Unit M Master Outline

Digestive System Μ.

MD13.01 Describe the structure of the digestive system.

- A. Alimentary canal
 - 1. Digestive tract or GI tract
 - 2. 30 ft. tube from mouth to anus
- B. Accessory organs of digestion
 - Tongue
 Teeth

 - 3. Salivary glands
 - 4. Pancreas
 - 5. Liver
 - 6. Gall bladder
- C. Peritoneum
- D. Mouth
 - 1. Hard palate
 - 2. Uvula
- E. Salivary glands
 - 1. Three pairs
 - 2. Parotid largest
- F. Teeth
 - 1. Gingiva gums
 - 2. Deciduous 20
 - 3. Adult mouth has 32 teeth
- G. Esophagus
 - 1. 10" long muscular tube
 - 2. Connects pharynx and stomach
- H. Stomach
 - 1. Cardiac sphincter
 - 2. Pyloric sphincter
 - 3. Rugae
- Small Intestine Ι.
 - 1. Duodenum 12" long
 - 2. Jejunum 8 ft. long
 - 3. Ileum 10 12 ft. long
- J. Pancreas Located behind stomach
- K. Liver
 - 1. Largest organ in body
 - 2. Located below the diaphragm, upper right quadrant
 - 3. Connected to gallbladder and small intestine by ducts
- L. Gallbladder
 - 1. Small, green organ
 - 2. Inferior surface of liver
- M. Large Intestine (Colon)
 - 1. Approx 2" in diameter
 - 2. Cecum
 - 3. Appendix
 - 4. Rectum
 - 5. Anus

MD13.02 Analyze the function of the digestive system.

- A. Digestion
 - 1. Bolus soft, pliable ball of semi-digested food
 - 2. Peristalsis wavelike motions that move food along esophagus, stomach and intestines
 - 3. Ptyalin in saliva in mouth, converts starches to simple sugar
 - 4. In stomach:
 - a. Gastric juices released
 - b. Stomach churns and mixes food and juice (chyme)
 - c. Small amounts chyme enter duodenum
 - d. Takes 2-4 hours for stomach to empty
 - 5. In small intestine:
 - a. Digestion completed, absorption occurs
 - b. Addition of enzymes from pancreas and liver (via gallbladder)
 - 6. In large intestine:
 - a. Large quantities of H₂0 absorbed back into bloodstream
 - b. Bacteria help break down undigested food
 - c. Gas formation (flatulence) from bacterial action
 - d. Feces undigested semi-solid waste
 - e. Defecation colon and rectal muscles contract, external anal sphincter under conscious control
- B. Enzymes help digestion
- C. Functions of Digestive System
 - 1. Physical breakdown of food
 - 2. Chemical digestion of food into the end products of fat, carbohydrates, and protein
 - 3. Absorb nutrients into blood capillaries of the small intestine
 - 4. Eliminate waste products of digestion
- D. Mouth
 - 1. Food enters digestive system through mouth
 - 2. Inside mouth covered with mucous membrane
 - 3. Roof of mouth is hard palate
 - 4. Uvula prevents food from going up nose when you swallow
- E. Tongue
 - 1. Attached to floor of mouth
 - 2. Helps in chewing and swallowing
 - 3. Made of skeletal muscle
 - 4. Taste buds on surface
- F. Salivary glands
 - 1. Three pairs
 - 2. Secrete saliva
 - 3. Parotid largest salivary glands, become inflamed during mumps
- G. Teeth
 - 1. Gingiva gums that support and protect teeth
 - 2. Mastication chewing
 - 3. Deciduous baby teeth
- H. Stomach
 - 1. Cardiac sphincter
 - a. Circular layer of muscle
 - b. Controls passage of food into stomach
 - 2. Pyloric sphincter regulates entrance of food into duodenum
 - 3. Rugae
 - a. Mucous coat lining
 - b. Folds when stomach empty
 - 4. Muscular coat contracts (peristalsis) to push food into small intestine

- I. Small Intestine
 - 1. Three sections
 - 2. Absorption
 - a. Digested food (nutrients) pass into bloodstream and on to body cells
 - b. Undigestible passes on to large intestine
- J. Pancreas
 - 1. Exocrine function secretes digestive enzymes
 - 2. Also has endocrine function
- K. Liver
 - 1. Manufactures bile
 - 2. Produces and stores glucose in the form of glycogen
 - 3. Detoxifies alcohol, drugs and other harmful substances
 - 4. Manufactures blood proteins
 - 5. Stores vitamin A, D and B complex
- L. Gallbladder
 - 1. Stores bile
 - 2. When fatty foods digested, bile released by gallbladder
- M. Large Intestine
 - 1. Chyme semi-liquid food

MD13.03 Analyze characteristics and treatments of common digestive disorders.

