MEDCoE 68W VLSP – Anatomy and Physiology (A&P) Course

Module Title: The Digestive System	**Date: 8/25/23**
Product Deliverable(s): ☒ **Storyboard Outline** ☐ **Storyboard** ☐ **Practical Exercise** ☐ **Pre-Test** ☐ **Answer Keys**	**Design Team:** Zachary Farrar **PM:** Karin Bromley **Lead ISD**: Michelle Austin **Lead Developer:** Brandon Bates **Media Production Manager**: Madisyn Bradow **Lead QA:** Aimee Crouch
Proponent: MEDCOE/DOTD	**Courseware Link (if applicable):**
Version number: 1.0	**Phase:** ☒ Draft Storyboard ☐ Final Storyboard ☐ Alpha IMI ☐ Final IMI ☐ Individual Trials ☐ Group Trials ☐ Final Packaging
TLO(s):	TLO 18: Identify components, characteristics, and functions of the digestive system. TLO 19: Identify common digestive system pathophysiology.
ELO(s):	ELO 18-A: Identify the components, functions, and anatomy of the gastrointestinal tract. ELO 18-B: Identify the components, functions, and anatomy of accessory organs that assist with digestion. ELO 18-C: Identify the functions and processes of the digestive system. ELO 18-D: Identify the impact of the digestive system on homeostasis. ELO 19-A: Identify the cause of abdominal pain based on patient signs and symptoms. ELO 19-B: Identify the impact of abdominal wounds and other trauma on the digestive system.

	ELO 19-C: Identify eating disorders. ELO 19-D: Identify the impact of biologic poisoning and liver toxicity on the digestive system.

Version Control Log

Version	Date	Changes & Comments	Update Author
1.0	8/28/2023	Initial Draft Submission	Anne-Marie Fiore, Ed.D.

Module Introduction Components

Title: **The Digestive System**

Objectives(s) Identify components, characteristics, and functions of the digestive system.

Introduction

An animated eMentor appears on the screen, providing learners with an overview of the module's content, followed by the presentation of the module's topics. Subsequently, a smooth transition leads to the engaging motivator scenario. The module's subjects encompass anatomy of the digestive tract, organs of digestion: mouth and salivary glands, the role of enzymes in digestion, swallowing and esophageal function, stomach structure and gastric secretion, small intestine: absorption and nutrient transport, large intestine and water absorption, liver function and bile production, pancreas and its role in digestion, and other common digestive disorders and diseases.

Motivator/Scenario Description

A soldier comes to the aid station, eager and focused, to get help for stomach pain. The air-conditioned tent is ready and can fit up to ten people at once, making it a safe place in the middle of the chaos. The soldier's pain is easy to feel. He has general stomach pain, bloating, waves of sickness, and random bouts of diarrhea. Your knowledge shines through as you quickly spot the signs and connect them to the substances that were taken in.

The combat medic, a seasoned professional with years of experience, approaches the soldier with a reassuring demeanor. "You're in good hands," the medic says calmly, observing the soldier's evident discomfort. The symptoms—stomach pain, bloating, waves of sickness, and unpredictable bouts of diarrhea—don't escape the medic's trained eye.

With a reassuring tone, the combat medic continues, "We've seen this before, and we know how to help. Let's get you inside the air-conditioned tent and assess your condition. Your well-being is our top priority, and we'll work together to provide the care and relief you need. You're not alone in this; we're here to support you every step of the way."

Transition Narration for eMentor Animation

"Facing this challenge, what knowledge of human anatomy and physiology is essential to provide assistance? Join us in exploring the intricacies of the human digestive system and gaining insights into the common ailments that medics should consider in scenarios like this."

Establishing Scene

Side by side view of structure and function of a human body with digestive system areas marked. Topics include Human body, anatomy, physiology, pathophysiology, homeostasis, digestion, digestive system, stomach, liver, gallbladder, intestines, large intestines, small intestines, colon, gastrointestinal, gastrointestinal tract, GI, GI tract, vomiting, nausea, virus, abdomen, abdominal wound, eating disorder, bulimia, anorexia, poison, and toxic liver.

