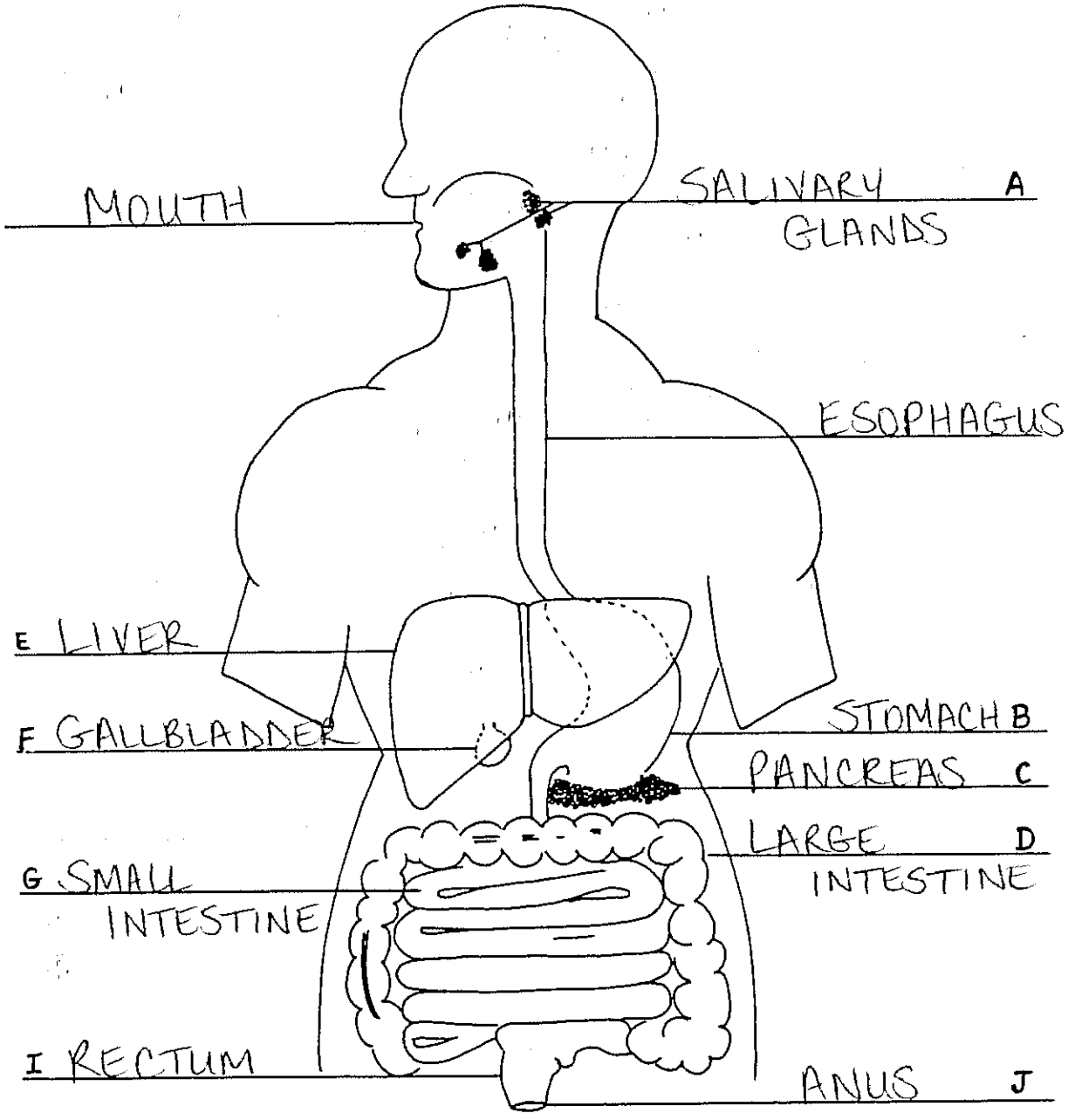
Name Key Date

9–2. THE ANATOMY OF THE HUMAN DIGESTIVE SYSTEM

Instructions: (1.) Read the text and the descriptions. (2.) Use the text and the descriptions to help you to label the diagram and to answer the questions.



The job of your digestive system is to take nutrients from the foods you eat so that the cells of your body can use them. If for some reason your digestive system could not do this, you would become malnourished and your health would deteriorate.

While completing this project, you will learn to name the different parts of the digestive system and learn how these parts work together to utilize the nutrients in the foods you eat.

Descriptions

1. The mouth is the beginning of the digestive system. Its job is to tear and grind food into pieces small enough to swallow. This tearing, grinding, and chewing process is called "mechanical digestion"; the mouth has thirty-two teeth and strong jaws to accomplish it. Find the arrow that points to the mouth. Label that arrow "mouth."
2. Chemical digestion also begins in the mouth. In the tissues within the mouth are three pairs of glands called "salivary glands"; they release a liquid called "saliva." Saliva moistens the food and helps you to swallow, and it has another important job to do: It contains a digestive enzyme called "amylase," which breaks starch molecules into sugar. (You may have noticed that a cracker—composed mostly of starch—tastes sweet after you have chewed it for a few seconds.) Arrow A points to the salivary glands. Label arrow A "salivary glands."
3. After food has been mechanically digested and moistened by saliva and after chemical digestion has begun, the tongue pushes the pulpy mass to the back of the throat and you swallow. Swallowing pushes the food into the esophagus, a tubular passageway to the stomach. Find the arrow that points to the esophagus. Label that arrow "esophagus."
4. At its lower end, the esophagus widens into a pouch called the "stomach." The stomach squeezes, sloshes, and mixes the food, and adds two important chemicals: hydrochloric acid and pepsin. These chemicals change food into a thick liquid called "chyme." On the diagram, arrow B points to the stomach. Label arrow B "stomach."
5. The chyme leaves the stomach and passes into the small intestine where chemical digestion continues. Specific chemical substances break complex sugars into simple sugars, break proteins into amino acids, and emulsify fats. Arrow G points to the small intestine. Label arrow G "small intestine."
6. The term *emulsify* means "to change into small drops." During emulsification, fats are broken into tiny drops that can pass through the wall of the small intestine. The small intestine uses a substance called "bile" to do this job. Bile is produced by the liver and is stored in the gallbladder.

