



Sadiq Public School

Do the right, fear no man

Subject: Biology

Class: C1

Day: Saturday (16-11-2024)

Lesson

This lesson is about revised concepts related to human nutrition (digestive system & role of organs in digestion).

A: Inquiry

We studied that human diet requires to be broken down into smaller pieces which is function of digestive system and its associated parts.

This lesson will enable the students to:

- State the names of different parts of digestive system.
- Describe role of each organ in mechanical as well as chemical digestion of food.

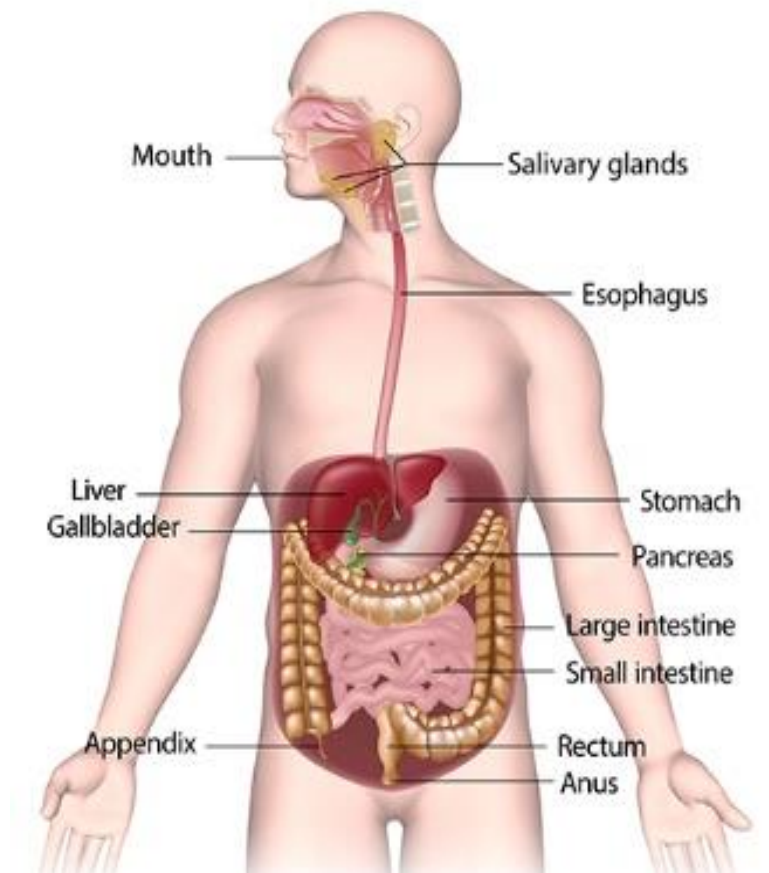
B: Information

Why is digestion important?

Digestion is important because your body needs nutrients from food and drink to work properly and to stay healthy. Proteins, fats, carbohydrates, vitamins, minerals, and water are all nutrients. Your digestive system breaks nutrients into parts small enough for your body to absorb and uses them for energy, growth, and cell repair.

- Proteins break into amino acids
- Fats break into fatty acids and glycerol
- Carbohydrates break into simple sugars

The Digestive System



How does food move through my GI tract?

Food moves through your digestive system by a process called peristalsis. Within your small intestine and colon, there is a muscle within the wall of the tubing which enables movement. It is this – an involuntary constriction and relaxation of the muscle, creating wave-like movement – which pushes food and liquid through your system and mixes the contents within each organ. As well as the use of peristalsis to move food through your GI tract, your digestive organs also break food into smaller parts using digestive juices; such as stomach acid, bile, and enzymes.

The below table shows what each aspect of your digestive system does:

Functions

Mouth – is the beginning of the digestive tract. In fact, digestion starts here when taking the first bite of food. Chewing breaks the food into pieces that are more easily digested, while saliva mixes with food to begin the process of breaking it down into a form your body can absorb and use.

Esophagus – Located in your throat near your trachea (windpipe), the esophagus receives food from your mouth when you swallow. By means of a series of muscular contractions called peristalsis, the esophagus delivers food to your stomach.

Stomach – a hollow organ that holds food while it is being mixed with enzymes that continue the process of breaking down food into a usable form. Cells in the lining of the stomach secrete a strong acid and powerful enzymes that are responsible for the breakdown process. When the contents of the stomach are sufficiently processed, they are released into the small intestine.

Organ	Movement	Digestive Juices Used	Food Particles Broken Down
Mouth	Chewing	Saliva	Starches
Esophagus	Swallowing	None	None
Stomach	Upper muscle in stomach relaxes to let food enter and lower muscle mixes food with digestive juice	Stomach acid	Protein
Small intestine	Peristalsis	Small intestine digestive juice	Starches, protein, and carbohydrates
Pancreas	None	Pancreatic juice	Starches, fats, and protein
Liver	None	Bile acids	Fats

Small intestine – Made up of three segments – the duodenum, jejunum, and ileum – the small intestine is a 22-foot long muscular tube that breaks down food using enzymes released by the pancreas and bile from the liver. Peristalsis is also at work in this organ; moving food through and mixing it with digestive secretions from the pancreas and liver. The duodenum is largely responsible for the continuous breaking-down process, with the jejunum and ileum mainly responsible for absorption of nutrients into the bloodstream.