1.0 DP_01 TLO_18 ELO_18-A LSA 1-2: Identify components, characteristics, and functions of the digestive system.

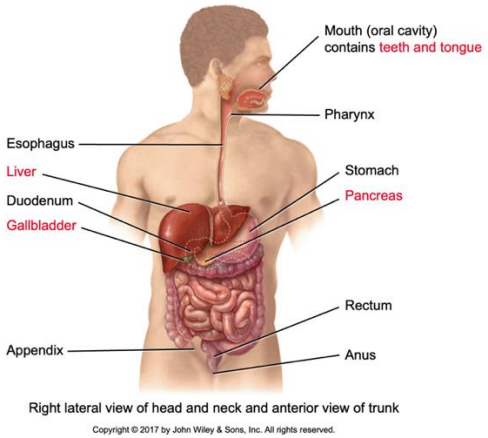
1. Initial Asset Requirements:
    a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the dibgestive system's components and their significance.
    b. Metahumans: Selected eMentor for the A&P course. Shurman
    c. Specific Assets:
        i. Images:
        ii. 360 Images:
            1. The image features a side-by-side view of the structure and function of the human body, highlighting the digestive system areas. On the left side, a detailed 3D representation of the human body is depicted. The body is semi-transparent, revealing internal organs. The digestive system components are prominently marked and color-coded. Starting from the mouth, the pathway follows the esophagus into the stomach, small intestine, and large intestine. The liver, gallbladder, and pancreas are also labeled, illustrating their roles in digestion.
            2. On the right side, a schematic representation of the digestive process is shown. It illustrates the sequential movement of food through the digestive tract. Arrows indicate the flow of food, and icons representing various food types are seen entering the mouth, passing through each digestive organ, and finally progressing to the large intestine. This side-by-side comparison effectively demonstrates the correlation between the anatomical structure and the functional aspects of the digestive system. The integration of visual elements and labels aids in understanding how each organ contributes to the overall digestion process within the human body.
    d. Injuries/Parts of the body:
        i. Motivator

ii. PE

2. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 18-A: LSA 1-2
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_01: TL_18 ELO_18-B: LSA 3,4 Identify components, characteristics, and functions of the digestive system	
STRUCTURE	**FUNCTION**
01. Learning Step/Activity 1 a. Define the gastrointestinal tract. i. The GI tract is one continuous tube running from the mouth to the anus. ii. It is in both the thoracic and abdominopelvic cavities. iii. The GI tract is also known as the alimentary canal. b. Identify the organs of the gastrointestinal tract. The organs of the GI tract, in order from top to bottom, are: i. Mouth ii. Pharynx iii. Esophagus iv. Stomach v. Small intestine vi. Large intestine vii. Anus	1. Learning Activity a. Identify the organs of the gastrointestinal tract. b. In order from top to bottom, the organs of the GI tract are the mouth, pharynx, esophagus, stomach, small intestine, large intestine, and anus. c. Identify the accessory digestive organs. d. The accessory organs participating in the digestive process are the teeth, tongue, salivary glands, liver, gallbladder, and pancreas.

Checks on Learning: Digestive System Challenge

Type	Question	Correct Answer
Click & Place	Check on Learning: Click and Place Instructions: Click and place each part of the digestive system on the left to its correct location on the image of the digestive system on the right. Parts of the Digestive System: a. esophagus b. liver c. duodenum d. gallbladder e. appendix f. mouth g. pharynx h. stomach i. pancreas j. rectum k. anus	 Right lateral view of head and neck and anterior view of trunk

02: DP_02: TL_18 ELO_18-B: LSA _1-2: Identify the components, functions, and anatomy of accessory organs that assist with digestion

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets
   i. Images: n/a
   ii. 360 Images:
      1. The image presents a comprehensive view of the gastrointestinal tract, combining both 2D and 3D elements to showcase its complexity. In the center of the image, a detailed 3D model of the gastrointestinal tract takes prominence. This model spans from the mouth to the anus and is depicted in semi-transparent layers, revealing the internal structures. Starting at the top, the mouth is illustrated with the lips, teeth, and tongue. A colored path follows down the esophagus, connecting to the stomach. The stomach is depicted as a curved pouch with an entrance labeled "Cardiac Sphincter" and an exit labeled "Pyloric Sphincter." The small intestine extends from the stomach in a convoluted manner, its various segments labeled: duodenum, jejunum, and ileum. Continuing downward, the large intestine is visible, comprising the cecum, ascending colon, transverse colon, descending colon, and sigmoid colon. The path culminates in the rectum and anus.
      2. Surrounding the 3D model, various 2D labels point to key features and functions. Arrows guide the viewer's eye along the digestive pathway, and callouts explain the roles of different organs in digestion, nutrient absorption, and waste elimination. This combined 2D and 3D presentation provides a comprehensive overview of the gastrointestinal tract's structure and function, aiding in understanding the intricate processes that enable the body to digest food and absorb nutrients.
d. Injuries/Parts of the body:
   iii. Motivator:
   iv. PE
e. Content and Strategies
   a. LSA Information: [LA and ELO] ELO_18-B: LSA 1-2 Identify the components, functions, and anatomy of accessory organs that assist with digestion

