

What Happens When You Eat?

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Objectives:

These activities will show students what organs aid in digestion and how digestion occurs in the human body. This lesson maybe appropriate for middle grades, but is designed for the upper grade curricula.

Materials Needed:

Activity #1: How Long is the Digestive System?

- yarn (at least 4 different colors)

Activity #2: Digestion

- sugar cubes
- granulated sugar
- 2 clear cups filled with water

Activity #3: Carbohydrate Digestion

- unsalted soda crackers (2 per student)

Activity #4: Hands on Digestion

- a small lump of hamburger (meatball size)
- one plastic baggie
- 1M HCl
- Digestive Juice A (pepsin, trypsin and water)
- Digestive Juice B (bile salts, pancreatin enzyme and water)

Activity #5: How do Villi aid the Small Intestine in Absorption?

- paper towels (10 per group)
- 4 cups of an equal amount of water
- graduated cylinder

Activity #6: A Digestive System Simulation

- large thin plastic bag
- newspaper
- paper sacks (2 sizes)
- Zip-lock bags
- M&M's candy
- masking tape
- markers & paper
- sponges
- trash can
- labeled spray bottles of water

Strategy:

Activity #1: How Long is the Digestive System

Have students cut a piece of yarn according to the following measurements. Allow students to use different color yarn to represent different organs. After the yarn has been cut tie the pieces together.

Esophagus	25 cm
Stomach	20 cm
Small Intestine	700 cm
Large Intestine	150 cm
 TOTAL	 895 cm

Activity #2: Digestion

Place a sugar cube in a cup of water. Place about a spoonful of granulated sugar in the other cup of water. Observe what happens.

Activity #3: Carbohydrate Digestion

Have the students chew two unsalted soda crackers for two minutes without swallowing.

Activity #4: Hands on Digestion

Place the hamburger, 3 eyedroppers full of 1M HCl, one tablespoon of Digestive Juice A and two tablespoons of Digestive Juice B into a plastic bag. Knead the bag with your hands (simulates the stomach) for about 10-15 minutes, it will have been reduced to mainly liquid and have a definite odor.

Activity #5: How do Villi aid the Small Intestine in Absorption?

Compare how 1, 2, 3, and 4 folded paper towels absorb. Dip each paper towel into a cup of water (use the same amount of water in each cup). Record the volume of water left in the cup (using a graduated cylinder).

Activity #6: A Digestive System Simulation

Procedure:

Things to make ahead of time:

1. **FOOD TUBE:** Lay out two parallel lines of tape on the floor, 3' apart and long enough for half the class to stand shoulder to shoulder on one side of the parallel lines.
2. **FOOD PARTICLE:** The food particle consists of M&M's placed in small zip-lock bags. These are placed in wadded newspapers in small paper sacks. Place the small sacks in larger sacks with added newspaper. Place all sacks and add newspaper until the large plastic bag is full. This bag is then taped or tied closed to complete the food particle.

Action:

1. **Peristaltic Movement:** Put the food particle to be eaten at one end of the food tube and a large trash can at the other. Have students line up on both sides, facing each other, squeeze the food particle the length of the food tube.
2. **Digestion:** Label and/or instruct the players. As the food comes to a student they should narrate what they are doing and why.

Teeth - tear food apart (break plastic bag)

Saliva - use spray bottles to moisten food particle

Stomach - tear small bags apart

Pancreatic juices - spray food

Small Intestine - absorbs food, find bags of candy and pass to blood
(the teacher can play the role of the blood)

Large Intestine - reabsorbs water, sponge up water on the floor

Rectum/Anus - puts the waste papers in the trash can

Performance Assessment:

At the completion of this lesson students should be able to answer the following questions:

1. What system in your body is the same length as the completed piece of yarn? What is its length (in centimeters, in feet)?
2. From your observations in Activity #2, what can you conclude must be done to food before digestion begins?
3. What physical and chemical changes occurred to the soda cracker?
4. What caused the physical and chemical changes to the soda cracker?

5. Did you notice a taste change in the soda cracker?
6. How was mechanical digestion simulated in Activity #4.
7. What evidence was there that chemical digestion occurred in the hamburger?
8. Which paper towel had the largest surface area?
9. Which cup had the highest volume of water left?
10. How do the villi (of the small intestine) aid in absorption?
11. Follow the path of a food particle through the digestive system; include the organs and their functions.

Conclusion:

These six activities will enhance the student's knowledge of what organs aid in digestion and how digestion occurs in the human body. Students will have a more comprehensive understanding of what happens in their bodies when they eat.

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