Digestion

1. **Have the Nutrition Honor.**

2. **Keep a record of what and how much food you eat for two weeks. Compare your diet to that of the food pyramid.**

3. **What is digestion? What is another name for the human digestive system?**
   Digestion is the process of breaking down food into its molecular and chemical components so that these nutrient molecules can cross plasma membranes.
   Another name for the human digestive system is the gastrointestinal tract

4. **Where does saliva come from? What are the three functions of saliva?**
   Saliva is produced in and secreted from salivary glands
   Three functions of saliva are:
   - **Lubrication and binding:** the mucus in saliva is extremely effective in binding masticated food into a slippery bolus that (usually) slides easily through the oesophagus without inflicting damage to the mucosa. Saliva also coats the oral cavity and oesophagus, and food basically never directly touches the epithelial cells of those tissues.
   - **Initiates starch digestion**: in most species, the serous acinar cells secrete an alpha-amylase which can begin to digest dietary starch into maltose.
   - **Oral hygiene**: The oral cavity is almost constantly flushed with saliva, which floats away food debris and keeps the mouth relatively clean. Flow of saliva diminishes considerably during sleep, allow populations of bacteria to build up in the mouth -- the result is dragon breath in the morning. Saliva also contains lysozyme, an enzyme that lyses many bacteria and prevents overgrowth of oral microbial populations.
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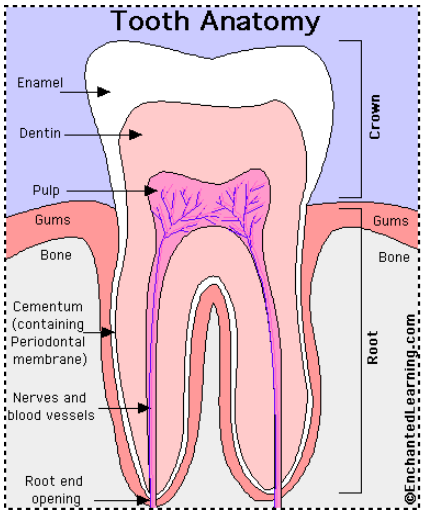
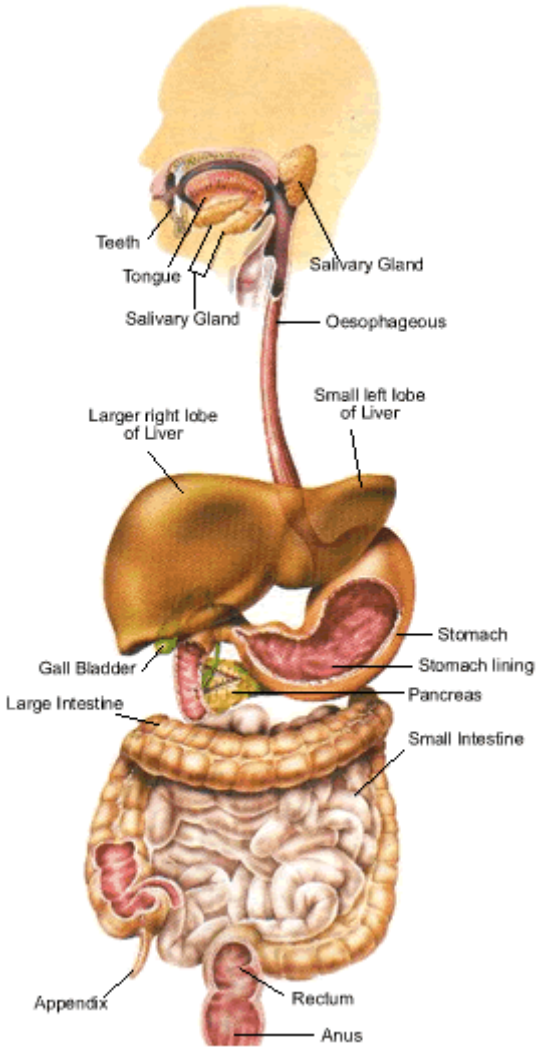
5. **Be able to identify the following parts of the tooth: enamel, dentin, pulp, gum, cementum, and periodontal membrane. What role do the teeth play in digestion?**



The role that the teeth play in digestion is to tear and chop the food. This allows the saliva to have a greater cross-sectional area to work on.