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

2.0 DP_02: TL_18 ELO_18-B: LSA 1-2 Identify the components, functions, and anatomy of accessory organs that assist with digestion

STRUCTURE	FUNCTION
01. Learning Step/Activity 3 a. Define the peritoneum and its anatomy. i. The peritoneum lines the abdominal cavity and consists of two layers: ii. Simple squamous epithelium (mesothelium) iii. Underlying supporting layer of areolar connective tissue b. The peritoneum is divided into two parts: i. Parietal peritoneum (lining the abdominal cavity) ii. Visceral peritoneum (covering individual organs) c. The peritoneal cavity separates the parietal and visceral portions of the peritoneum and contains lubricating serous fluid. d. Identify the anatomy of the mouth (buccal cavity). i. Cheeks: The lateral walls of the oral cavity, protected externally by skin and internally by a mucous membrane. ii. Lips (labia): The fleshy folds around the opening of the mouth. iii. Hard palate: The anterior portion of the roof of the mouth.	01. Learning Step/Activity 3 a. Define the function of the peritoneum. i. The peritoneum serves as the largest serous membrane in the body, covering the abdominal cavity and its organs, including the liver, stomach, intestines, and more. ii. It provides a protective lining for the abdominal cavity and its organs, shielding them from potential injuries and infections. iii. The peritoneal fluid within the peritoneal cavity prevents friction between organs, facilitating smooth movement during digestion and other physical activities. b. Define the function of the mouth. i. The mouth, or oral cavity, serves as the entrance point for food and liquids into the digestive system.

iv. Soft palate: An arch-shaped muscular partition comprising the posterior portion of the roof of the mouth. v. Tongue: Provides the floor of the oral cavity.	

Checks on Learning: Anatomy of the Mouth Challenge

Type	Question	Correct Answer
Click N Place	Instructions: Your task is to match each description of a mouth anatomy part to its correct term. Click and place the terms from the right column to the corresponding descriptions on the left. Descriptions: 1. The lateral walls of the oral cavity, protected externally by skin and internally by a mucous membrane. 2. The fleshy folds around the opening of the mouth. 3. The anterior portion of the roof of the mouth. 4. An arch-shaped muscular partition comprising the posterior portion of the roof of the mouth. 5. Provides the floor of the oral cavity. Have fun identifying the anatomy of the mouth!	Answer Key: 1. The lateral walls of the oral cavity, protected externally by skin and internally by a mucous membrane: Cheeks 2. The fleshy folds around the opening of the mouth: Lips (labia) 3. The anterior portion of the roof of the mouth: Hard palate 4. An arch-shaped muscular partition comprising the posterior portion of the roof of the mouth: Soft palate 5. Provides the floor of the oral cavity: Tongue

3: DP_03 TLO_18 ELO_18-B LSA 3-4; Identify the components, functions, and anatomy of accessory organs that assist with digestion.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. The image illustrates the components, functions, and anatomy of the gastrointestinal tract. The gastrointestinal tract, often referred to as the digestive tract, is a complex system responsible for the digestion and absorption of food. The tract starts with the mouth, followed by the esophagus, stomach, small intestine, and large intestine. Associated organs like the liver, gallbladder, and pancreas are also shown. Each segment has distinct functions such as mechanical and chemical digestion, nutrient absorption, and waste elimination. Arrows depict the flow of food and digestive processes throughout this intricate pathway, highlighting the essential role of each component in the digestion and absorption of nutrients.
    b. Injuries/Parts of the body:
        i. Motivator
        ii. PE:
d. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 18-B: LSA 3-4
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_03 TLO_18 ELO_18-B LSA 3-4 Identify the components, functions, and anatomy of accessory organs that assist with digestion.

