

A Journey Through the Digestive System

Skills: Health, Math, Physical Activity, Science, Language Arts

Objective: Students will use math and science skills while taking a journey through the digestive system.

Background

The main function of the digestive system is to break down food into molecules small enough for the body to absorb. The nutrients are absorbed in the body and used for energy. Our digestive system goes through eight basic steps.

1. **Mouth/Teeth**—First steps in the digestive system take place in the mouth as the teeth cut, tear, and grind the food down into small enough pieces so that it can fit down the throat. Saliva is squirted into the food to moisten and soften the food. The mouth makes close to 500 milliliters (1/2 quart) of saliva each day. Saliva contains chemicals called enzymes, which break down the starches in the food. The enzyme in saliva that breaks down starch into sugar is called amylase.
2. **Tongue**—A muscle that works with the food and saliva to form a "ball" that can be swallowed. Of course, the tongue also contains taste buds that helps us tell the difference between salty, sour, sweet, and bitter foods.
3. **Esophagus**—The esophagus is simply a transportation tube from the mouth to the stomach. When we swallow, what we are really doing is closing a trap door in our throat called the epiglottis. This sends food down the esophagus and prevents food from going down the trachea (or windpipe) and into our lungs. Food moves down the esophagus by a process called peristalsis. Peristalsis uses layers of muscle in your esophagus and intestines. These muscles relax and contract in a wave motion to pass food forward.
4. **Stomach**—The first stop after the esophagus is the stomach. Once the food gets to the stomach the stomach uses chemicals to try to make the food particles tinier. These chemicals are called gastric juices and they include hydrochloric acid and enzymes (chemicals that break down food). The food is moved around in the stomach and mixed with the chemicals for 3-4 hours. When the stomach is finished with it, the food is a cream-like liquid call chyme. This substance is still not small enough to get into our blood stream, and it has not yet provided the body with anything useful. Now a valve at the end of the stomach opens, sending the food past the liver.

P.A.S.S.

GRADE 3

Health—1.11

Science Process—1.1,2;
3.1,2; 4.3

Life Science—2.1,2

Math Process—1.1,2; 2.3;
4.3,4; 5.2

Math Concept—4.2ab

Language Arts—2.1,4;
4.1c,2c,3a

PE—5.3; 6.2

GRADE 4

Health—1.11

Science Process—1.1,2;
3.1,2; 4.4

Math Process—1.1,2; 2.3;
4.3,4; 5.2

Math Concept—4.4ab

Language Arts—1.1,4b;
3.1a,2d,3ac,4d

GRADE 5

Health—1.8; 3.10

Science Process—1.1,2;
3.1,3

Math Process—1.1,2; 2.3;
4.3,4; 5.2

Math Concept—4.4

Language Arts—1.1a,4b;
3.1d,2e,3ad

PE—4.1; 5.5; 6.3; 7.1,3

GRADE 6

Health—1.8; 3.10

Science Process—1.1,2;
3.1; 4.1

Math Process—1.1,3,6;
4.1; 5.4

Language Arts—1.1a,3ab;
3.1d,2c,3ad

PE—5.1,2

Materials

long string and a yardstick

unsalted or regular crackers

dictionaries

chalk

5. Liver/Gall Bladder—At this point, our food is hit with more chemicals. The liver makes a chemical called bile, and it is stored in the gall bladder. When the gall bladder mixes bile with our food, it does an important job: breaking down the fat (from milk, butter, cheeses) into tiny droplets. This fat will supply us with much energy later.
6. Pancreas—The pancreas also adds a digestive chemical as the food leaves the stomach. This digestive juice works on breaking down the carbohydrates (from breads, potatoes, pasta, etc.) and the proteins (from meats, eggs, peanut butter, etc.)
7. Small Intestine—The small intestine is the real hero of the digestive system. The small intestine is a tube that is about 18 feet long! This is where the real digestion takes place. As the food passes through, it is mixed with the new chemicals, and is finally digested enough to be put to use by the body. Along the walls of the intestine are thousands of tiny fingers called villi. Blood vessels (capillaries) in the villi can absorb the tiny food molecules and send them off to the rest of our body through the blood.
8. Large Intestine—Whatever the body cannot put to use is sent to the large intestine. Many plants, for example, contain cellulose, which cannot be digested. The big job of the large intestine is to remove water. Water has been necessary up until this point in the digestive process. Now it is no longer needed; therefore, the water in large intestine is sent into the bloodstream. Food spends about 12 hours in the large intestine. Undigested food is called solid waste feces, and this is stored in the rectum until it leaves the body.

