

Biology 12 - Digestion Study Guide

1. a) What is digestion? b) What is the difference between digestion and absorption? c) Between chemical and mechanical digestion?
2. Compare the composition of the food we eat with the molecules that our cells actually use.
3. a) How many teeth do adults have? b) What are the four types of teeth and their functions?
4. Use your tongue to locate at least one of the salivary enzymes on the inside of your mouth. How many pairs of salivary glands do you have?
5. a) What is a hydrolytic enzyme? b) What is the enzyme in saliva?
6. a) What is the substrate of this enzyme? b) What are the products? c) Write the overall reaction as a chemical equation.
7. Differentiate between what gets mechanically digested in the mouth and what gets chemically digested.
8. List the three main events that occur during swallowing. Help your explanation by using a labelled diagram.
9. Describe the process of **peristalsis** in the esophagus? How can a combination of circular and longitudinal muscles cause this action? Again, using a diagram will help your explanation.
10. What are the functions of the stomach? Be specific!
11. a) What is gastric juice? b) Where exactly is it produced? c) List the three main ingredients of gastric juice d) How is it activated?
12. What is the function of the following in digestion: a) pepsin b) water
13. a) How come, if your stomach is full of acid and protein-digesting enzymes, doesn't it digest itself? b) What is an ulcer, and what causes them?
14. How is the **structure** of the stomach **related** to its **function**?
15. Give a one sentence description, using your own words, of the function of the following digestive components:

Name	Function
1. mouth	
2. pharynx	
3. epiglottis	
4. cardiac sphincter	
5. esophagus	
6. pepsinogen	

16. Where does the majority of digestion take place?
17. Describe the structure of the small intestine, including the following words:

DIGESTION BASICS	
1. Majority of digestion takes place in this organ	
2. Length of this organ.	
3. Three parts of this organ are called:	1
	2
	3
4. How long is duodenum?	
5. What controls flow of material into duodenum?	
6. What is this material that enters the duodenum called?	
7. What is main role of duodenum in digestion?	
8. What two organs produce secretions that end up in duodenum?	1
	2
9. Liver produces what?	
10. Why is it greenish in colour?	
11. Where is this substance stored?	
12. What does an emulsifying agent do?	
13. What do bile salts do?	

14.	What sodium compound does pancreatic juice contain?	
15.	What does this substance do?	
16.	What 3 important enzymes does pancreatic juice contains	Name: Function:
		Name: Function:
		Name: Function:
17.	What produces the intestinal juices in the small intestine?	
18.	Where are these glands located?	
19.	Two important intestinal juice enzymes and their functions are:	Name: Function:
		Name: Function:
20.	Draw a villus, and show the blood and lymph vessels within.	
21.	Where does absorption take place?	
22.	Is this absorption passive? What does it require?	
23.	Where do sugars and amino acids go?	
24.	Where do glycerol and fatty acids go?	
25.	What is the function of the hepatic portal vein?	
26.	In your own words, list 6 functions of the liver.	1
		2
		3
		4
		5
		6

2. Explain how the large intestine is **structurally** and **functionally** different from the small intestine. What is the composition of **feces**?
3. What is the name of the **main bacteria** present in the large intestine? What is its **function**?
5. Make a table that explains how **hormones** control the release of digestive enzymes in the digestive system. Use the following as a template.

7. **Make a table** that lists the following information:

Enzyme	Secreted by:	Site of secretion	Optimum pH	Reactants	Product
Salivary Amylase					
Maltase					
Pepsin					
Pancreatic Amylase					
Nucleases					
Trypsin					
Lipase					

8. **Briefly** summarize the roles of the following molecules in human nutrition:

a. carbohydrates	b. proteins	c. fats
d. vitamins	e. minerals	

- List 4 **fat soluble** vitamins. Why is it **not** a good idea to ingest too much of these vitamins?
- List 11 **water soluble vitamins**. Why are vitamins only needed in small amounts?
- List 4 mineral **macronutrients**. Why are they called macronutrients?
- List 13 mineral **micronutrients**. Why are they called micronutrients?
- What is wrong with a diet that **high in fat**? Detail at least 5 things.
- What are the two **leading causes of death** in North America? Is this largely **preventable**? Explain why diet has a profound influence on health.
- What is the best way to **lose weight**?

DIGESTION EXTENSIONS!

- Explain how the various digestive organs work together to digest a protein.
- During emergency situations, the mouth often gets "cottony" (exceptionally dry). Why is this?
- Most animals cannot digest cellulose, so that grass, an ubiquitous plant, cannot satisfy their nutritional needs. How do some animals utilize grass and, in insects like termites, even wood?
- List three **advantages** to an animal having a large internal food storage capacity.
- Vomiting is a forcible ejection of both partially digested food and digestive juices from the upper gastrointestinal tract. It is mediated by the nervous system, primarily the parasympathetic trunk, and is coordinated by a center in the medulla oblongata of the brain. It usually involves initially a strong wave of nausea and excess production of saliva, which floods the mouth. Then the duodenal region of the intestine and the lower (pyloric) stomach contract and force food into the upper part of the stomach. A profound inspiration (breathing in) occurs, the esophagus relaxes, and a series of spasmodic abdominal contractions, along with contractions of the stomach, takes place. These conjoined responses force fluid and partially digested food to move up through the esophagus and out of the mouth. The glottis is kept closed throughout this forcible evacuation: this guards against choking. **What function do you suppose the vomiting reflex serves?**
- There does not seem to be any function for the appendix in humans, even the cecum, which serves as storage space in herbivores and acts as a fermentation vat in horses and a few other species, seems to be on little use. What possible dangers can the appendix pose?
- Individuals suffering from *hepatitis*, an inflammation of the liver, are given diets high in simple sugars. Why?
- Why do you suppose excessive doses of vitamins A and D pose a greater threat to health than vitamins such as C and the B complex vitamins?
- In Japan, the Japanese demonstrate an extremely low incidence of heart attacks and even hypertension. Descendants of Japanese who move to the United States soon show a tendency toward an increased incidence of heart attacks and an increase in blood pressure, even though there is little intermarriage with the larger population in early generations. This tendency develops over a time span of as little as two generations. What conclusions about health can be drawn from these facts?