Digestive System: The Food Tube (5th Grade)

Key Behavior

Write on the Chalkboard

Whole wheat is great to eat!
Eat foods high in fiber!

Grow healthy and strong by eating whole grains, fruits and vegetables every day.

NUTRITION OBJECTIVES CHECK LIST

Students will be able to:

- ☑ ***taste*** a bean and salsa dip with whole wheat crackers.
- ☑ ***express ways*** they can ***eat whole wheat foods.***
- ☑ ***explain*** the ***health benefits*** of eating high fiber foods.
- ☑ ***identify*** that whole wheat foods and beans are high in fiber and good for the digestive system.

MATERIALS AND INGREDIENTS

Bins	Teacher Provides	Will be Delivered
In Kitchen Bin - small bowl - mixing spoon - can opener ***In Paper Goods Bin*** - small paper plates*	- text copies* - diagram copies* - activity sheet copies* - 2' by 3' paper (one sheet for two students) - pencils with good erasers - drawing materials (markers and /or crayons) - 30 feet of yarn or string - napkins*	- chunky salsa (16 oz) - 2 cans refried beans low-fat or no-fat (15 oz) - whole wheat crackers (Triscuit® style) 4 - 6 per student - hot sauce - family letter/recipe copies*

*one per student

EXPERIMENT

Bins	Teacher Provides	Will be Delivered
- N/A	- N/A	- 1 box or bag oyster crackers

Reinforcing Colorado Comprehensive Health Standards

Fifth Grade, Standard 2. Physical and Personal Wellness. 1. Apply knowledge and skills to engage in lifelong healthy eating.

While INEP nutrition lessons focus on the Colorado Comprehensive Health Standards, you will find you may utilize lessons to reinforce mathematics, physical education, reading, writing & communicating, science & social studies standards for your class.

SET-UP

Copies:

- Make copies of text (each student), The Food Tube activity sheet (each student), and the diagram of the digestive system (each student). **Note:** Use overhead device to cut down on copies.

Work area:

- Students will work in pairs.
- Students will need space where they can spread the large piece of butcher block paper (2' by 3') on the floor and lay on that paper to trace their upper bodies.
- Have nutrition table ready for lesson ingredients and materials.

Food-prep:

- Open the can of refried beans.
- Have beans, salsa and hot sauce ready to mix together, along with small bowl and mixing spoon.
- Have whole wheat crackers, small paper plates, and napkins ready to pass out along with bean dip.

Other-prep:

- Have oyster crackers ready to pass out. **Note-*The oyster crackers are for the experiment in the introduction. They are not a part of the snack.***
- Cut butcher block paper into about 2' by 3' pieces, one sheet for two students.
- Have drawing materials (crayons and/or markers) ready to pass out.
- Have a 30-foot-long piece of yarn or string to demonstrate the length of the whole digestive system.

INTRODUCTION WITH STUDENTS

Let's Wake Up Our Brains! Brain Boost Exercise!
Move Your Body! Let's get our hearts pumping!

- ♥ Jog in place. (30 seconds)
- ♥ Jump in place. (30 seconds)
- ♥ Squat up and down. (30 seconds)
- ♥ High knees in place. (30 seconds)

Now that our minds are ready to go, let's get started on our nutrition lesson.

- Tell the students they are going to learn about the digestive system, also known as “the food tube”.
- Ask students what they know about the digestive system and how they think the system works.
- **Experiment:** Pass out one oyster cracker to each student. Ask them to hold the crackers in their mouths for one minute without chewing. After one minute, ask them to chew the softened crackers well and swallow them.
- Discuss what happened to the pieces of cracker they just ate.
- Explain to students that the digestive system starts with the mouth, teeth and saliva.
- Explain that as the crackers sat in their mouths they started to digest. The saliva in their mouths had started the process of digestion.
- Pass out or display the text “The Food Tube” to each student. Read the text together.
- **Refer to the Key Behavior on the board and tell students they can keep their food tube healthy by eating a variety of fiber-rich foods such as whole grains, beans, fruits and vegetables. Explain that eating these foods regularly helps our digestive system work properly.**
- Pass out the small diagram of the digestive system and have students use their food tube text to help them label each part.
- Tell students that from start to end, the human digestive system is close to 30 feet long.
- Ask a volunteer to hold one end of the yarn and ask another volunteer to hold the other end of the yarn and try to stretch the yarn all the way to 30 feet.
- Remind students that most of the digestive system’s length is in the small intestine, which is about 20 feet long!
- Tell students that they are going to make their own life size digestive system and eat fiber-rich foods for their snack.