You can help your digestive system by drinking water and fluids, at least 8 glasses a day, and eating a healthy diet that includes foods rich in fiber. High-fiber foods, like fruits, vegetables, and whole grains, make it easier for solid waste to pass through your system.

The digestive system is a pretty important part of your body. Without it, you couldn't get the nutrients you need to grow properly and stay healthy. Next time you sit down to lunch, you'll know where your food goes—from start to finish!

Health

1. Hand out worksheet.
 - Read and discuss background.
 - Students will fill in the blanks on the worksheet as they listen to the background information.

Language Arts

1. Hand out vocabulary worksheet.
 - Review vocabulary.
 - Students write the correct word next to the definition. Provide diction-

aries.

2. Students will write, diagram or act out the eight-step journey of food through the digestive system.

Science/Math

1. Discuss the role of saliva in breaking down food. Saliva contains chemicals called enzymes, which break down the starches in the food. The enzyme in saliva that breaks down starch into sugar is called amylase. How does saliva help digest food?
 - Students take several bites of the cracker and chew thoroughly, but DO NOT SWALLOW the cracker.
 - Students write descriptions of the cracker’s flavor and texture.
 - Students keep chewing the cracker for at least one minute and try not to swallow.
 - Students write descriptions of the cracker’s flavor and texture after the saliva has worked on it.
 - Ask students what they think the saliva does to the starch in the cracker. Students write their answers.
 - Discuss some of the ways saliva helps digest food.
2. How long is the average digestive system?
 - Mark off 3 inches (7 cm) of string to represent your mouth.
 - Add 10 inches (25 cm) for your esophagus.
 - Add 6 inches (15 cm) for your stomach.
 - Add 18 feet (5.5 m) for your small intestine.
 - Add 5 feet (1.5 m) more for your large intestine.
 - Measure the entire length of the string, and record the results. How many inches? Centimeters? Feet? Meters? Yards?

Physical Education

1. Play this game to test students’ knowledge of vocabulary words.
 - Write “Digestive System” on two separate places on the chalkboard.
 - Create an open space where students can move from the back of the room to the front of the room to the chalkboard.
 - Divide the class into two groups. Make sure the teams are divided evenly. One person may have to go twice.
 - Each group will line up at the back of the room for a relay race.
 - The first person in each line will be given a piece of chalk.
 - One by one, students will hop, walk backwards or skip to the chalkboard.
 - At the chalkboard, each student writes one of the vocabulary words before returning to the group hopping, walking backwards, etc.
 - The returning student pass the chalk to the next person in their line, who will then hop, walk backwards, or skip across the room and add another different word to the list. No team member can use a word already used by another team member.
 - Students repeat the process until everyone has had a chance to write a

Vocabulary

amylase—the enzyme in saliva that breaks down starch into sugar

bile—a liquid produced by the liver that helps digest fat

capillary—any of the tiny blood vessels connecting the small arteries and veins

cellulose—a complex carbohydrate that is the chief part of the cell walls of plants

chyme—the partly fluid and partly solid mass of incompletely digested food that passes from the stomach into the first part of the small intestine

digestion—process by which the body changes food so it can be used to supply energy

enzyme—chemicals that break down food

epiglottis—flap of tissue that covers the windpipe during swallowing of food

esophagus—a muscular tube which connects the throat to the stomach

feces—bodily waste discharged through digestive system/process

gall bladder—organ where bile is stored

large intestine—a short, wide tube in which water is absorbed from undigested food

liver—a large, lobed organ that produces bile

mouth—the opening through which food passes into the body

(Continued on Next Page.)

Vocabulary (Cont.)

pancreas—a gland that produces pancreatic juice

peristalsis—squeezing motion that pushes food through the digestive system

rectum—part of the body at the end of the large intestine where solid wastes are stored until they leave the body; a straight muscle

saliva—a fluid containing water, protein, salts, and often a starch-splitting enzyme that is secreted into the mouth by salivary glands

salivary glands—glands that produce saliva

small intestine—a long, coiled tube in which food is digested and absorbed

stomach—a J-shaped, muscular sac that stores food and helps digest it

tooth—one of the hard bony structures that are usually located on the jaws of vertebrates and are used for seizing and chewing food

tongue—a muscle that works with the food and saliva to form a “ball”

trachea—the main part of the system of tubes by which air passes to and from the lungs in vertebrates—called also wind-pipe

villi—finger-like structures that cover the inner wall of the small intestine

word on the chalkboard.

