I. OVERVIEW OF THE DIGESTIVE SYSTEM

A. Functions of the Digestive System

1. ________________ - Consuming food
2. ________________ - Breakdown of ingested food into smaller molecule
3. ________________ - Passage of nutrients into the blood
4. ________________ - Converting nutrients into raw materials for production of cellular energy (ATP)
5. ________________ - Removing indigestible wastes

B. Types of Digestion

1. ________________:
   - ____________, mixing, churning, ____________, tearing, or mashing of food.
2. ________________:
   - ________________ break down food molecules into their ________________
     - ________________ are broken down to simple ____________
     - ________________ are broken down to ________________
     - ____________ are broken down to ________________ and alcohols

II. ORGANS OF THE DIGESTIVE SYSTEM

A. Two main types of digestive organs

1. Organs along the ________________ (Gastrointestinal tract): – continuous coiled hollow tube over 30 ft. long
   - Mouth, pharynx, ________________, ________________, small and large ________________, rectum
2. ________________: Organs that contribute secretions (fluids) & enzymes to aid in digestion
   - ________________, liver, gall bladder, pancreas

B. ALIMENTARY CANAL ORGANS

1. ORAL CAVITY (Mouth, Teeth, & Salivary Glands)
   a. Mouth
   - Food enters the mouth where digestion begins
     - MECHANICAL DIGESTION: ________________ (chewing) of food by teeth
     - CHEMICAL DIGESTION: ________________ contains the enzyme ________________ that breaks down ________________ and starches in the mouth
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### 1. Teeth
- **Function:** ___________
- **Humans have 2 sets:**
  1. ___________ (baby or milk) teeth
     - 20 teeth are fully formed by age two
  2. ___________ (adult) teeth
     - Replace deciduous teeth between the ages of 6 to 12
     - A full set is 32 teeth, but some people do not have wisdom teeth
- **Classification of teeth**
  - ___________ – used for biting food
  - ___________ – used for tearing food
  - ___________ (bicuspids) – used for grinding food
  - ___________ – Used for crushing food
- **Parts of a tooth**
  - ___________ – exposed part of tooth made of enamel
  - ___________ – connects crown to root
  - _______ – Periodontal membrane attached to the bone, contains blood vessels and nerves

### 2. Salivary Glands
- ___________ - mixture of mucus and serous fluids
- Helps to ____________________________________
- Contains salivary ___________ to begin starch digestion
- Dissolves chemicals so they can be tasted

### 3. Pharynx
- The passageway for air and food
- Has 3 parts: (see diagram)

- **Swallowing:**
  - _______ that causes the epiglottis to move blocking the trachea (windpipe)
  - The _______ opens to receive the _______

### 3. Esophagus
- "___________" links the pharynx to the stomach through the diaphragm
- _______ layers contract to _______ food through the _______
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the stomach
  - Longitudinal inner layer
  - Circular outer layer
  - ___________ – alternating waves of muscle contraction

4. STOMACH
a. Structure & Path of Food
  - __________________________ organ located on the left side of the abdominal cavity
  - Bolus (food) enters through the __________________________
    - Prevents the backup of stomach acid into esophagus (__________)
  - Bolus (food) enters through the four regions of the stomach:
    - ________ region – near the heart
    - ________ region
    - ________ region – main part of stomach
    - ________ region – funnel-shaped end
  - ________ (mixture of _______ & gastric juices) exits through the __________________________ into the small intestine
  - MECHANICAL DIGESTION: Muscle of stomach contract to _______ and _______ food with gastric juices.
  - Deep folds called _______ allow stomach to expand when filled with food

b. Coverings of the stomach
  - __________________________ – membrane that covers the abdominal wall and organs
    - ________ peritoneum – covers the organ
    - ________ peritoneum – covers the cavity walls
  - __________________________ holds the stomach & intestines in place in abdominopelvic cavity

c. Gastric Juices
  - CHEMICAL DIGESTION: Lining of the stomach ________ gastric juices that ________ food.
  - Gastric juices contain pepsin, HCl, and mucus
    - ________ breaks down ________ into amino acids
    - ________________ (HCl) is a very strong acid (pH _______) that activate enzymes and kills __________
    - ____________ protects the lining of the stomach from the acidic environment
      - Replaced every few days
If the mucus layer is broken down by increased acid, an _________ may form: Open sores on the lining of the digestive tract that may bleed and be very painful
  ▪ Caused by bacteria (Heliobacter pylori), regular use of pain relievers or other medications