PROCESS

Step 1: Demonstrate to students how to make a life size model of the digestive system.

- ✓ Set the piece of (butcher block) paper on the floor.
- ✓ Have a volunteer come up to the front and have him/her lay their head and torso on the sheet, arms out.
- ✓ Make sure the volunteer’s head is to the side so you can draw the profile and neck.
- ✓ Trace the outline of the student using a pencil.

Tip: Show students how to move hair away from neck so it is easier to draw the profile and neck.

Note: If there is not enough time or space to make the life size model of the digestive system, have the students complete “The Food Tube” activity sheet and the diagram of the digestive system.

Step 2: Adjust the outline of the upper body, if necessary, to make it look anatomically correct. Trace the lines with a thick marker.

Step 3: Show students how to sketch the six parts of the digestive system.

- ✓ Use a pencil first.
- ✓ Ask them to use the diagram they labeled earlier as a reference to tell you how to draw each part.
- ✓ "Where is the stomach?" (The stomach sits somewhere above the belly button.)
- ✓ "Where do you draw the small intestine?" (The small intestine takes up a large space in the lower abdominal part).

Step 4: After the sketched parts look correct, draw over the sketched lines with a thick marker and/or crayons. Label each part.

Step 5: Pair up students. Tell them to make one life-size model of the digestive system. Pass out the pieces of paper (one sheet for two students) and drawing materials.

Step 6: Have pairs of students work on making the life-size model.

Step 7: As students finish, pass out activity sheet and have them complete.

Step 8: When all students are finished have them wash their hands with soap and warm water.

Step 9: Show students each of the ingredients for the ***high-fiber snack***. Point out the whole wheat crackers. Ask students to name other whole grain foods.

- ✓ whole wheat bread
- ✓ whole wheat noodles
- ✓ whole wheat cereal
- ✓ brown rice
- ✓ oatmeal

Explain that whole grain foods are ***high in fiber*** and help keep our food tube healthy. Other foods that are very high in fiber are beans, nuts, fruits and vegetables.

Step 10: Explain that fiber is the part of food that our stomachs don't digest. Fiber moves through our intestines and makes up a lot of what comes out the other side. ***Foods high in fiber*** also help keep our hearts healthy. ***So, eat high fiber foods (fruits, vegetables, beans, nuts and whole grains) for a healthy heart and digestive system!***

Step 11: Demonstrate how to make a quick and simple high-fiber snack. Mix refried beans and salsa in a bowl. Add hot sauce for flavor.

Step 12: Pass out whole wheat crackers, plastic spoons, and napkins. Serve the bean dip on the small paper plates. Give them a small amount to start (about 1 teaspoon). Offer seconds to those who want more.

Step 13: **<u>Let's Eat, Let's Talk.</u> While students are eating ask them what they learned today. Help them personalize ways they can keep their food tube healthy by eating a variety of fiber-rich foods. Ask and discuss the questions in the box <u>MAKE HEALTH HAPPEN.</u>**

Step 14: *<u>Pass out recipe and encourage students to take home and share with their family.</u>*

Make Health Happen

- ☑ What can you do to keep your digestive system healthy?
- ☑ What is your favorite high-fiber food (whole grains, beans, nuts, fruits and vegetables)?
- ☑ What are some things you can do to eat more whole grains?