—First group to finish wins.

Resources Used for This Lesson

<http://www.sciencebob.com/lab/bodyzone/digestion.html>

<http://www.quia.com/jg/66042.html>

<http://www.imcpl.org/kids/guides/health/digestivesystem.html>

Carothers, Sue and Elizabeth Henke, “Skills for Success – Human Body –Grades 4-6 workbook, Carson-Dellosa.

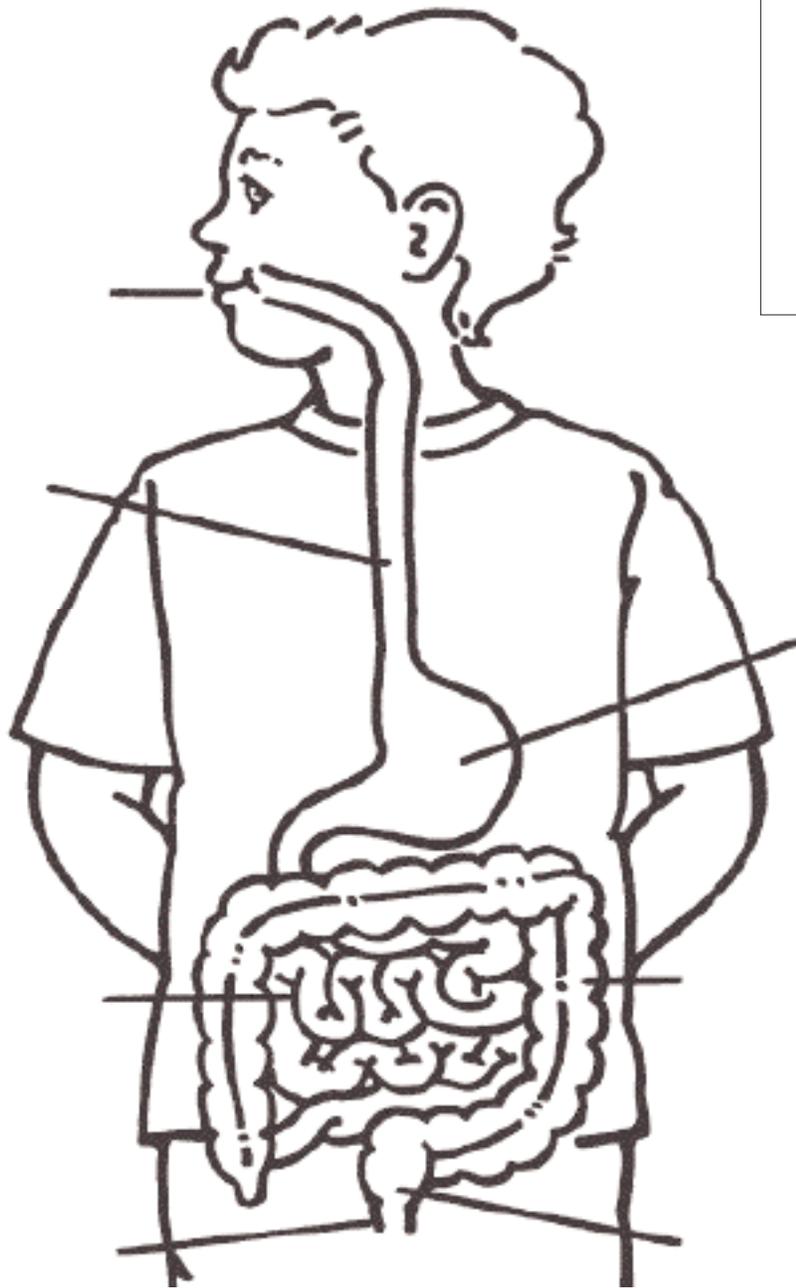
Shevick, Edward, Health Science Workbook – Grades 4-8, Teaching & Learning