6. **Be able to label a diagram or model of all the organs that help with digestion. Starting from where the food goes into the mouth to where it's expelled from the anus.**



7. **Know the difference between food bolus and chyme.**
   Bolus is a mass of chewed food mixed with salivary secretions that is propelled into the oesophagus during the swallowing phase of digestion, whereas chyme is the term used to refer to partially digested food as it moves through the digestive tract

8. **Where does bile come from? Where is it stored? What does it do in the duodenum?**
   The liver produces bile and it is stored in the gallbladder. The bile enters duodenum, helps emulsify fats for better/faster digestion
9. **What are Villi? What makes them absorb the nutrients so quickly? At what point are all the nutrients removed from the food/chyme? Compare the amount of water absorbed by plain paper compared to a similar sized paper towel using a 1/8 cup (17.2 ml) of water.**
   Villi are tiny, finger-like projections on the surface of the small intestine that help absorb nutrients. Villi walls are only one cell layer thick with blood and lymphatic capillaries just under those cells. As nutrients are absorbed by the cells, they pass thru and into the capillaries and are transported around the body
   Chyme is basically nutrient free when it is ready to leave the small intestine

   The paper towel absorbs more water because it has miniature folds, just like our small intestine.

10. **What happens if too much water is present in the large intestine? What happens if not enough water is present?**
    An excess of water in the large intestine results in diarrhoea. The lack of water in the large intestine results in constipation.

11. **How does fiber in your diet aid in digestion? How long should food remain in the digestive tract? What happens if food stays in the digestive system too long?**
    Fibre absorbs excess fat and carries it out of the body in the waste products. It also helps the food move along in the digestion process, not letting it get clogged up during the removal from the body
    Food should remain 20 to 30 hours in the digestive track

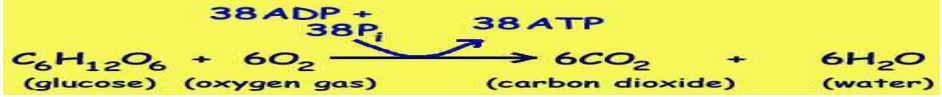
12. **Demonstrate the digestion of starch into simple sugar using the iodine test.**

13. **What are the six basic nutrients that are essential for life and where does the bulk of their digestion/absorption take place?**
    Carbohydrates - starts in the mouth and absorbed in the small intestine.
    Fat - small intestine with the help of the liver and gall bladder.
    Protein - stomach and small intestine with the help of the pancreas.
    Vitamins - small intestine
    Minerals - small intestine and large intestine
    Water - large intestine

14. **Know the difference between monosaccharide, disaccharide, and polysaccharide. What is the most important carbohydrate?**
    Monosaccharides are simple sugars.
    Disaccharides are made from two monosaccharide.
    Polysaccharides are long are long chains of monosaccharide.
    All three of these are referred to as carbohydrates. The most important of these is glucose, which is a monosaccharide

15. **What are amino acids? How many are needed to make all the proteins in the body? What is meant by essential amino acids? How many of them are essential? Where can you get all the essential amino acids?**
    The basic building blocks of proteins. (Although around 80 amino acids are found in nature, only 22 are needed for human metabolism)
    There are 20 common amino acids that make up virtually all proteins.
    Nine of these are called essential amino acids.
    All of the necessary amino acids, dietary proteins are considered to belong to two different groups, depending on the amino acids they provide. ***Complete proteins***, which constitute the first group, contain ample amounts of all of the essential amino acids. These proteins are found in meat, fish, poultry, cheese, eggs, and milk. **In*complete proteins***, which constitute the second group, contain only some of the essential amino acids. These proteins are found in a variety of foods, including grains, legumes, and leafy green vegetables.