<u>For more information</u> about, "the man with the hole in his stomach", listen to radio lab at: https://www.wnycstudios.org/story/197112-guts/

BACKGROUND INFORMATION

- The food tube (digestive system) mechanically and chemically processes food into small molecules that our bodies can use. The digestive system, which is about a 30-foot-long tube and open at both ends, includes the **mouth**, **esophagus**, **stomach**, **small intestine**, **large intestine**, and **rectum**. The entire process of digesting a meal usually takes from 15 to 24 hours.
- **The mouth** is where digestion starts. When food is put into the mouth, the **teeth** begin to tear, shred, and grind the food into small pieces and **saliva** (spit) moistens it. An **enzyme** in saliva starts breaking down complex carbohydrates (starch) into sugar called **glucose**.
- **The esophagus** is a muscular tube that is about 1 inch in diameter and 10 inches long. Each swallow triggers a **peristaltic wave** that travels the length of the esophagus and carries the bolus of food down to the stomach.
- **The stomach** is a strong stretchy bag that can hold up to 2 quarts of food for 2 to 3 hours. The bolus of food is forced into the stomach through a one-way valve called the **cardiac valve**. The food is then pushed downward into the more muscular lower area of the stomach; this is where protein digestion starts. **Gastric juice** (mainly **hydrochloric acid**, 50 times stronger than lemon juice) is squirted in and the strong stomach walls start to knead and churn the food. A mucus membrane protects the stomach wall to prevent it from being digested by its own digestive juice. As the food is churned and mixed with gastric juice, the solid food is changed into a liquefied mixture called **chyme**. The **pyloric valve**, at the stomach's lower end controls the spurt of chyme into the small intestine allowing only a little at a time.
- **The small intestine** is about 18 to 20 feet long and 1 inch in diameter. It takes from four to eight hours for food to travel through the small intestine. Digestion starts in the 10-inch-long **duodenum**, a short loop at the beginning of the small intestine. The digestive juices from the **liver** and **pancreas** are added here. The liver secretes **bile** (the dark color comes from the used red blood cells) that emulsifies fats. The pancreas produces an enzyme that digests starch. It also produces a digestive juice that contains **bicarbonate** (an alkaline compound), which neutralizes the strong stomach acid. Digestion continues throughout the small intestine where the nutrients are absorbed through the inner wall. The inner wall is covered with **villi**, finger-shaped **tentacles**. Nutrients absorbed from the small intestine go into the bloodstream and are carried to all the cells in the body.

- **The large intestine** is a larger and wider tube than the small intestine, 2-3 inches in diameter and 5 feet long. The remainder of the food stays here for ten to twelve hours. The large intestine absorbs approximately 3 to 5 liters of water from the digestive juices in a day; it then consolidates undigested food. There is a whole population of **bacteria** (they can fill up a soda pop can!) that reside in the large intestine. Not only are these bacteria useful in digesting the remaining food, but they also secrete some helpful vitamins like K, B12, thiamin, and riboflavin.
- **The rectum** is a tube between the large intestine and the **anus**. The rectum has a pressure sensor that measures fullness. When the rectum gets full, the nerve sensor sends a message to the brain and at a convenient time, the anal muscle relaxes, and fecal materials are excreted. The color of the **feces** comes from the leftover bile. The feces mainly contain bacteria and also some undigested food and water.

There are four things you can do to keep your food tube healthy:

1. **Chew your food well:** The mouth is the only part of the digestive system where you can control movement. When you chew food thoroughly, you can minimize the effort in the stomach. By chewing your food, you can also break the hard skins of corn kernels or seeds that otherwise travel through the digestive tract and exit undigested.
2. **Eat more fiber:** High fiber foods are called roughage. Roughage stimulates peristalsis. The fiber in these foods provides bulk against which the muscle of the large intestine can work. Whole grain products, beans, fruits, and vegetables are good sources of fiber.
3. **Drink plenty of water:** Water helps break down food and prevent constipation by softening the stool. Water is vital for optimal health. It is recommended that we drink 6 to 8 glasses of water each day. Try to drink a glass of water whenever you have a meal.
4. **Try to exercise:** Exercise increases blood flow to improve circulation and eliminate waste. Movement also relieves stress which is a trigger of digestive problems. Try to get at least 30 minutes of moderate to intense exercise most days of the week.

The Digestive System *or* Wonderful Food Tube

In 1833, more than 175 years ago, very little was known about the digestive system. Doctors and scientists did not know what happened inside the body to the food people ate. They only knew what came out of the body on the other side.