- A. Heartburn
 - 1. Acid reflux
 - 2. Symp burning sensation
 - Rx avoid chocolate, peppermint, coffee, citris, fried or fatty foods, tomato products, stop smoking, take antacids, don't lay down 2-3 hours after eating
- B. Pyloric stenosis
 - 1. Narrowing of pyloric sphincter, often found in infants
 - 2. Symp projectile vomiting
 - 3. Rx Surgery
- C. Gastritis acute or chronic inflammation of the stomach lining
- D. Gastroenteritis
 - 1. Inflammation of mucous membrane lining of stomach and intestine
 - 2. Common cause virus
 - 3. Symps diarrhea and vomiting
 - 4. Complication dehydration
- E. Ulcer
 - 1. Sore or lesion that forms in the lining of the stomach
 - 2. Gastic ulcers in the stomach, duodenal ulcers in the duodenum
 - 3. Primary cause *H. pylori* (bacteria)
 - 4. Contributing factors smoking, alcohol, stress, certain drugs
 - 5. Symp burning pain in abdomen between meals and early morning, may be relieved by eating or taking an antacid
 - 6. Diagnosis x-ray, gastroscopy
 - 7. $Rx H_2$ blockers (drugs) that block release of histamine
- F. Colitis (Irritable Bowel Syndrome)
 - 1. Large intestine inflamed
 - 2. Cause unknown
 - 3. Symps episodes of diarrhea or constipation

- G. Appendicitis
 - 1. When appendix becomes inflamed
 - 2. If it ruptures, bacteria can spread to peritoneal cavity, causing peritonitis
 - 3. Symps RLQ pain, rebound tenderness, fever, nausea and vomiting
 - 4. Rx appendectomy
- H. Hepatitis A

Ι.

- 1. Infectious hepatitis
- 2. Cause virus
- 3. Spread through contaminated food and water
- Hepatitis B (Serum hepatitis)
 - 1. Caused by virus found in blood
 - 2. Transmitted by blood transfusion or being stuck by contaminated needle (drug user)
 - 3. Health care workers at risk should be vaccinated
 - 4. Use standard precautions for prevention
- J. Cirrhosis
 - 1. Chronic, progressive disease of the liver
 - 2. Normal tissue replaced by fibrous connective tissue
 - 3. 75% caused by excessive alcohol consumption
- K. Cholecystitis inflammation of the gall bladder
- L. Cholelithiasis (gall stones)
 - 1. Can block bile duct causing pain and digestive disorders
 - 2. Small ones may pass on their own, large ones are surgically removed
 - 3. Surgical removal of the gallbladder = cholecystectomy
- M. Pancreatitis
 - 1. Inflammation of pancreas
 - 2. 1/3 of cases cause unknown
 - 3. Sometimes associated with chronic alcoholism
- N. Diverticulosis (diverticulitis)
 - 1. Little sacs (diverticuli) develop in wall of colon
 - 2. Most people over age 60 have this
 - 3. When the sacs become inflammed = diverticulitis
- O. Diarrhea
 - 1. Loose, watery, frequent bowel movements when feces pass through colon too rapidly
 - 2. Caused by infection, poor diet, nervousness, toxic substances or food irritants
- P. Constipation
 - 1. When defecation is delayed, feces become dry and hard
 - 2. Rx diet of cereals, fruits andvegetables (roughage), drinking plenty of fluids, exercise and avoid tension
- Q. Colon cancer
 - 1. Colonoscopy
 - 2. Hemoccult
 - 3. Colostomy
- R. Caries tooth decay, cavities
- S. Gingivitis inflammation of the gums
- T. Jaundice yellow color the skin

- U. Laparoscopic cholecystectomy 1. Most common method of cholecystectomy
 - 2. Small abdominal incisions allow insertion of surgical instruments and small video camera
 - 3. Surgeon performs procedure by watching monitor and manipulating instruments
 - 4. Stomach muscles are not cut so healing is quicker

Daily Lesson Plans

Digestive System Unit M:

Lessons:

5 7 ½ clock hours Hours:

| Steps | Lesson #1 | Lesson #2 | Lesson #3 |
|-------------------------------|--|---|---|
| Focus and Review | Brainstorm – What is the relationship between the special senses and the digestive system? | Using model, point to structures and allow students to write the correct name of the structure. | Collect note cards. Ask questions from cards. |
| Statement of Objectives | MD13.01 Explain the structure of the digestive system. | MD13.02 Analyze the function of the digestive system. | MD13.03 Analyze characteristics and treatment of common digestive disorders. |
| Teacher Input | Overheads – Structure and Function of the Digestive system. Use a classroom model to also point out the structures. Assign the Digestive System Project (<i>MD14.01D</i>) You may group students in pairs if necessary to write the monologue together, but only on of the pair needs to act out the assigned role. | Overheads – finish structure and function if needed. Guest Speaker – Radiologic technologist – ask the Rad Tech to bring x-rays of digestive system. Use the overhead projector to show the x-rays. Have Rad Tech talk about A&P of Digestive System as it relates to his/her job. | Allow students to present their play "As the Stomach Churns." Debrief important concepts. Overheads – Discuss disorders of the Digestive System |
| Guided Practice | Working in pairs, begin preliminary work on the Digestive System Project. | Allow students time to finish their projects. | Begin filling in Digestive Disease overview. |
| Independe nt Practice | Write 3 questions on note cards related to digestive anatomy. Complete the Digestive System diagram. | Write thank you note to guest speaker. | Finish Digestive Disease Overview. White 3 disorder questions on notecards. |
| Closure | Collect note cards. Go around the room asking questions from the notecards. | Reinforce important concepts raised by the speaker. Find out if any students would consider a career in Radiologic Technology. | Collect note cards. Ask questions from the notecards. |
| Materials | Overheads Handouts – Digestive System diagram and Digestive System project. | Overheads Overhead projector Certificate of Appreciation for speaker | Overheads Handout – Digestive Disease overview |

| Unit M: | Digestive System | (Continued) |
|---------|-------------------------|-------------|
| | 5 | |

| Steps | Lesson #4 | Lesson #5 | |
|-------------------------------|--|---|--|
| Focus and Review | Correct Digestive Disease overview in class. | Answer student questions before the test. | |
| Statement of Objectives | MD13.03 Analyze characteristics and treatment of common digestive disorders. | MD13.03 Analyze characteristics and treatment of common digestive disorders. | |
| Teacher Input | Take class to the technology lab. Have them look up Colonoscopy and Virtual Colonoscopy on the web. With time remaining, go back to the classroom and play HOSA Bowl. Use notecards created in class for questions. | TEST – Digestive System | |
| Guided Practice | Have students write a one page essay on either colonoscopy, virtual colonoscopy, or a personal "digestive disorder" experience. Use clinical terms and classroom learning in the essay. | Take unit test. Grade test in class. | |
| Independe nt Practice | Study for test. | Have students look up the answers to the questions they got wrong and turn in their corrected test. | |
| Closure | Review major concepts for test. | Introduce the next unit. Make a reading assignment. Use remaining class time for HOSA business/update. | |
| Materials | Technology lab HOSA Bowl equipment Student-created note cards | Test and key. Green pens for grading tests. | |

Unit M: Digestive System Terminology List

- 1. absorption
- 2. alimentary canal
- 3. anus
- 4. appendix
- 5. bile
- 6. bolus
- 7. cardiac sphincter
- 8. cecum
- 9. chyme
- 10. colon
- 11. defecation
- 12. digestion
- 13. duodenum
- 14. enzymes
- 15. esophagus
- 16. feces
- 17. flatulence
- 18. gallbladder

Disorders and Related Terminology

- 1. appendicitis
- 2. cancer
- 3. caries (decay)
- 4. cholecystitits
- 5. cholelithiasis
- 6. cholecystectomy
- 7. cirrhosis
- 8. colitis/irritable bowel
- 9. colonoscopy
- 10. colostomy
- 11. constipation
- 12. diarrhea
- 13. diverticulosis/diverticulitis

- 19. gingiva
- 20. glycogen
- 21. hard palate
- 22. jejunum
- 23. liver
- 24. mastication
- 25. pancreas
- 26. parotid glands
- 27. peristalsis
- 28. ptyalin
- 29. pyloric sphincter
- 30. rectum
- 31. rugae
- 32. salivary glands
- 33. stomach
- 34. tongue
- 35. uvula
- 14. gastritis
- 15. gastroenteritis
- 16. gingivitis
- 17. heartburn
- 18. hemoccult
- 19. hepatitis A
- 20. hepatitis B
- 21. jaundice
- 22. laparoscopic cholecystectomy
- 23. pancreatitis
- 24. peritonitis
- 25. pyloric stenosis
- 26. ulcer

The Digestive System

Label the following structures:

- 1. Diaphragm
- Liver 2.
- 3.
- Esophagus Transverse colon 4.
- 5. Small intestine
- Pancreas 6.