STRUCTURE	FUNCTION
1. Learning Step Activity a. Identify the anatomy of the pharynx. i. The pharynx is made up of skeletal muscle. ii. It is lined by a mucous membrane. iii. The pharynx has three parts: 1. Nasopharynx 2. Oropharynx 3. Laryngopharynx b. Define the esophagus and its anatomy. i. The esophagus is a collapsible muscular tube. ii. It links the pharynx and the stomach.	1. Learning Step Activity a. Define the function of the pharynx. i. The pharynx is a duct that serves as a passage for both food and air. ii. It starts at the internal nares, extends partway down the neck, and opens into the esophagus (posteriorly) and the larynx (anteriorly) iii. The pharynx is a crucial part of the swallowing process, where swallowed food passes through its different regions to reach the esophagus and stomach. b. Define the function of the esophagus. i. The esophagus is primarily responsible for transporting food from the pharynx to the stomach. ii. It does not participate in any digestive processes but secretes mucus to aid in the smooth passage of food to the stomach. c. Define swallowing (deglutition) and its function. i. Swallowing is the process of moving food from the mouth to the stomach. ii. During swallowing, muscles are activated to propel food downward, aided

	by the secretion of saliva and mucus in the mouth, pharynx, and esophagus. iii. Swallowing occurs in three stages: 1. Voluntary stage: The bolus is passed into the oropharynx actively by the person eating 2. Pharyngeal stage: The bolus passes through the pharynx into the esophagus involuntarily. This stage involves specific muscle contractions and protective measures to prevent food from entering the respiratory system. 3. Esophageal stage: The bolus is involuntarily moved through the esophagus into the stomach via peristalsis.

Checks on Learning: Swallowing Stages

Type	Question	Correct Answer
SRT	Digestive System Challenge - Swallowing Stages Question: Click and the place the stages of swallowing (deglutition) in the correct order of occurrence. Stages of Swallowing: • Pharyngeal stage • Esophageal stage • Voluntary stage	**Answer Key** 1. Voluntary stage 2. Esophageal stage 3. Pharyngeal stage

4: DP_04 TLO_18 ELO 18-C, LSA 1-2 Identify the functions and processes of the digestive system.

- Initial Asset Requirements:
    a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
    b. Metahumans: Selected eMentor for the A&P course. Shurman
    c. Specific Assets:
        i. Images:
            1. n/a
        ii. 360 Images:
            1. 2D Stomach Structure: In a 2D representation, the stomach appears as a curved, muscular sac situated in the upper abdomen, just below the ribcage. It is a vital organ within the digestive system. The stomach's internal structure includes various layers of tissues, each with its own function. The innermost lining is composed of mucous membrane, which has numerous small folds known as rugae when the stomach is empty. These rugae expand as the stomach fills with food.
            2. 3D Stomach Structure: In a 3D representation, the stomach has a more three-dimensional aspect. It is shaped like a flattened and elongated pouch, with a wider upper portion known as the fundus, a central body region, and a narrower lower portion called the pylorus. The cardiac sphincter at the top connects the stomach to the esophagus, while the pyloric sphincter at the bottom connects the stomach to the small intestine. The stomach's muscular walls allow it to contract and expand, aiding in the mechanical breakdown of food through a process known as churning. The stomach also secretes gastric juices containing hydrochloric acid and enzymes, facilitating chemical digestion. The stomach's unique combination of muscular activity and secretions plays a crucial role in breaking down food into a semi-liquid mixture known as chyme, which is further processed in the small intestine for nutrient absorption. Whether viewed in 2D or 3D, the stomach's structure and function are essential for the initial stages of digestion, preparing ingested food for further processing along the gastrointestinal tract.
    d. Injuries/Parts of the body:
        iii. Motivator
        iv. PE
e. Content and Strategies
    a. LSA Information: [LA and ELO] ELO_18-C LSA 1-2 the components, functions, and anatomy of the digestive system.

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_04 TLO_18 ELO 18-C, LSA 1-2 Identify the functions and processes of the digestive system.