Doctor William Beaumont published a book that year that changed what people understood about the digestive system. He was a doctor and a scientist who had discovered what happens inside the stomach by studying a man with a hole in his stomach. The man, Alexis St. Martin, got the hole from a gunshot wound. The wound healed but the hole was still there. Alexis lived to be 79 years old.

The doctor learned about what happened in the stomach by tying food to a string and putting it through the hole and into the man's stomach. He then took it out of the man's stomach to see what happened to the food. By doing this type of experiment many times he discovered the stomach had special juices that turned the food into a soupy liquid. Today we have *Dr. Beaumont* and *Alexis St, Martin, the man with the hole in his stomach,* to thank for a better understanding of what goes on inside our bodies!

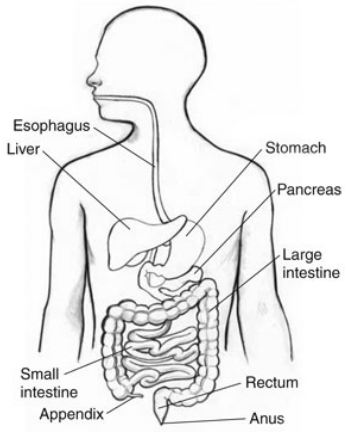
The function or job of the digestive system *is* to feed the body. The food tube includes six different parts: **mouth**, **esophagus**, **stomach**, **small intestine**, **large intestine**, and **rectum**. It takes about 24 hours for food to travel through the food tube from mouth to rectum.

Digestion starts in the **mouth** where **teeth** chew food into small pieces. Saliva moistens it. An **enzyme** in saliva starts breaking down food. The **esophagus** is a muscular tube that pushes food into the **stomach**. The **stomach** is a stretchy bag that holds food for 2 to 3 hours. The **stomach** churns and mixes the food with digestive juices turning it into a soupy food.

After the food leaves the **stomach,** it travels through a long thin tube (about 18 to 20 feet long) called the **small intestine**. Here **protein, fat, carbohydrates, vitamins**, and **minerals,** which are nutrients, are extracted or taken through the lining of the small intestine and into the blood stream. The nutrients (from food) are carried in the blood stream throughout the body to provide food for our cells. This is how our body is fed. The **large intestine** absorbs the water from the undigested food (mostly fiber from food). What is left over is waste. The waste reaches the **rectum**, and leaves through the anus.

Here are four important things you can do to keep your "Food Tube" healthy:

1. Eat ***fiber rich foods***, such as ***whole grains***, ***beans***, ***nuts***, ***fruits***, and ***vegetables***.
2. ***Chew*** your food well.
3. ***Drink*** plenty of ***water***.
4. Get lots of ***exercise***.



El Sistema Digestivo: El Tubo de la Comida

En 1833, más de 175 años atrás, se sabía muy poco sobre el sistema digestivo. Los médicos y los científicos no sabían que pasaba con la comida que la gente comía una vez que entraba al cuerpo. Sólo sabían lo que salía del cuerpo por el otro lado.

El doctor William Beaumont ese año publicó un libro que cambió lo que la gente entendía sobre el sistema digestivo. Él era un médico y un científico que descubrió lo que ocurre en el interior del estómago estudiando a un hombre que tenia un agujero de bala en su estómago.

El doctor descubrió lo que pasaba en el estómago atando alimentos a un hilo, pasándolo a través del agujero al estómago del hombre y dejando los alimentos por tiempo variables y luego los sacaba para ver lo que pasaba con la comida. Al hacer este tipo de experimento muchas veces, descubrió que el estómago tiene jugos especiales que convierten el alimento en un líquido espeso. ¡Hoy tenemos que agradecer al *doctor Beaumont*, y *Alexis St, Martin,* al hombre con el agujero en el estómago, por ayudarnos a entender mejor lo que sucede dentro de nuestro cuerpo!