16. **What is ATP? What is it used for? What does your body make ATP for? What three sets of chemical reactions make ATP in your body? Why do we need to breathe oxygen?**
    ATP (Adenosine triphosphate) is a nucleotide that performs many essential roles in the cell.
    ATP is used for everything your body does that requires energy
    Krebs cycle, Glycolysis and electron transport
    Every cell in our body uses that oxygen gas in its mitochondria to make ATP. However, our cells also need glucose to make ATP. If a cell has both glucose and oxygen, the following formula represents how it makes ATP:



17. **Know the difference between water and fat soluble vitamins. What are two common vitamins that are fat soluble? What are two vitamins that are water soluble?**

- Fat-soluble Vitamins – Fat-soluble vitamins do not break down in water. If excess fat soluble vitamins are ingested, the additional vitamin is stored in the body's fat and liver. A build-up of excess fat soluble

vitamins, particularly vitamins A and D, can be toxic. The fat-soluble vitamins are vitamin A (retinol, retinaldehyde, retinoic acid), vitamin D (calciferol), vitamin E (tocopherol, tocotrienol), and vitamin K (phylloquinone).

- Water-soluble Vitamins – Water-soluble vitamins break down in water and do not build up in the body. Excess water-soluble vitamins dissolve and are excreted by the body. Vitamin C and the B vitamins (biotin, folate, pantothenic acid, vitamin B1(thiamine), vitamin B2 (riboflavin), vitamin B6 (pyridoxine, pyridoxal, pyridoxamine) and vitamin B12 (cobalamin)) are water soluble vitamins.

18. List four (4) Bible texts that refer to digestion.

Matthew 15:17 - Do you not see that whatever goes into the mouth passes into the **stomach**, and so passes on?
Ezekiel 3:3 - And he said to me, "Son of man, eat this scroll that I give you and fill your **stomach** with it." Then I ate it; and it was in my mouth as sweet as honey.
1 Timothy 5:23 - No longer drink only water, but use a little wine for the sake of your **stomach** and your frequent ailments.
1 Corinthians 6:13 - "Food is meant for the **stomach** and the **stomach** for food" --and God will destroy both one and the other. The body is not meant for immorality, but for the Lord, and the Lord for the body.

19. List five (5) E.G. White references that promote proper digestion. Choose a variety of topics

Counsel on Diet and Food

p 132, para 1 “Nearly all the members of the human family eat more than the system requires. This excess decays and becomes a putrid mass. . . . If more food, even of a simple quality, is placed in the stomach than the living machinery requires, this surplus becomes a burden. The system makes desperate efforts to dispose of it, and this extra work causes a tired, weary feeling. Some who are continually eating call this all-gone feeling hunger, but it is caused by the overworked condition of the digestive organs”

p180-181, para 4 “Many turn from light and knowledge, and sacrifice principle to taste. They eat when the system needs no food, and at irregular intervals, because they have no moral stamina to resist inclination. As the result, the abused stomach rebels, and suffering follows. Regularity in eating is very important for health of body and serenity of mind. Never should a morsel of food pass the lips between meals.”

p 328, para 2 “frequently sit down to the tables of the brethren and sisters, and see that they use a great amount of milk and sugar. These clog the system, irritate the digestive organs, and affect the brain. Anything that hinders the active motion of the living machinery, affects the brain very directly. And from the light given me, sugar, when largely used, is more injurious than meat. These changes should be made cautiously, and the subject should be treated in a manner not calculated to disgust and prejudice those whom we would teach and help”

Healthful Living

p 49-50, para 5 “The poor tired stomach may complain of weariness in vain. More food is forced upon it, which sets the digestive organs in motion, again to perform the same round of labour through the sleeping hours. In the morning there is a sense of languor and loss of appetite; a lack of energy is felt through the entire system”

p 62, para 7 “A great amount of milk and sugar . . . clog the system, irritate the digestive organs, and affect the brain”