- 7.
- Appendix Ascending colon 8.
- Stomach 9.
- Descending colon 10.
- 11. Rectum
- Gallbladder 12.
- Cecum 13.



Appendix MD13.01B



A Walk Through the Digestive System

- 1. As a class, determine how to obtain two white full-size sheets and sew them together.
- 2. Your teacher will divide your class into four groups. As a class, find a diagram of the digestive system, and divide it into four sections using a grid line.
- 3. Each group must draw the organs or parts of organs in their section. (As determined by the grid lines.) Once the organs are drawn, use fabric paint to paint the organs. Try to use different colors for each organ. (You will need to place some paper under the fabric to protect your floor.)
- 4. Once the paint dries, you will have a digestive system you can walk through as you learn the names of the organs and how food progresses through the body. Your teacher can also journey through the body as he/she teaches about the each organ.

Note to the Teacher: This task requires a lot of teamwork because students must work together to determine where their drawings will meet and what size the organs should be to be proportional. They also must discuss color choice.

Appendix MD13.01C

Digestive System Project



You are about to be assigned a starring role in the play, "The Stomach Churns." Once the director assigns you a role, you are to write a short monologue in which you explain your role in the digestive system. You also are to create a costume with props which relates to your role and will create a visual image. Practice your role and be "*dramatic*!" The

director will give you your cues as to when you are to appear on stage. Remember you are that organ. *"LIGHTS.....CAMERAS.....ACTION"*

"THE STOMACH CHURNS"

STARRING:

Appendix MD13.01D

Digestive System Lecture Notes



Student participation instructions

| Supplies Needed: | Zip-lock bag coloring, an | ıs, water, whole gra d colander | ain cereal, green food |
|-----------------------------|------------------------------|-------------------------------------|---|
| Major structures of GI syst | tem are: | Oral Cavity Pharynx Esophagus | Stomach Small Intestine Large Intestine |

The liver, pancreas, and gallbladder, often are called accessory organs because they not a part of the alimentary canal, but are involved in the digestive process.

There are two forms of digestion:

<u>Mechanical Digestion -</u> the breaking down of food into progressively smaller and smaller particles through tearing, cutting, grinding, and the moving of food along the digestive tract.

<u>Chemical Digestion -</u> the process where food is converted to substances usable by the body. Substances called enzymes speed up this process.

Oral Cavity

- Receives food and begins the preparation of food for digestion.
- Food is torn and ground into smaller pieces through mastication (chewing.)
- Saliva from the salivary glands is added to the food as it is being broken down.



(Fill the zip-lock bag with about a cup of cereal - imagine the food entering the mouth and it closing.)

• Digestion begins in the oral cavity (both chemical and mechanical digestion.)

Main parts of the oral cavity involved are the teeth, tongue, and salivary glands.

- Teeth responsible for mastication.
- Front teeth (incisors) have thin, sharp edges. Function is to tear and cut chunks of food from the main portions.
- Premolars and molars grind the food into even smaller pieces.
- Tongue moves the food around your oral cavity so that all food can be ground up. Tongue also facilitates deglutination (swallowing.) Tongue covered with tiny projectiles called papilla (taste buds.)



(Mash up the food in the bag – the food is being chewed.)

<u>Salivary Glands</u>

You have three pairs.

- 1. **Parotid Glands** largest pair, located anterior and inferior to your ears. These are the glands that swell up when infected with the mumps virus.
- 2. **Submaxillary** or **submandibular** glands are found near the inner surface of your lower jaw.
- 3. Sublingual glands are located under your tongue.

They produce saliva. Aids in liquefying food making it easier to digest. Saliva is 99% water but also contains the enzymes ptyalin, or salivary amylase which begins the breakdown of starch.