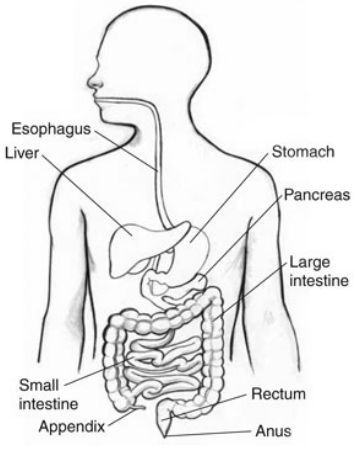
La función del sistema digestivo es la de alimentar al cuerpo. El sistema digestivo consiste de seis partes diferentes: **la boca, el esófago, el estómago, el intestino delgado, el intestino grueso, y el recto**. La comida tarda casi 24 horas para viajar por el sistema digestivo desde la boca hasta el recto.

La digestión empieza en **la boca** donde **los dientes** mastican la comida hasta formar pedacitos. La saliva humedece la comida. Una **enzima** en la saliva empieza a digerir la comida. El **esófago** es un tubo muscular que empuja la comida hacia el **estómago**. El **estómago** es un saco elástico que retiene la comida unas 2 a 3 horas. El **estómago** agita y mezcla la comida con los jugos digestivos hasta volverlos una especie de sopa.

Después de que la comida deja el **estómago,** ésta viaja por un tubo largo y delgado (alrededor de 18 a 20 pies de largo) llamado el **intestino delgado.** Aquí las **proteínas, las grasas, los carbohidratos, las vitaminas,** y **los minerales** en la comida se absorben por las paredes del intestino delgado y son transportadas a la sangre. Los nutrientes (de los alimentos) son tranpostados en la sangre por todo el cuerpo para alimentar a nuestras células. El **intestino grueso** absorbe el agua de la comida que no fué digerida (la mayor parte es fibra). Lo que sobra son productos residuales (desecho). Los productos residuales viajan hasta el **recto,** y se deshechan del cuerpo por el ano.

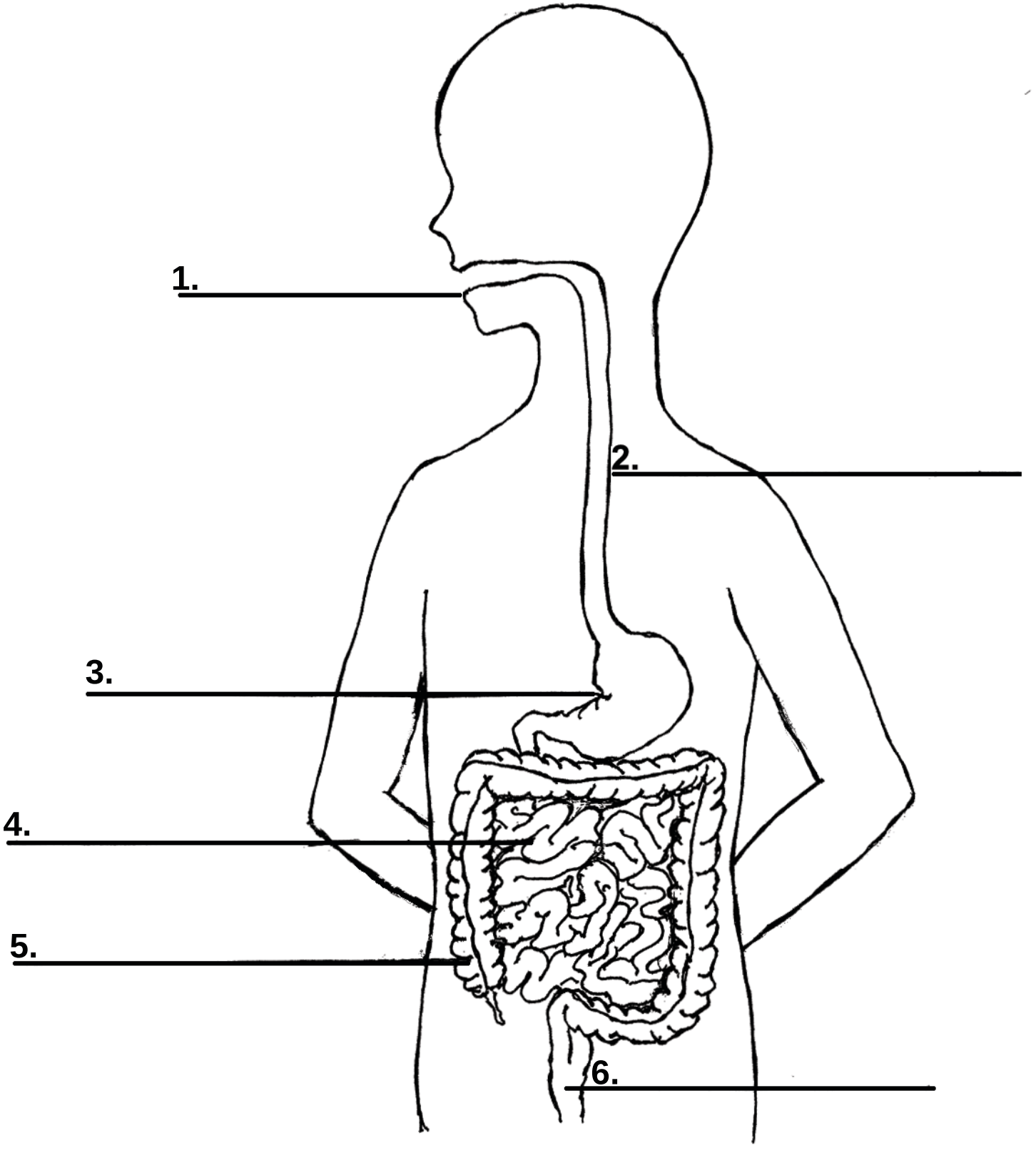
Hay cuatro cosas importantes que tiene uno que hacer para mantener un sistema digestivo saludable:

1. Comer alimentos que tengan **bastante fibra** como los **granos integrales, frijoles, nueces, frutas, y verduras.**
2. **Mastica**r bien la **comida.**
3. **Tomar** mucha **agua**.
4. Hacer mucho **ejercicio.**



The Digestive System:
The Food Tube

Name:_____ Date:_____



Digestive System: The Food Tube

Name:_____ Date:_____

1. What is the function or job of the digestive system?

_____

_____

2. List two parts of the digestive system and explain what each part does.

   1) _____

   _____

   2) _____

   _____

3. What can you do to keep your digestive system healthy?

_____

_____

4. Name three foods that are high in fiber.

   _____ _____ _____

Eat fiber-rich food for your healthy food tube!

El Sistema Digestivo: El Tubo de la Comida

Nombre:_____ Fecha:_____

1. ¿Cual es la función del sistema digestivo?

_____

_____

2. Escribe dos partes del sistema digestivo y explica lo que hace cada parte.

   1) _____

   _____

   2) _____

   _____

3. ¿Qué puedes hacer para mantener un sistema digestivo saludable?

_____

_____

4. Nombre tres comidas que son buenas fuentes de fibra.

   _____ _____ _____

¡Coman alimentos que tengan mucha fibra para mantener un sistema digestivo saludable!

The Integrated Nutrition Education Program
El Programa de Educación sobre Alimentación Integrada

Family Letter:
December

Culture of Wellness in Preschools
Younger. Healthier. Happier.

Dear Families,

Today, your student learned about their "food tube" - the digestive system. They explored how eating a variety of foods, especially whole grains, fruits, and vegetables helps to keep their digestive system moving and healthy. They also prepared and tasted a snack with beans, vegetables, and whole wheat crackers - all foods high in fiber.

Tip!
Kids learn to like new foods they see and taste more than once. It may take a few tries to get them interested in tasting something new.

Bean Dip with Whole Wheat Crackers

Makes About: 6 - 8 servings

Total Recipe Cost: $8.60 - $9.40

Ingredients

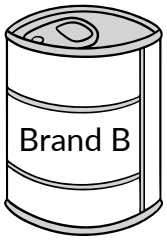
- 1 can low-fat refried beans
- 1 jar chunky tomato salsa
- hot sauce, to taste
- whole wheat crackers

Directions

1. Empty can of refried beans into a bowl and mash with spoon.
2. Mix in salsa.
3. Add hot sauce to taste.
4. Serve with whole wheat crackers.

