Test Review Digestive and Urinary Systems

DIGESTIVE SYSTEM WORKSHEETS

Digestion is the process by which large, complex molecules in food are broken down into smaller molecules that can be used by the body. The **digestive system** is a collection of organs that breaks down food into energy that can be used in cells. The major organs of the digestive system are the mouth, **esophagus, stomach,** pancreas, liver, gallbladder, large and **small intestines,** rectum, and anus. Contractions of smooth muscle in the walls of the organs, along with rings of muscle called **sphincters,** keep food moving in one direction.

Food is broken down into smaller molecules through a combination of mechanical and chemical actions. These actions begin in the mouth, continue in the stomach, and end in the first part of the small intestine. In the mouth, food is chewed, and starches are broken down by salivary amylase. The food is then swallowed and enters the esophagus, where it is kept moving by the action of **peristalsis.** In the stomach, food is churned by smooth muscle contractions and further broken down by gastric juices, HCl, and pepsin. Proteins are broken down in the stomach, but fats and most sugars are broken down in the small intestine. Digestive juices and enzymes turn the partly digested food into a semi-liquid mixture called **chyme.**

The remaining carbohydrates, proteins, and fats are digested only in the duodenum of the small intestine. The food is churned, and enzymes and hormones from the pancreas, liver, and gallbladder flow through ducts into the duodenum. Enzymes released by the pancreas break down starches and split fats into smaller molecules. The liver and gallbladder release a chemical called **bile** to digest fats. Proteins are further broken down into amino acids. The chyme then passes into the rest of the small intestine where molecules are absorbed by the body.

1. What is the main function of digestion?

   to break down large molecules of food into smaller molecules that can be used by the body

2. Give an example of chemical and mechanical digestion in the mouth and stomach.

   mouth: chemical - amylase mechanical - chewing
   stomach: chemical - gastric juices, pepsin, HCl mechanical - mixing and churning

3. How is food kept moving in one direction throughout the digestive system?

   by peristalsis and sphincters

4. What organs help to complete digestion in the duodenum?

   pancreas, gallbladder, liver

Digestion is only part of the process of maintaining the body's health. The body also must absorb the nutrients to distribute them to all of the body's cells, tissues, and organs. **Absorption** is the process by which nutrients move out of the digestive organs into the circulatory and lymphatic systems.

Nutrients are absorbed in each of the three parts of the small intestine: duodenum, jejunum, and ileum. Most simple sugars, amino acids, and minerals such as calcium and iron are absorbed in the duodenum. In the jejunum, glucose along with some amino acids and vitamins are absorbed. Fat-soluble vitamins and vitamin B_{12}, fatty acids, and cholesterol are absorbed in the ileum.

Nutrient-rich blood leaves the small intestine and enters the liver. In the liver, some nutrients are used to build more complex molecules, while others are stored for future use. The rest of the nutrients enter the circulatory and lymphatic systems and are distributed to all the cells in the body.

The large intestine, or colon, processes solid wastes and absorbs water to help maintain the body's fluid balance. Solid waste, called feces, is composed of undigested materials, bile pigments, and dead bacteria. The feces is stored in the rectum and eliminated through the anus. Some bacteria in the large intestine synthesize B and K vitamins. At times, harmful bacteria might overgrow beneficial bacteria, which can reduce water absorption and cause severe diarrhea.

5. Why is absorption such an important part of the digestive process?

it is the process by which nutrients move out of the digestive system and are distributed to the body's cells

6. What are the main functions of the small intestine lining, villi, and microvilli in the process of absorption?

small intestine lining - gives more surface area and slows transport of food for more absorption

microvilli - adds more surface area for absorption

7. What are the main functions of the large intestine?

to process solid wastes to absorb water to maintain fluid balance

8. Fill in the chart summarizing absorption in the three parts of the small intestine.

Part of Small Intestine	Materials Absorbed	Distribution
duodenum	simple sugars, amino acids, minerals	circulatory and lymphatic systems
jejunum	glucose, amino acids, vitamin C, vitamin B, water	circulatory system
ileum	fat-soluble vitamins, vitamin B_{12}, fatty acid, cholesterol, some water	circulatory and lymphatic systems

9. What happens when nutrient-rich blood leaves the small intestine and enters the liver?

enzymes use some of the nutrients to build more complex molecules that cells need; the liver stores some nutrients for future use

10. What keeps the stomach from digesting itself?

Pepsin is active only when there is food in the stomach, a layer of mucus keeps stomach acids from digesting the lining