Structure	Function
a. Identify the anatomy of the stomach: i. Cardia: Links the opening of the esophagus to the bladder of the stomach. ii. Fundus: The rounded portion located superiorly and to the left of the cardia, responsible for storing stomach gases iii. Body: The large central portion of the stomach associated with holding food. iv. Pylorus: The lowest part of the stomach, connecting it to the duodenum and controlling the transfer of food to the small intestine. v. Pyloric antrum: Connects to the body of the stomach. 1. Pyloric canal: Leads to the third region of the pylorus. 2. Pyloric sphincter: Connects to the duodenum.	a. Define the stomach and its function. i. The stomach is a J-shaped enlargement in the GI tract, connecting the esophagus at the top and the duodenum (first part of the small intestine) at the bottom. ii. Functions of the stomach include: 1) Forming chyme: Mixing saliva, food, and gastric juice to create a semi-fluid mixture for further digestion. 2) Holding food in reserve: Temporarily storing food before it moves into the small intestine. 3) Secreting gastric juice: A mixture containing hydrochloric acid (HCl), pepsin, intrinsic factor, and gastric lipase, which helps in protein digestion, absorption of

	vitamin B12, and digestion of fats, and aids in killing bacteria. 4) Secreting gastrin: A hormone released into the blood to regulate stomach functions.

Checks on Learning: Stomach Anatomy Challenge

Type	Question	Correct Answer
Click –n- Place	Check on Learning Stomach Anatomy Challenge Instructions: Click and place the parts of the stomach onto the correct descriptions. Parts of the Stomach: a. Cardia b. Fundus c. Body d. Pylorus e. Pyloric antrum f. Pyloric canal g. Pyloric sphincter	a. Links the opening of the esophagus to the bladder of the stomach. - Cardia b. The rounded portion located superiorly and to the left of the cardia, responsible for storing stomach gases. - Fundus c. The large central portion of the stomach associated with holding food. - Body d. The lowest part of the stomach, connecting it to the duodenum and controlling the transfer of food to the small intestine. - Pylorus e. Connects to the body of the stomach. - Pyloric antrum f. Leads to the third region of the pylorus. - Pyloric canal g. Connects to the duodenum. - Pyloric sphincter

5: DP_05 TLO_18 ELO_18-C LSA 3 4 Identify the components, functions, and anatomy of the digestive system.

Initial Asset Requirements:

Scene Descriptor: Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.

Metahumans: Selected eMentor for the A&P course. Shurman

Specific Assets:

Images:

n/a

360 images:

In this 2D image, you can see a detailed cross-sectional view of the small intestine. The small intestine is a long, convoluted tube that is intricately folded to maximize its surface area. The image depicts the three main sections of the small intestine: the duodenum, jejunum, and ileum. These sections are labeled and differentiated by their varying lengths and positions. Structure of the Small Intestines: The small intestines are a long, coiled tube located in the abdominal cavity. They are divided into three sections: the duodenum, the jejunum, and the ileum.

a. Duodenum: This is the first and shortest section of the small intestine. It receives partially digested food from the stomach and mixes it with digestive enzymes from the pancreas and bile from the liver to continue the digestion process.
b. Jejunum: The middle section of the small intestine is where most of the nutrient absorption takes place. Its walls are lined with finger-like projections called villi, which increase the surface area for absorption. Nutrients like carbohydrates, proteins, and fats are absorbed through the villi and enter the bloodstream.
c. Ileum: The final section of the small intestine connects to the large intestine. It continues the absorption of nutrients and also absorbs vitamin B12, bile salts, and any remaining nutrients.
d. Function of the Small Intestines: The small intestines play a crucial role in the digestion and absorption of nutrients from the food we consume. Here's an overview of their functions:
e. Digestion: The small intestines continue the digestion process that starts in the stomach. Enzymes from the pancreas and bile from the liver are mixed with the partially digested food in the duodenum. These enzymes break down carbohydrates, proteins, and fats into smaller molecules that can be absorbed.

f. Absorption: The walls of the small intestines are lined with villi and microvilli, which greatly increase the surface area available for absorption. Nutrients, including glucose, amino acids, fatty acids, vitamins, and minerals, are absorbed through the walls of the small intestines and transported into the bloodstream.
g. Nutrient Transport: Once absorbed, the nutrients are transported through the bloodstream to various cells and tissues in the body, where they are used for energy, growth, and repair.
h. Vitamin and Mineral Absorption: In addition to nutrients, the small intestines also absorb important vitamins like vitamin B12 and certain minerals such as iron.
i. Waste Formation: As digestion and absorption occur, indigestible substances and waste products move through the small intestines and into the large intestine for eventual elimination.

d. Injuries/Parts of the body:
    i. Motivator
    ii. PE

f. Content and Strategies
    a. LSA Information: [LA and ELO] ELO_18-C LSA 3 4
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content

5: DP_05 TLO_18 ELO_18-C LSA 3-4 Identify the components, functions, and anatomy of the digestive system.