Checking the **unit price** of a product is an easy way to save money at the grocery store. You can compare costs of similar items with varying sizes and brands by looking at the "unit price". Unit price usually tells us the cost of something per ounce or pound. Find the unit price on the tag on the grocery store shelf.

Brand A: Fat Free Refried Beans (16 oz.)	
Unit Price: **$0.08/oz**	Total Price: $1.29/ea



Brand B: Fat Free Refried Beans (30 oz.)	
Unit Price: **$0.06/oz**	Total Price: $1.99/ea

The lower the unit price, the lower the cost of the product. Brand A and Brand B are similar products but different sizes. Brand A is smaller (16 oz.) than Brand B (30 oz.). Brand A fat free refried beans are **MORE** expensive per unit because they cost **$0.08/oz.** compared to Brand B fat free refried beans, which cost only **$0.06/oz**. Buying in bulk is often a less expensive cost **per unit**.

Movement is about nourishing the body and the brain!

In Your Seat

Even a five-minute video that gets you moving benefits your overall health. Follow this QR code to do a fun activity.

On your Feet

SNAP-Ed
Division of Food & Energy Assistance

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.
This institution is an equal opportunity provider.

Carta Familiar:
Diciembre

Queridas familias,

Hoy, su estudiante aprendió sobre su "tubo digestivo": el sistema digestivo. Aprendieron cómo comer una variedad de alimentos, especialmente granos integrales, frutas y verduras ayuda a mantener su sistema digestivo en movimiento y saludable. También prepararon y degustaron una merienda con frijoles, verduras y galletas integrales, todos alimentos ricos en fibra.

¡Consejo!
A los niños les gustan ver y probar un nuevo alimento más de una vez. Puede tomar algunos intentos para que se interesen en probar algo nuevo.

Salsa de frijoles y galletas de granos enteros

Rinde: 6-8 porciones

Costo Total: $8.60 - $9.40

Ingredientes

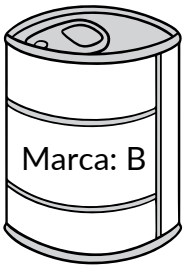
- 1 lata de frijoles refritos bajos en grasa
- 1 lata de tomate en trozos
- salsa picante, al gusto
- galletas integrales

Instrucciones

1. Vacíe la lata de frijoles refritos en un tazón y hágalos puré con una cuchara.
2. Mezcle la salsa.
3. Agregue la salsa picante al gusto.
4. Sirva con las galletas integrales.

Verificar el precio **unitario de un producto** es una manera fácil de ahorrar dinero en el supermercado. Ud. puede comparar los costos de artículos similares con diferentes tamaños y marcas revisando el "precio unitario". El precio unitario generalmente nos dice el costo de algo por onza o libra. Encuentre el precio unitario en la etiqueta en el estante de la tienda de comestibles.

Marca A: Frijoles refritos sin grasa (16 oz.)	
Precio unitario: **$0.08/onza**	Precio total: $1.29 c/u



Marca B: Frijoles refritos sin grasa (30 oz.)	
Precio unitario: **$0.06/onza**	Precio total: $1.99 c/u

Cuanto menor sea el precio unitario, menor será el costo del producto. La marca A y la marca B son productos similares pero de diferentes tamaños. La marca A es más pequeña (16 oz.) que la marca B (30 oz.). Los frijoles refritos sin grasa marca A son **MÁS** caros por unidad porque cuestan **$0.08/oz.** en comparación con los frijoles refritos sin grasa de la marca B, que cuestan solo **$0.06/oz.** Comprar a granel es a menudo menos costoso por unidad.

¡El movimiento se trata de nutrir al cuerpo y al cerebro!

En su asiento

Incluso un video de cinco minutos que le ayude a moverse beneficia su salud en general. Siga este código QR para hacer una actividad divertida. Videos en ingles.

En sus pies

Este material se desarrolló con fondos proporcionados por el Supplemental Nutrition Assistance Program (SNAP en inglés) del Departamento de Agricultura de los EE.UU. (USDA siglas en inglés).
Esta institución es un proveedor que ofrece igualdad de oportunidades.