruits and vegetables. Students can make notes in the area provided on their chewing activity sheet.*

The carrots were orange.

Question: Who can name other orange foods?

Answers: Carrots, squash, pumpkin, oranges, tangerines, sweet potatoes

We ate red cranberries.

Question: What are some other red foods?

Answers: Beets, red cabbage, red leaf lettuce, strawberries, red grapefruit, red peppers, cherries

The kiwi was green.

Question: Who can name some other green foods?

Answers: Artichokes, broccoli, brussel sprouts, cabbage, green beans, lettuce, leeks, grapes

Question: Who can name some yellow or white foods straight from nature?

Answers: Yellow: grapefruit, yellow peppers

White: potatoes, pears, turnips, garlic, onion, jicama, cauliflower

Our digestion journey is not over yet -- the leftovers that your body can't use still have more traveling to do! In our next and final lesson we will discuss where that food ends up and what happens next.

To review, we learned that food enters our mouth, we chew it and it travels down our esophagus, to the stomach and into the small intestine where digestion is completed and our body absorbs the nutrients.

And, we learned that fruits and vegetables contain many nutrients, as well as phytonutrients and antioxidants that fight off disease and keep us strong and healthy.

Remember to show your parents the "Grill Me About..." flyer that is being sent home with you. See if you can stump your parents with what phytonutrients and antioxidants do for our bodies!