STRUCTURE	FUNCTION
Learning Step/Activity 9 a. Identify the anatomy of the small intestine: i. Duodenum: A C-shaped tube that begins at the pyloric sphincter of the stomach and extends until it merges with the jejunum. ii. Jejunum: Follows the duodenum and is part of the small intestine.	Learning Step/Activity 9 a. Define the small intestine and its function. i. The small intestine is a long tube in the GI tract that starts at the pyloric sphincter of the stomach, passes through the abdominal/peritoneal cavity, and ends at the large intestine. ii. The small intestine plays a vital role in the digestion and absorption of nutrients.

iii. Ileum: Connects the jejunum to the large intestine.	b. Functions of the small intestine include: i. Segmentation movements: These contractions mix and break down chyme with digestive juices and bring the food into contact with the mucosa for absorption. Peristalsis, overall, propels chyme through the small intestine. ii. Digestion of nutrients: The small intestine completes the digestion of carbohydrates, proteins, and lipids. Additionally, it initiates the digestion of nucleic acids. iii. Absorption: The small intestine is responsible for absorbing approximately 90% of the nutrients and water that pass through the digestive system.

Checks on Learning: Small Intestine Anatomy & Function Challenge

Type	Question	Correct Answer
Matching	**Small Intestine Anatomy & Function Challenge** Instructions: Match the following descriptions to the correct part or function of the small intestine. Descriptions: 1. A C-shaped tube that begins at the pyloric sphincter of the stomach. 2. Connects to the large intestine. 3. Completes the digestion of carbohydrates, proteins, and lipids. 4. Responsible for absorbing approximately 90% of the nutrients and water.	Answers: 1. A C-shaped tube that begins at the pyloric sphincter of the stomach. Answer: A. Duodenum 2. Connects to the large intestine. Answer: C. Ileum 3. Completes the digestion of carbohydrates, proteins, and lipids. Answer: E. Digestion of nutrients

	5. Contractions that mix and break down chyme with digestive juices. 6. Follows the duodenum and is part of the small intestine. 7. Initiates the digestion of nucleic acids. 8. Propels chyme through the small intestine.	4. Responsible for absorbing approximately 90% of the nutrients and water. Answer: F. Absorption 5. Contractions that mix and break down chyme with digestive juices. Answer: D. Segmentation movements 6. Follows the duodenum and is part of the small intestine. Answer: B. Jejunum 7. Initiates the digestion of nucleic acids. Answer: H. Digestion of nucleic acids 8. Propels chyme through the small intestine. Answer: G. Peristalsis

6: DP_06 TLO_18 ELO_18-C: LSA 5-6: Identify the functions and processes of the digestive system.

Initial Asset Requirements:

a. Scene Descriptor: Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: In this 2D image, you can observe a detailed cross-sectional view of the large intestine, also known as the colon. The large intestine is a thick and muscular tube that forms the final part of the digestive tract. The image showcases the distinct regions of the large intestine, including the ascending colon, transverse colon, descending colon, sigmoid colon, and rectum. The walls of the large intestine are marked by numerous pouch-like structures known as haustra, which give the intestine its segmented appearance. These haustra are separated by bands of muscle called taeniae coli. The cecum, a pouch-like structure that connects the small intestine to the colon, is also visible in the lower-right part of the image. Towards the bottom of the image, you can see the rectum, which is the terminal portion of the large intestine. The rectum serves as a temporary storage site for feces before elimination.
        2. 3D Image Description: In this 3D image, you can explore the large intestine from a three-dimensional perspective. The intestine is depicted in its characteristic coiled shape, looping through the abdominal cavity. The outer layer of the intestine is muscular and helps with the movement of material through the colon. As you virtually navigate through the image, you'll notice the different segments of the large intestine, each marked by its unique features. The ascending colon, transverse colon, descending colon, sigmoid colon, and rectum are all clearly visible, showing the path that waste material takes as it moves through the colon. Prominently displayed are the haustra, which create the segmented appearance of the large intestine. These segments expand and contract as the colon propels waste toward the rectum. The taeniae coli, the longitudinal bands of muscle, are visible as well. Towards the end of the image, the rectum is depicted. This terminal portion of the large intestine is larger and wider, designed to temporarily store feces before they are eliminated from the body. This detailed representation of the large intestine emphasizes its essential role in the final stages of digestion, water absorption, and waste elimination within the human digestive system.

d. Injuries/Parts of the body:
    iii. Motivator
    iv. PE:

g. Content and Strategies
    a. LSA Information: [LA and ELO] ELO_18-C: LSA 5-6,
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_06 TLO_18 ELO_18-C: LSA 5-6, Identify the functions and processes of the digestive system.