Name _____

Digestive Tract

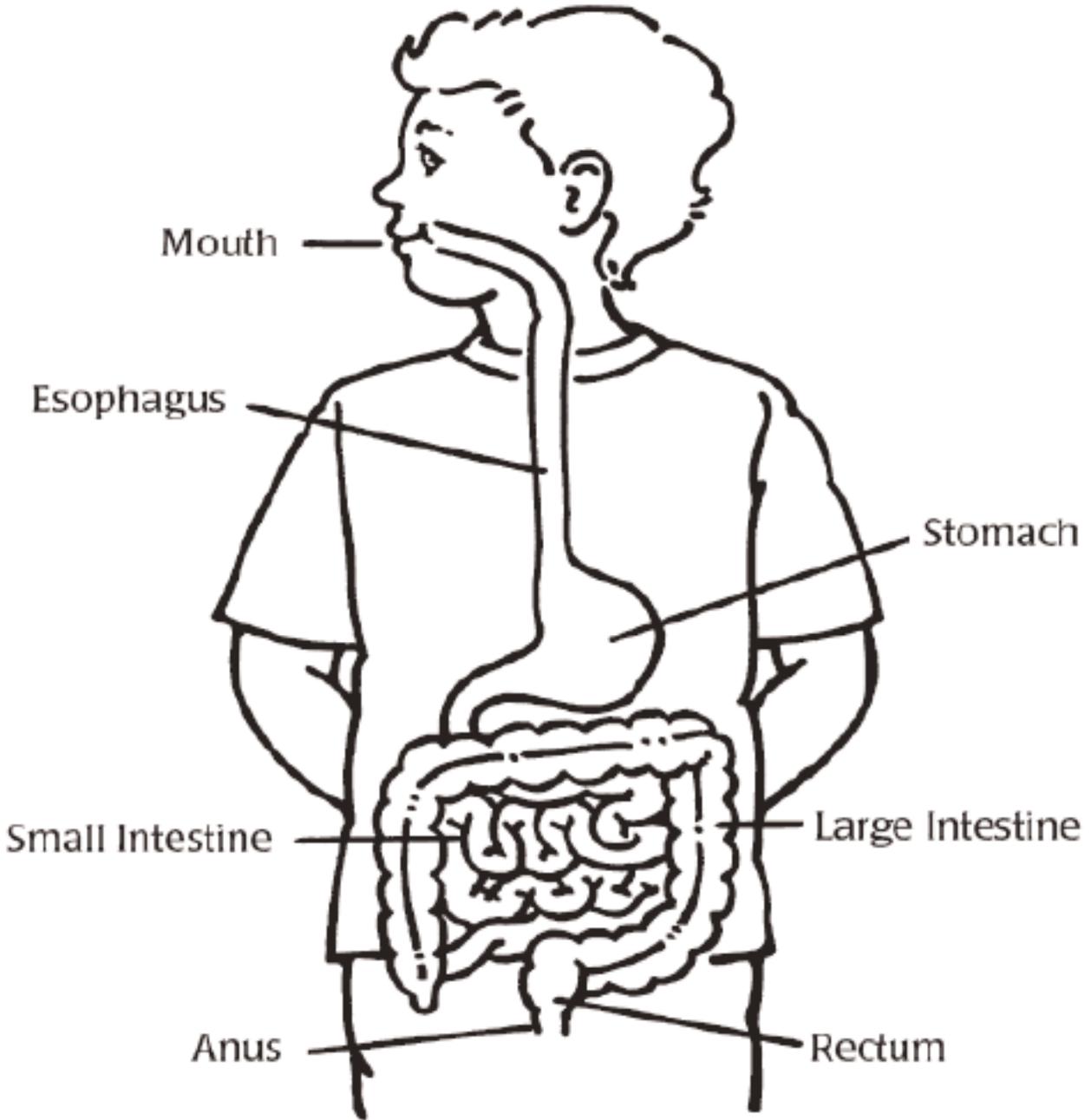
Use the words in the box to label the digestive tract below. Write the correct words in the spaces provided

anus
esophagus
large intestine
mouth
rectum
small intestine
stomach



Name _____

Digestive Tract (Answers)



Name _____

Digestion Vocabulary

Find the word in the box that matches the definition. Write the definition on the line provided. Use a dictionary, if you need one.