11. Why is it important that food move slowly through the small intestine?

to allow more time for nutrients to be absorbed

12. How does the large intestine help to maintain the body's fluid balance, or homeostasis?

by absorbing some water and salts

13. What materials make up the feces?

undigested plant fiber, bile pigments, dead bacteria, traces of undigested fat and protein

14. In what ways can bacteria in the large intestine be helpful or harmful?

helpful - some bacteria make vitamins K & B_{12}

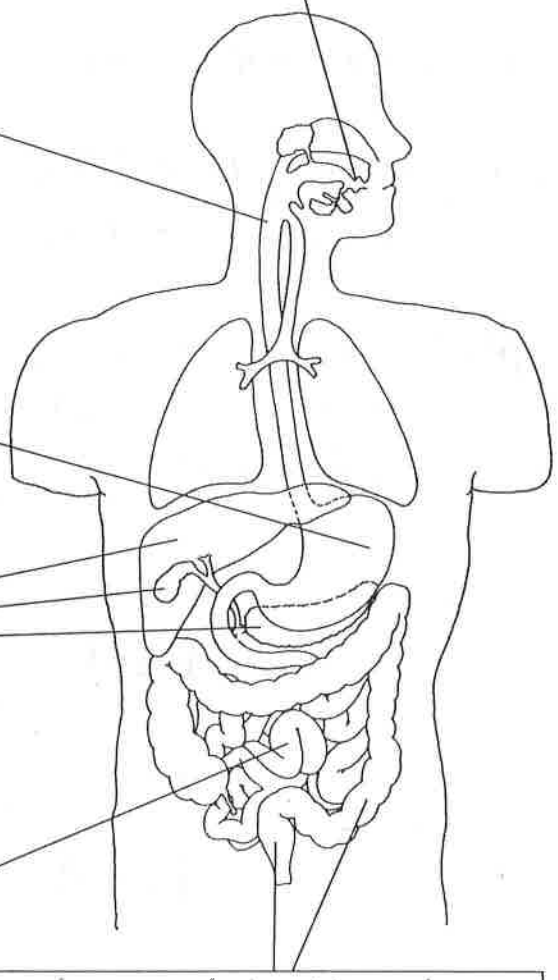
harmful - if some harmless bacteria overgrow other bacteria, they can reduce water absorption and cause serious diarrhea

15. Fill in the chart below to help you remember facts about key digestive enzymes.

Enzyme	Function
salivary amylase, amylase	break down starches into simpler sugars
pepsin, peptides	breaks down proteins
lipase	breaks down fats

16. Part mouth
Function:
chew and shred food; amalase begins digestion of carbohydrates

17. Part Esophagus
Function:
Peristaltic movement moves food into stomach



18. Part Stomach
Function:
begins digestion of protein, mixes and churns food into chyme

19. Parts Liver / gall bladder / pancreas
Function:
produces bile to help digest fat, finish protein digestion

20. Part small intestine
Function:
completes digestion of proteins and sugars, digests fats

21. Parts Large intestine / rectum / anus
Function:
absorb water and form solid waste, eliminate solid waste from the body

1. What does bile do?

digest fats

2. Where in the digestive tract are most nutrients absorbed?

Small intestine

3. What is the definition of digestion?

the process by which food is broken down to its chemical components

4. Where do the absorbed nutrients in the blood go first?

liver

5. What does the large intestine do?

consolidates waste, allows water reabsorbtion, eliminates solid waste

6. Where are sugars digested?

duodenum

7. What is the function of the liver?

produces bile, filters toxins from blood including alcohol

8. What is the blood filtering unit of the kidney called?

nephron

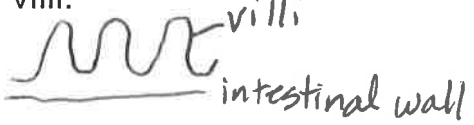
9. What is the function of the kidney?

filter wastes from the blood
produce urine to excrete the wastes

10. What is the function of the gallbladder?

Stores and releases bile

11. Draw a picture of villi.



12. Trace urine production from the renal arteries through the urethra.

renal artery → glomerulus → Bowman's capsule → proximal tubule → loop of Henle → distal tubule → collecting duct → renal pelvis → ureter → bladder → urethra

13. What is in Bowman's capsule filtrate?

urea

14. What is the function of dialysis?

filter waste from the blood

15. What do kidneys remove?

waste products

16. What does sugar break down into? Fats? Proteins?

monosaccharides; triglycerides; amino acids

17. What makes up the alimentary canal?

mouth, esophagus, stomach, small intestine, large intestine, anus

18. What is food chemically turned into in the stomach?

chyme

19. What is the esophagus?

a muscular tube from the mouth to the stomach

20. Know the urinary and digestive systems diagrams.

21. Know the nephron diagram.