(Add about 1/8 cup of water; this is the saliva. Make sure that students do not add too much water at this point. Mixture should be very thick!)

Food is now a wet, nondescript and utterly repugnant mass, it is called "Bolus."

<u>Pharynx</u>

- Bolus pushed into pharynx with the aid of your tongue.
- Uvula (that soft, bag-shaped mass attached to the soft palate and hanging down in the back of your throat.) blocks the passageway between your nasal and oral cavities when you swallow.
- Tongue can not push food all the way down to the stomach. The bolus is moved further downward by way of rhythmic, muscular contractions of the pharynx, known as peristalsis. These contractions occur in a downward wave.

<u>Esophagus</u>

- Passing from the pharynx is a 9-10 inch (25 cm.) long, flexible tube-like structure called the esophagus.
- Begins in the throat, travels through the middle chest region, through the diaphragm, and eventually ends in the abdominal cavity.



(Mash the bag more and ask them to pretend that the food is moving down the esophagus into the stomach.) <u>Stomach</u>

• Sac-like structure located in the upper left quadrant of the abdomen. This organ is filled with gastric juices and mucus.

- Gastric juice is an acidic substances composed mainly of pepsin, an enzyme that breaks down the proteins found in food.
- Hydrochloric acid in the stomach destroys unwanted bacteria and other microorganism white future aiding the digestion of food. This acid also contributes to the absorption of iron.
- Around 35 million gastric glands produce gastric juice.
- Mere sight or smell of food is enough to make your glands in your stomach secrete more gastric juices.
- The reason the stomach does not dissolve itself it because it secretes and maintains a mucous lining which acts as a protective barrier.



(Add more water for the gastric juices.)

- The stomach makes a churning action by way of muscle contractions. This action increases the effectiveness of gastric juices. They do not flow backwards and squirt up your throat because of the cardiac valve or cardiac sphincter.
- The cardiac sphincter is a ring-like structure located between the esophagus and the stomach which opens to allow food and liquid into the stomach and stays shuts sometimes.
- Sometimes it does not to work if you try to swallow food too quickly. This can be painful.
- In the stomach food becomes s semiliquid, creamy, homogeneous substance called "chyme."



(Mash up the bag some more.)

• Chyme leaves the bottom of the stomach through the pyloric sphincter and travels a short way to the small intestine.

Small Intestine (3-5 hours)

- 1 inch in diameter and 23 feet long.
- It is coiled up in abdominal cavity.
- Digestion continues and this is where absorption occurs.
- Consists of three portions:
 - 1. Duodenum (about 12 inches long) This is where the pancreas and liver have ducts which empty into the small intestine. Most of the chemical digestion occurs in this first division. (This is a site of frequent ulceration duodenal ulcer.)
 - 2. Jejunum (about 8 feet in length)
 - 3. Ileum
- Food is now broken down into usable substances which can be used by the tissues.
- These substances are absorbed by the villi (millions line the walls of the small intestine.)
- Nutrients are either sent to the blood or put into storage.

- Water is also absorbed by the small intestine. On the average about 10 liters of water is absorbed each day. If necessary, however, your small intestine can absorb at least 1 liter of water every hour.
- Usually only indigestible substances, waste material, and excess water are left.

<u>Liver</u>

3-4 pound organ located in upper right quad. of abdomen under the diaphragm. Usually cannot feel the liver when palpating your abdomen. Liver responsible for many vital things:

- 1. Maintains correct blood sugar (glucose) levels.
- 2. Filters out and destroys old red blood cells (RBCs) and saves the iron to be used again.
- 3. Produces bile, which is needed for the digestion and utilization of fats.



(Add green food color to represent bile. Pretend food is in the small intestine.)

- 4. Acts as a storehouse for a variety of vitamins, such as vitamins K, A, D, E, and B12.
- 5. Produces prothrombin which is needed for blood clotting.
- 6. Filters out harmful toxins that may be swallowed.

Gallbladder

- Bile made by the liver goes to the gallbladder.
- The gallbladder can store about 50 milliliters of bile.
- When fatty foods are eaten, this 7- 10 cm. long, pear-shaped organ is signaled to release bile to the duodenum via the common bile duct.
- Some of the bile used comes directly from the liver via the hepatic ducts.
- Bile breaks down fat like soap breaks down grease.
- After it is broken down, the fat can be stored by the lacteals of the villi in the intestinal wall and used by the body.