1. _____ a large, lobed organ that produces bile
2. _____ any of the tiny blood vessels connecting the small arteries and veins
3. _____ a liquid produced by the liver that helps digest fat
4. _____ a complex carbohydrate that is the chief part of the cell walls of plants
5. _____ process by which the body changes food so it can be used to supply energy
6. _____ flap of tissue that covers the windpipe during swallowing of food
7. _____ the main part of the system of tubes by which air passes to and from the lungs in vertebrates—called also windpipe
8. _____ a muscular tube which connects the throat to the stomach
9. _____ a J-shaped, muscular sac that stores food and helps digest it
10. _____ bodily waste discharged through digestive system/process
11. _____ a fluid containing water, protein, salts, and often a starch-splitting enzyme that is secreted into the mouth by salivary glands
12. _____ organ where bile is stored
13. _____ one of the hard bony structures that are usually located on the jaws of vertebrates and are used for seizing and chewing food
14. _____ the enzyme in saliva that breaks down starch into sugar
15. _____ a short, wide tube in which water is absorbed from undigested food
16. _____ finger-like structures that cover the inner wall of the small intestine
17. _____ chemicals that break down food
18. _____ the opening through which food passes into the body
19. _____ a gland that produces pancreatic juice
20. _____ squeezing motion that pushes food through the digestive system
21. _____ part of the body at the end of the large intestine where solid wastes are stored until they leave the body; a straight muscle
22. _____ the partly fluid and partly solid mass of incompletely digested food that passes from the stomach into the first part of the small intestine
23. _____ glands that produce saliva
24. _____ a long, coiled tube in which food is digested and absorbed
25. _____ a muscle that works with the food and saliva to form a “ball”

- | |
|-----------------|
| amylase |
| bile |
| capillary |
| cellulose |
| chyme |
| digestion |
| enzyme |
| epiglottis |
| esophagus |
| feces |
| gall bladder |
| large intestine |
| liver |
| mouth |
| pancreas |
| peristalsis |
| rectum |
| saliva |
| salivary glands |
| small intestine |
| stomach |
| tooth |
| tongue |
| trachea |
| villi |

Name _____

Digestion Vocabulary (answers)

Find the word in the box that matches the definition. Write the definition on the line provided. Use a dictionary, if you need one.

- | | | |
|----------------------------|--|--|
| 1. <u>liver</u> | a large, lobed organ that produces bile | amylase
bile
capillary
cellulose
chyme
digestion
enzymes
epiglottis
esophagus
feces
gall bladder
large intestine
liver
mouth
pancreas
peristalsis
rectum
saliva
salivary glands
small intestine
stomach
tooth
tongue
trachea
villi |
| 2. <u>capillary</u> | any of the tiny blood vessels connecting the small arteries and veins | |
| 3. <u>bile</u> | a liquid produced by the liver that helps digest fat | |
| 4. <u>cellulose</u> | a complex carbohydrate that is the chief part of the cell walls of plants | |
| 5. <u>digestion</u> | process by which the body changes food so it can be used to supply energy | |
| 6. <u>epiglottis</u> | flap of tissue that covers the windpipe during swallowing of food | |
| 7. <u>trachea</u> | the main part of the system of tubes by which air passes to and from the lungs in vertebrates—called also windpipe | |
| 8. <u>esophagus</u> | a muscular tube which connects the throat to the stomach | |
| 9. <u>stomach</u> | a J-shaped, muscular sac that stores food and helps digest it | |
| 10. <u>feces</u> | bodily waste discharged through digestive system/process | |
| 11. <u>saliva</u> | a fluid containing water, protein, salts, and often a starch-splitting enzyme that is secreted into the mouth by salivary glands | |
| 12. <u>gall bladder</u> | organ where bile is stored | |
| 13. <u>tooth</u> | one of the hard bony structures that are usually located on the jaws of vertebrates and are used for seizing and chewing food | |
| 14. <u>amylase</u> | the enzyme in saliva that breaks down starch into sugar | |
| 15. <u>large intestine</u> | a short, wide tube in which water is absorbed from undigested food | |
| 16. <u>villi</u> | finger-like structures that cover the inner wall of the small intestine | |
| 17. <u>enzymes</u> | chemicals that break down food | |
| 18. <u>mouth</u> | the opening through which food passes into the body | |
| 19. <u>pancreas</u> | a gland that produces pancreatic juice | |
| 20. <u>peristalsis</u> | squeezing motion that pushes food through the digestive system | |
| 21. <u>rectum</u> | part of the body at the end of the large intestine where solid wastes are stored until they leave the body; a straight muscle | |
| 22. <u>chyme</u> | the partly fluid and partly solid mass of incompletely digested food that passes from the stomach into the first part of the small intestine | |
| 23. <u>salivary glands</u> | glands that produce saliva | |
| 24. <u>small intestine</u> | a long, coiled tube in which food is digested and absorbed | |
| 25. <u>tongue</u> | a muscle that works with the food and saliva to form a “ball” | |