   The gallbladder is a sac connected to the small intestine by a small tube. Arrow E points to the liver, and arrow F points to the gallbladder. Locate these arrows and label them.
7. The pancreas is a gland that adds more digestive chemicals to the chyme as the chyme travels through the small intestine. One such chemical is trypsin, which breaks proteins into amino acids. These amino acids enter the circulatory system where they are transported to the liver for storage. (A few of these amino acids are sent directly to the cells, where they are used to make new protein.) Arrow C points to the pancreas. Label arrow C "pancreas."
8. The last step of digestion is called "absorption"; it occurs when nutrients pass through the wall of the small intestine and enter the circulatory system.

   Only wastes remain in the small intestine after absorption has occurred. They enter the large intestine, where water is removed from the wastes and returned to the body; this process is called "reabsorption." Arrow D points to the large intestine. Label arrow D "large intestine."
9. After reabsorption, wastes collect in the last four to six inches of the large intestine. This part of the large intestine is called the "rectum"; it has nerve endings that, when stretched, are responsible for the urge to defecate. Defecation occurs when wastes are removed from the rectum through an opening called the "anus." Arrow I points to the rectum, and arrow J points to the anus. Locate and label these arrows.

Level One Questions:

1. The mouth is the BEGINNING of the digestive system.
2. What is mechanical digestion?
   TEARING, GRINDING, CHEWING OF FOOD
3. Where does mechanical digestion take place?
   MOUTH
4. Where does chemical digestion begin?
   MOUTH, REST OF DIGESTIVE SYSTEM
5. How many pairs of salivary glands are within the tissues of the mouth? 3
6. Name the digestive enzyme in saliva. AMYLASE
7. Amylase breaks starch molecules into SUGAR.
8. What is the job of the esophagus?
   DIRECTS FOOD FROM MOUTH TO STOMACH
9. What is the job of the stomach?
   SQUEEZE, SLOSH, MIX FOOD; ADD HCl + PEPSIN
10. Where does chyme go after it leaves the stomach?
    SMALL INTESTINE
11. What happens to chyme in the small intestine?
    CHEMICALS BREAK DOWN COMPLEX SUGARS, PROTEINS INTO A.A. + 'EMULSIFY' FATS
12. What does the term *emulsify* mean?
    CHANGE INTO SMALL DROPS
13. Where are fats emulsified?
    SMALL INTESTINE
14. What is bile?
    CHEMICAL PRODUCED IN LIVER + STORED IN GALLBLADDER, EMULSIFIES FATS
15. What does the gallbladder look like?
    A SMALL SAC
16. How is the gallbladder connected to the small intestine?
    BY A SMALL TUBE
17. What is the job of the pancreas?
    ADD DIGESTIVE CHEMICALS TO SMALL INTESTINE
18. How does trypsin digest protein?
    BREAKS INTO A.A.
19. After proteins have been broken down into amino acids, where do the amino acids go?
    ENTER CIRCULATORY SYSTEM WHERE THEY ARE TRANSPORTED TO LIVER OR CELLS

20. What does the liver do with amino acids?
STORES THEM

21. How do the cells use amino acids?
MAKE NEW PROTEINS

22. What remains in the small intestine after all the nutrients have passed through its walls?
WASTES

23. What is the job of the large intestine?
REMOVE H_2O FROM WASTES + RETURN IT TO BODY

24. What is the job of the rectum?
STORE DEHYDRATED WASTES UNTIL THEY ARE REMOVED FROM BODY

Level Two Questions:

25. Write a short report on the back of this sheet that describes how food passes through the digestive system.

26. From what you have learned, name two functions of the liver.
STORAGE, PRODUCE DIGESTIVE CHEMICALS (BILE)

Level Three Questions:

27. The following statement is true, although it may not appear to be. Can you explain why scientists consider it to be accurate?

> Nutrients are not really inside the body until they have passed through the wall of the small intestine.

As you consider your answer, you might think about a spool of thread. If you pass a length of thread through the center hole, is the thread inside the spool?
THREAD PASSING THROUGH HOLE DOESN'T PENETRATE WOOD OF SPOOL, THE CHANNELS OF BODY, STARTING W/ MOUTH + ENDING W/ ANUS, ARE LIKE HOLE PASSING THROUGH SPOOL

28. Persons suffering from severe diarrhea may become dehydrated. Look up "dehydration" in a dictionary, consider the eighth step in the digestive process, and explain what the term means and why it happens.
DURING DIARRHEA, WASTES PASS THROUGH LARGE INTESTINE BEFORE H_2O CAN BE REMOVED + RETURNED TO THE BODY