Sandwich in Motion

Trace how accessory organs help digest a meal

HAP.10.a "Construct an explanation of the roles of accessory organs (salivary glands, pancreas, and liver) in digestion."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each accessory organ's name, circle what it releases, and put a star beside each explanation of how that release helps digestion.

What Happens to a Cheese Sandwich?

1. Take a bite of a cheese sandwich. The bread contains starch, while the cheese supplies protein and fat. Teeth crush the bite, but chewing alone cannot split large food molecules into pieces the body can absorb. Three accessory organs help by sending substances into the digestive tract; food does not travel through these organs. In the mouth, salivary glands release saliva that wets the bite, making it easier to swallow. Saliva also carries amylase, an enzyme that starts breaking starch into smaller sugars. Once the bite is swallowed, it moves through the esophagus toward the stomach.

2. After the stomach churns the sandwich, it sends a partly digested mixture into the first part of the small intestine. Fat from the cheese does not mix well with the watery digestive juices there. The liver makes bile, which is stored in the gallbladder and released into the small intestine. Bile breaks large fat globules into tiny droplets, a physical process called emulsification. This gives fat-digesting enzymes more surface to work on. Bile is not an enzyme, and emulsification does not cut fat molecules into absorbable pieces. That chemical work still needs an enzyme.

3. The pancreas also sends substances into the first part of the small intestine through a duct. Its bicarbonate helps neutralize acid that arrived with the stomach's mixture, creating conditions in which digestive enzymes can work. Pancreatic amylase continues breaking down starch, pancreatic proteases break proteins into smaller peptides, and pancreatic lipase breaks fats into fatty acids and other smaller molecules. The bile-made droplets help lipase reach more fat at once. Together, the salivary glands start starch digestion in the mouth, the liver prepares fats for enzyme action, and the pancreas supplies enzymes that digest several kinds of food.

2 ANSWER WITH EVIDENCE

Use the passage

1. Explain how the salivary glands help with the sandwich before it reaches the stomach.

2. Why does bile from the liver help digest cheese fat even though bile is not an enzyme?

3. Explain two different ways substances from the pancreas help digest the mixture entering the small intestine.

4. How do the liver and pancreas work together to help digest the fat in cheese?

3 YOUR TURN

Your own words

Imagine a meal of rice, tofu, and avocado. In one paragraph, explain how all three accessory organs help digest its starch, protein, and fat. Include where each organ's release acts and how the liver and pancreas work together.

Sandwich in Motion

PART 1 · READ AND MARK

Underline each accessory organ's name, circle what it releases, and put a star beside each explanation of how that release helps digestion. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Explain how the salivary glands help with the sandwich before it reaches the stomach.	**They release saliva in the mouth. It wets the bite, and its amylase starts breaking down starch in the bread.**
2	Why does bile from the liver help digest cheese fat even though bile is not an enzyme?	**Bile separates fat into tiny droplets, giving fat-digesting enzymes more surface to work on.**
3	Explain two different ways substances from the pancreas help digest the mixture entering the small intestine.	**Bicarbonate helps neutralize stomach acid so digestive enzymes can work. Pancreatic enzymes break down starch, proteins, and fats.**
4	How do the liver and pancreas work together to help digest the fat in cheese?	**The liver makes bile, which separates fat into tiny droplets. Pancreatic lipase can then reach more of the fat and break it into smaller molecules.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Salivary glands release saliva into the mouth, where amylase starts breaking down starch in the rice. The liver makes bile that reaches the small intestine, where it separates avocado fat into tiny droplets. This does not chemically digest the fat, but it gives pancreatic lipase more surface to act on. The pancreas sends bicarbonate and enzymes into the small intestine. Bicarbonate helps neutralize stomach acid, pancreatic amylase continues digesting rice starch, proteases digest tofu proteins, and lipase breaks down avocado fat.

Accept explanations that connect each organ's release to its digestive effect. Students should distinguish bile's physical action on fat from lipase's chemical breakdown of fat.