Pancreas

- Located behind the stomach.
- Oblong, flattened organ is about 15 cm long.
- Produces pancreatic juice, which contains more digestive enzymes. This juice travels through the pancreatic duct and then through the common bile duct to get to the duodenum.
- These enzymes help digest proteins and fats. They also contribute to the control of blood sugar levels via its production of insulin.

Large Intestine (18 to 24 hours.)

- About 5 feet long and 2 inches in diameter.
- Curled up within the abdomen.
- Nutrients not absorbed in small intestines are absorbed here as is some of the water.
- This is where E. Coli (bacteria) is and works on undigested substances and is needed to synthesize vitamins. (B-complex and Vit. K)
- Serves as the storage and elimination structure for indigestible substances.
- Water and salts are absorbed.
- Still in the form of chyme when it enters, but in the colon, chyme is converted into feces.
- Takes longer for food to pass through large intestine. Mass movements occur 3 4 times a day.
- Defecation is the elimination of feces.
- Reflex activity moves feces through the internal anal sphincter. Voluntary activity regulates movement through the external anal sphincter.



(Strain contents of the bag; the liquid part is the nutrients absorbed by the body and the solid part is pushed to the large intestine. This is where the solid waste is packed and sent out the body through the

anus.)

Appendix MD13.02A



THE JOURNEY OF A MEATBALL (Sung to the Tune -- On Top of Old Smoky)

- On top of spaghetti -- all covered with cheese
 I spotted a meatball, and quick as you please
 I forked that big meatball right into my mouth and started a process that this song's about.
- My teeth chewed the meatball and mixed it up well with saliva and juices, all triggered by smell. That bolus of food then passed out of my mouth and into the esophagus for its long journey south.
- The old peristalsis kicked right in you know and took my big meatball where the pH is low. Inside of my stomach, HCL and pepsin were mixed with the meatball by churning again.
- 4. Then shortly my stomach told the meatball good-bye passed it to the intestine where the pH is high. Intestinal juices, pancreatic ones too along with the liver's bile has much work to do.
- All of those enzymes got right down to work and broke down my meatball with nary a quirk. Amino acids, monosaccharides too are all that is left from my meatball it's true.
- Now all of the nutrients set out for a ride in a little red blood cell tucked safely inside they'll ride in the plasma wherever it leads and nourish a cell that has nutritional needs.
- 7. Back in the intestine the rest of my meal was sent to the colon -- which removes water with zeal. When you eat spaghetti all covered with cheese remember my meatball and these processes.

Printed with permission from Cindy Moss (Biology Teacher) Independence High School in Charlotte, NC.

Appendix MD13.02B

Digestive System Project

You will be working in groups of two or three people. Each group will be assigned an organ in the digestive system. You will have this class period to learn about the function of this organ as it relates to the digestive system as well as any diseases involving your organ. You have the entire class period to work on this project.

The next class period you will take on the role of this organ. You need to have a costume or props which relate to your function. You will tell the class the role you play in digestion.

- Where do you receive food from and what do you do with the food when you receive it?
- □ Where do you send the food and in what form?
- Are there any enzymes or chemicals which help you do your job? What diseases are associated with your organ and what symptoms would a person have?
- Are there any diagnostic tests used to examine you?

Be creative and informative. <u>You will present this the next class period whether your</u> partner is here or not so be prepared and involved in the project!!!!

YOUR ORGAN ______ YOUR PARTNER______

Counts as Test Grade:

| • | Function | (15 points) |
|---|--|-------------|
| • | Receives food from where and in what form | (10 points) |
| • | Sends food where and in what form | (10 points) |
| • | Enzymes and chemicals involved with organ | (10 points) |
| • | Diseases and symptoms | (15 points) |
| • | Diagnostic Tests | (10 points) |
| • | Types of healthcare workers involved in caring for you | (5 points) |
| • | Costume and props | (25 points) |

Appendix MD13.02D

DIGESTIVE SYSTEM PROJECT GRADE FORM

STUDENTS:

ORGAN:

| • | Function Receives food from where and in what form | (15 points) (10 points) | |
|---|--|----------------------------|--|
| • | Sends food where and in what form Enzymes and chemicals involved with organ | (10 points) (10 points) | |
| • | Diseases and symptoms Diagnostic Tests | (15 points) (10 points) | |
| - | Types of healthcare workers involved in caring for you Costume and props | (5 points) (25 points) | |
| | | (| |

Total Points (100 Points)

Comments:

Digestive Disease Overview

Describe the following digestive disorders, treatments and terms.

| Hepatitis A | |
|-----------------|--|
| Hepatitis B | |
| Cholelithiasis | |
| Cholecystectomy | |
| Heartburn | |
| Ulcer | |
| GERD | |
| Cirrhosis | |
| Jaundice | |
| Constipation | |
| Gastroenteritis | |
| Appendicitis | |
| Pancreatitis | |

Appendix MD13.03A

Unit M: Digestive System





DIGESTION – the process of changing complex solid foods into simpler soluble forms which can be absorbed by body cells.