STRUCTURE	FUNCTION
Learning Step/Activity a. Identify the anatomy of the large intestine: i. Cecum: Hangs inferior to the ileocecal valve. ii. Colon: A long tube that merges with the open end of the cecum and is divided into four parts: 1. Ascending portion 2. Transverse portion 3. Descending portion 4. Sigmoid portion b. Rectum: Lies anterior to the sacrum and coccyx. c. Anal canal: The terminal end of the large intestine, arranged in longitudinal folds.	01. Learning Step/Activity a. Define the large intestine and its function. i. The large intestine is the final portion of the GI tract, extending from the ileum of the small intestine to the anus. ii. Functions of the large intestine include: 1. Haustral churning, peristalsis, and mass peristalsis drive the contents of the colon into the rectum. 2. Bacteria in the large intestine convert proteins to amino acids, break down amino acids, and produce some B vitamins and vitamin K. 3. Absorption of some water, ions, and vitamins takes place in the large intestine. 4. The large intestine is responsible for the formation of feces. 5. It plays a role in the process of defecation, which involves emptying the rectum.

Checks on Learning: Anatomy Adventure

TYPE	QUESTION	CORRECT ANSWER
MC	You find yourself inside the Trivia Maze, an intricate labyrinth of knowledge. To proceed, you must correctly answer questions about anatomy. You stand at the entrance of the maze, and two paths lie before you. Path A: Cecum Conundrum You take Path A and encounter a signpost with a question: "Which part of the large intestine hangs inferior to the ileocecal valve?" Path B: Function Junction You take Path B and come across a signpost with a question: "What is one of the functions of the large intestine related to water and vitamin absorption?" Path C: Enzyme Expedition You take Path C and encounter a signpost with a question: "Which enzyme present in saliva helps break down carbohydrates in the mouth?"	Path A: Cecum Conundrum The correct answer is: B) Cecum Path B: Function Junction The correct answer is: C) Absorption of water, ions, and vitamins Path C: The enzyme present in saliva that helps break down carbohydrates in the mouth is called "amylase." It plays a crucial role in the initial digestion of starches and other complex carbohydrates, breaking them down into simpler sugars for further processing in the digestive system.

7: DP_07 TLO_18 ELO C: LSA 7-8: Identify the components, functions, and anatomy of accessory organs that assist with digestion.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. Image of function
        2. Image of structure
    ii. 360 Images:
        1. 2D Image Description: In this 2D image, you can observe a detailed depiction of the accessory organs that play a crucial role in the process of digestion. The image showcases these organs in relation to the digestive system. The liver is prominently featured on the upper right side of the image. Its distinct lobes are visible, and the gallbladder is positioned beneath it. The gallbladder is a small, pear-shaped organ that stores bile produced by the liver. A duct connects the gallbladder to the duodenum, facilitating the release of bile into the digestive tract to aid in fat digestion. Moving to the upper left side of the image, you can see the pancreas. It is elongated and extends horizontally across the abdomen. The pancreas is both an endocrine and exocrine organ. Its exocrine function involves producing digestive enzymes that are released into the duodenum to further break down carbohydrates, proteins, and fats.
        2. 3D Image Description: In this 3D image, you can explore the accessory organs that assist in digestion from a multidimensional perspective. The liver takes center stage on the right side of the image, with its lobes and distinct coloration. The gallbladder is positioned just below the liver and is connected by a duct. As you navigate through the image, the pancreas comes into view on the left side. It is elongated and has a dual function, making it a significant digestive organ. The exocrine portion of the pancreas, responsible for producing digestive enzymes, is evident. These enzymes aid in breaking down various nutrients in the small intestine. Both the liver and pancreas are closely connected to the digestive process, as the liver produces bile to emulsify fats and the pancreas secretes enzymes for breaking down food particles. This comprehensive representation of the accessory digestive organs underscores their essential contributions to the breakdown and absorption of nutrients within the human body.
d. Injuries/Parts of the body:

i. Motivator
ii. PE

h. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 18-C: LSA 7-8
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_07 TLO_18 ELO C: LSA 7-8 Identify the components, functions, and anatomy of accessory organs that assist with digestion.	
STRUCTURE	**FUNCTION**