The contents of the small intestine start out semi-solid but end in a liquid form after passing through the organ. Water, bile, enzymes, and mucous contribute to the change in consistency. Once the nutrients have been absorbed and the leftover-food residue liquid has passed through the small intestine, it then moves on to the large intestine, or colon.

Pancreas – secretes digestive enzymes into the duodenum, the first segment of the small intestine. These enzymes break down protein, fats, and carbohydrates. The pancreas also makes insulin, secreting it directly into the bloodstream. Insulin is the chief hormone for metabolizing sugar.

Liver – The liver has multiple functions, but its main function within the digestive system is to process the nutrients absorbed from the small intestine. Bile from the liver secreted into the small intestine also plays an important role in digesting fat. In addition, the liver is the body's chemical 'factory': it takes the raw materials absorbed by the intestine and makes all the various chemicals the body needs to function. The liver also detoxifies potentially harmful chemicals, as well as breaking down and secreting many drugs.

Gallbladder – The gallbladder stores and concentrates bile, and then releases it into the duodenum to help absorb and digest fats.

Colon (large intestine) – The colon is a 6-foot long muscular tube that connects the small intestine to the rectum. The large intestine is made up of the cecum, the ascending (right) colon, the transverse (across) colon, the descending (left) colon, and the sigmoid colon, which connects to the rectum. The large intestine is a highly specialized organ that is responsible for processing waste so that emptying the bowels is easy and convenient.

Rectum – The rectum (Latin for ‘straight’) is an 8-inch chamber that connects the colon to the anus. It is the rectum’s job to receive stool from the colon, to let the person know that there is stool to be evacuated, and to hold the stool until evacuation happens. When anything comes into the rectum, sensors send a message to the brain. The brain then decides if the rectal contents can be released or not. If they can, the sphincters relax and the rectum contracts, disposing its contents. If the contents cannot be disposed, the sphincter contracts and the rectum accommodates so that the sensation temporarily goes away.

Anus – The anus is the last part of the digestive tract. It is a 2-inch long canal consisting of the pelvic floor muscles and the two anal sphincters (internal and external). The lining of the upper anus is specialized to detect rectal contents. It lets you know whether the contents are liquid, gas, or solid. The anus is surrounded by sphincter muscles that are important in allowing control of defecation.

C: Synthesis/absorbing the information

➤ Write your own notes in your notebooks based on information about balanced diet.

D: Practicing:

Complete the following table by choosing the correct function from the list. Write the letter of the function in the box. The first one has been completed as an example.

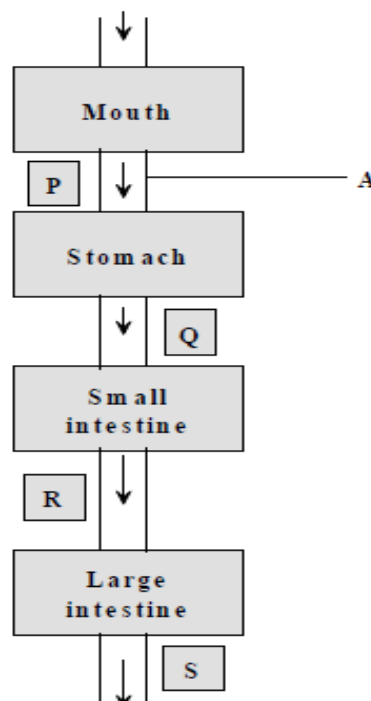
FUNCTION

1. Chews and grinds food.
2. Absorbs water from food.
3. Produces bile.
4. Stores bile.
5. Produces acid and a protein-digesting enzyme.
6. Absorbs digested food into the blood.

Part of digestive system	Function
Teeth	1
Gall bladder	
Stomach	
Liver	
Small intestine	
Large intestine	

[5]

The diagram shows the main parts of the digestive system



(a) Name structure A. Choose from this list.

duodenum

rectum

trachea

oesophagus

.....
.....[1]

(b) How is food moved along structure A?

.....[1]

(c) As food passes along the digestive system enzymes are added to it. There are three types of digestive enzyme - lipases, carbohydrases and proteases. Which of these types of enzyme is produced in:

(i) the mouth?[1]

(ii) the stomach?[1]

(d) The pancreas also produces digestive enzymes. Which of the positions, P, Q, R or S shows the position of the pancreas?

.....[1]

(e)(i) In which part of the digestive system are villi found?

.....[1]

(iii) What is the function of villi?

.....[1]

[7]