ENZYMES – chemical substances that promote chemical reactions in living things.

ALIMENTARY CANAL – digestive tract or gastrointestinal tract (GI Tract). A 30 ft. tube from mouth to anus.

Accessory organs of digestion:

- Tongue
- Teeth
- Salivary glands
- Pancreas
- Liver
- . Gall bladder



Lining of the Digestive System

PERITONEUM – double-layered serous membrane that lines the abdominal cavity

Functions of the Digestive System

- 1. Physical breakdown of food
- 2. Chemical digestion of food into the end products of fat, carbohydrates and protein.
- 3. Absorb nutrients into blood capillaries of the small intestines
- 4. Eliminate waste products of digestion

Structure of Organs of Digestion

MOUTH

- Food enters digestive system through mouth
- Inside of mouth covered with mucous membrane
- Roof of mouth is HARD PALATE (bone) and soft palate
- UVULA flap that hangs off soft palate prevents food from going up the nose when you swallow

TONGUE

- Attached to floor of mouth
- Helps in chewing and swallowing
- Made of skeletal muscle attached to four bones
- Taste buds on the surface

SALIVARY GLANDS

- Three pairs of glands
- PAROTID largest salivary glands, they become inflamed during mumps
- Secrete saliva

TEETH

- GINGIVA gums, support and protect teeth
- MASTICATION chewing, teeth help in mechanical digestion
- DECIDUOUS teeth baby teeth (#20)
- Adult mouth has 32 teeth

ESOPHAGUS

- Muscular tube, 10" long
- Connects pharynx and stomach

STOMACH

- Upper part of abdominal cavity
- CARDIAC SPHINCTER circular layer of muscle, controls passage of food into stomach
- PYLORIC SPHINCTER valve, regulates the entrance of food into duodenum
- RUGAE mucous coat lining of stomach in folds when the stomach is empty
- Stomach has muscular coat that allows it to contract (peristalsis) and push food into the small intestine



SMALL INTESTINE

- DUODENUM first segment, curves around pancreas, 12" long
- JEJUNUM next section, 8 ft. long
- ILEUM final portion, 10-12 feet long
- ABSORPTION in small intestine, digested food passes into bloodstream and on to body cells, undigestible passes on to large intestine

Accessory Organs of Digestion

PANCREAS

- Located behind stomach
- Exocrine function secretes digestive enzymes
- Also has endocrine function

LIVER



- Largest organ in the body
- Located below the diaphragm, upper right quadrant
- Connected to gallbladder and small intestine by ducts
- Functions:
 - 1. Produce and store glucose in the form of GLYCOGEN
 - 2. Detoxify alcohol, drugs and other harmful substances
 - 3. Manufacture blood proteins
 - 4. Manufactures bile
 - 5. Store Vitamins A, D and B complex

GALL BLADDER

- Small green organ, inferior surface of the liver
- Stores and concentrates bile until needed by the body
- When fatty foods digested, bile released by gallbladder

LARGE INTESTINE

- CHYME semi-liquid food
- Approx 2" in diameter
- Also called the colon
- CECUM lower right portion of large intestine
- APPENDIX is finger-like projection off cecum
- RECTUM last portion of large intestine
- ANUS external opening



Summer 2005 M.35

Digestion

BOLUS – soft, pliable ball – creating from chewing and addition of saliva – it slides down esophagus

PERISTALSIS – wavelike motions, moves food along esophagus, stomach and intestines

In the mouth...

 saliva softens food to make it easier to swallow



- PTYALIN in saliva converts starches into simple sugar
- under nervous control just thinking of food can cause your mouth to water

In the stomach...

- gastric (digestive) juices are released
- stomach walls churn and mix (This mixture is chyme)
- small amount of chyme enters duodenum at a time - controlled by pyloric sphincter
- takes 2-4 hours for stomach to empty

In the small intestine...