The Digestive System Notes Part 2

II. ORGANS OF THE DIGESTIVE SYSTEM (continued)
B. ALIMENTARY CANAL ORGANS

5. SMALL INTESTINE
   a. Overview
      ▪ ______________ extending from the pyloric sphincter to the ileocecal valve
      ▪ Up to 22 feet long
      ▪ Functions:
        ▪ ____________________ – most digestion occurs in the small intestine
        ▪ Carbohydrate and protein digestion is completed
        ▪ Fat digestion begins
        ▪ Main site of ______________ into the blood
   b. Structure
      ▪ Small Intestine has 3 parts:
        ▪ ____________
          ▪ First 25 cm, attached to the stomach
          ▪ ______________ from the liver and pancreas to aid in digestion
        ▪ ____________
          ▪ Next 3 feet
          ▪ Contains folds and villi for absorption
        ▪ ____________
          ▪ Last 6-7 feet
          ▪ Extends from jejunum to large intestine
      ▪ Walls of the small intestine
      ▪ Has 3 features that increase the ____________ for maximum absorption of nutrients
        ▪ 1. ____________________ – permanent transverse folds in the mucosa and submucosa
        ▪ 2. ____________ – fingerlike projections of the mucosa
          ▪ Goblet cells in villi produce mucus to lubricate chyme
          ▪ Villi contain absorptive cells and blood capillaries to absorb nutrients
        ▪ 3. ______________ – microscopic extensions from the plasma membrane
CHEMICAL DIGESTION in the Small Intestine

- Accessory organs aid in digestion by secreting enzymes into the small intestine
  - Bile from the gall bladder
    - Breaks down __________
  - Pancreatic juices from the pancreas
    - Sodium bicarbonate __________ the acid

6. LARGE INTESTINE

- Once digestion & absorption of nutrients is complete, the chyme moves into the large intestine by peristalsis
- Also known as the ________
- Larger in diameter, but shorter than the small intestine

a. Functions of the Large Intestine
- Absorption of __________
- Does not participate in digestion of food
- __________ indigestible food from the body as ________
- Goblet cells produce mucus to act as a lubricant

b. Structure
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- Colon – includes the cecum (saclike structure) with a small projection called the ____________________
- Colon
- Colon
- Colon

C. Food Breakdown & Absorption in the Large Intestine
- Bacteria breaks down indigestible materials
  o Source of __________
  o Produce some vitamin __ and __
  o Release ________
- ________, vitamins ___, and vitamin ___ are ______________________
- Remaining materials are eliminated as feces

7. RECTUM
- Feces moves from the sigmoid colon of the large intestine to the rectum by peristalsis
  in the ________ until the involuntary internal anal sphincter is triggered to open
- __________ or expulsion of feces occurs when the voluntary external anal sphincter relaxes and the feces passes out of the body
  - Happens daily
  - __________ by __________ of feces in rectum

C. ACCESSORY DIGESTIVE ORGANS
1. PANCREAS
- a wide spectrum of ___________________________ that break down all types of food
- Enzymes are secreted into the __________ of the small intestine
a. Secretions of the Pancreas
1. __________: Helps complete digestion of starch
2. __________, etc: Carry out about half of all protein digestion
3. __________: Responsible for fat digestion
4. __________: Digest nucleic acids
5. __________: Neutralize acidic chyme
- Enzymes are transported to the small intestine through the __________ (shared with the liver)
2. LIVER
   ▪ ________ organ in the body
   ▪ Has ____ main lobes
     o Larger right lobe
     o Smaller left lobe
   ▪ The ________ also contributes to digestion by ______________________

   a. Bile
      ▪ Bile is a greenish substance that __________
      ▪ Stored in _________________
      ▪ Composed of bile salts & pigments
        (___________ from hemoglobin breakdown), cholesterol, phospholipids, & electrolytes
      ▪ Helps to digest fatty foods

   b. Role of the Liver in Metabolism
      ▪ Removes _________ and __________ from blood
      ▪ Degrades hormones
      ▪ Produce cholesterol, blood proteins (albumin and clotting proteins)
      ▪ Plays a central role in ______________
      ▪ Stores products of digestion as ________________ to be released as needed

3. GALL BLADDER
   ▪ Sac found in hollow fossa of liver
   ▪ ________________ produced by the liver
   ▪ Bile is introduced into the duodenum in the presence of fatty food
   ▪ ________________ can cause blockages

III. Control of Digestive Activity
   ▪ Mostly controlled by ___________ via the ______________division of nervous system
   ▪ Chemical and mechanical ____________ are located in organ walls that
     ________________
   ▪ ________________ include:
     o Stretch of the organ
     o ________ of the contents
     o ________________ of breakdown products
   ▪ ________________ include:
     o Activation or inhibition of glandular secretions
     o Smooth ___________ activity
**Unit 7: Digestive System**

**Chapter 15**

- **Processes of the Digestive System** (See diagram)

***You will write one summary for part 1 and part 2 notes combined. This will be a LONG summery.***

**Learning Goals:**

1) Describe the functions of the digestive system.
2) Compare and contrast chemical and mechanical digestion.
3) Describe the pathway of food through the alimentary canal organs (7 total) and for each organ, state the type of digestion (mechanical and/or chemical) that occurs. If chemical digestion occurs, additionally state what enzyme is involved and what is broken down.
4) Explain the role of the pancreas and describe each of the five pancreatic secretions.