- where digestion is completed and absorption occurs
- addition of enzymes from pancreas and bile from liver/gallbladder

In the large intestine...

- regulation of H₂O balance by absorbing large quantities back into bloodstream
- bacterial action on undigested food decomposed products excreted through colon – bacteria form moderate amounts of B complex and Vitamin K
- gas formation 1-3 pints/day, pass it through rectum (flatulence) 14 times a day, bacteria produce the gas
- FECES undigested semi-solid consisting of bacteria, waste products, mucous and cellulose
- DEFECATION when Ig intestine fills, defecation reflex triggered colon and rectal muscles contract while internal sphincter relaxes external anal sphincter under conscious control



HEARTBURN

- Acid reflux
- Symp burning sensation
- Rx avoid chocolate and peppermint, coffee, citris, fried or fatty foods, tomato products – stop smoking – take antacids – don't lay down 2-3 hours after eating

PYLORIC STENOSIS

- Narrowing of pyloric sphincter, often found in infants
- Symp projectile vomiting
- Rx surgery

GASTRITIS – acute or chronic inflammation of the stomach lining

GASTROENTERITIS

- Inflammation of mucous membrane lining of stomach and intestine
- Common cause = virus
- Symps diarrhea and vomiting for 24-36 hours
- Complication = dehydration

ULCER

- Sore or lesion that forms in the mucosal lining of the stomach
- Gastric ulcers in the stomach and duodenal ulcers in the duodenum
- Cause *H. pylori* (bacteria) is primary cause
- Lifestyle factors that contribute: cigarette smoking, alcohol, stress, certain drugs
- Symp burning pain in abdomen, between meals and early morning, may be relieved by eating or taking antacid
- Diagnosis x-ray, presence of bacteria
- Rx H₂ blockers (drugs) that block release of histamine



COLITIS (IRRITABLE BOWEL SYNDROME)

- Large intestine inflamed
- Cause unknown
- Symps episodes of constipation or diarrhea

APPENDICITIS

- When appendix becomes inflamed
- If it ruptures, bacteria from appendix can spread to peritoneal cavity causing PERITONITIS

HEPATITIS A

- Infectious hepatitis
- Cause virus
- Spread through contaminated food or H₂O

HEPATITIS B (Serum Hepatitis)

- Caused by virus found in blood
- Transmitted by blood transfusion or being stuck with contaminated needles (drug addicts)
- Health care workers at risk and should be vaccinated
- Use standard precautions for prevention

CIRRHOSIS

- Chronic, progressive disease of liver
- Normal tissue replaced by fibrous connective tissue
- 75% caused by excessive alcohol consumption

CHOLECYSTITIS

• Inflammation of gallbladder

CHOLELITHIASIS



- Gallstones
- Can block the bile duct causing pain and digestive disorders
- Small ones may pass on their own, large ones surgically removed
- Surgical removal of gallbladder = CHOLECYSTECTOMY

PANCREATITIS

- Inflammation of pancreas
- 1/3 of cases = cause unknown
- Sometimes associated with chronic alcoholism

DIVERTICULOSIS

- Little sacs (diverticuli) develop in wall of colon
- Most people over age 60 have this
- When the sacs become inflammed = DIVERTICULITIS

DIARRHEA

- Loose, watery, frequent bowel movements when feces pass along colon too rapidly
- Caused by infection, poor diet, nervousness, toxic substances or irritants in food

CONSTIPATION

- When defecation delayed, feces become dry and hard
- Rx diet with cereals, fruits, vegetables, (roughage), drinking plenty of fluids, exercise, and avoiding tension

COLON CANCER

- Early detection critical COLONOSCOPY after age 50
- HEMOCCULT stool slide specimen to look for hidden blood
- Rx colon resection
- COLOSTOMY opening in abdomen, healthy bowel brought to skin after cancer removed, pouch worn to collect waste

CARIES – tooth decay (cavities)

GINGIVITIS – inflammation of the gums

JAUNDICE – yellow color when bile pigment gets in bloodstream

LAPAROSCOPIC CHOLECYSTECTOMY

- Most common method of cholecystectomy
- Small abdominal incisions allow insertion of surgical instruments and small video camera
- Surgeon performs procedure by watching monitor and manipulating instruments
- Stomach muscles are not cut, healing is quicker