Learning Step/Activity	Learning Step/Activity
a. Identify the anatomy of teeth: i. Crown: The visible portion of the tooth above the level of the gums. ii. Roots: Embedded in the socket, there can be one to three roots per tooth. iii. Neck: The constricted junction of the crown and root near the gum line. b. Define tongue and its anatomy: i. The tongue is a large skeletal muscle covered by mucous membrane found on the floor of the oral cavity. ii. It has two lateral halves separated by a median septum that extends the entire length of the tongue. iii. The tongue is attached inferiorly to the hyoid bone, styloid process of the temporal bone, and mandible. iv. Both sides of the tongue have identical extrinsic and intrinsic muscles.	a. Identify the purpose of the accessory digestive organs. i. Teeth physically break down food by cutting, shredding, crushing, and grinding it. ii. The tongue assists in chewing and swallowing. b. Define teeth and their function. i. Teeth are composed of calcified connective tissue embedded in bony sockets (alveolar processes). ii. Gingivae (gums) cover the alveolar processes and extend partly into the sockets. iii. Periodontal ligament lines the sockets, anchoring the teeth and acting as a shock absorber during chewing. c. Define tongue and its function. i. The tongue, with its associated muscles, forms the floor of the oral cavity and helps in chewing and swallowing. ii. Extrinsic muscles of the tongue facilitate lateral movement, in-and-out movement, shaping of food, and pushing food to the back of the mouth for swallowing. They also maintain the tongue's position and form the floor of the mouth.

	iii. Intrinsic muscles of the tongue change its shape and size for swallowing and speech.

Checks on Learning: Teeth and Tongue Challenge

Type	Question	Correct Answer
MC	Level 1: Teeth Anatomy Question 1: What is the visible portion of the tooth above the level of the gums called? Question 2: How many roots can a tooth have, embedded in its socket? Question 3: What is the constricted junction of the crown and root near the gum line known as? Question 4: What term describes the calcified connective tissue in which teeth are embedded? Level 2: Tongue Anatomy and Function Question 5: What is the primary purpose of the tongue in the digestive process? Question 6: The tongue is a large skeletal muscle covered by: Question 7: What anatomical structure separates the two lateral halves of the tongue? Question 8: Which type of muscles change the shape and size of the tongue for functions like swallowing and speech?	Answer Key and Student Feedback Question 1: What is the visible portion of the tooth above the level of the gums called? Answer: c) Crown Question 2: How many roots can a tooth have, embedded in its socket? Answer: b) Two Question 3: What is the constricted junction of the crown and root near the gum line known as? Answer: c) Neck Question 4: What term describes the calcified connective tissue in which teeth are embedded? Answer: a) Alveolar process Level 2: Tongue Anatomy and Function Question 5: What is the primary purpose of the tongue in the digestive process?

		Answer: c) Chewing food Question 6: The tongue is a large skeletal muscle covered by: Answer: c) Mucous membrane Question 7: What anatomical structure separates the two lateral halves of the tongue? Answer: c) Median septum Question 8: Which type of muscles change the shape and size of the tongue for functions like swallowing and speech? Answer: b) Intrinsic muscles

8: DP_08 TLO_18 ELO C: LSA 9-10 Identify the functions and processes of the digestive system.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: In this 2D image, you can see a detailed illustration of the salivary glands, which are essential structures in the oral cavity. The image depicts the major salivary glands: the parotid glands, submandibular glands, and sublingual glands. The parotid glands are visible on both sides of the face, near the ears. They are the largest of the salivary glands. The submandibular glands are positioned beneath the mandible, and the sublingual glands are located beneath the tongue. Ducts from each gland are shown extending towards the oral cavity, allowing saliva to be released and aid in the digestive process. Saliva is produced in these glands and contains enzymes that begin the breakdown of food, as well as lubricating components to facilitate swallowing.
        2. 3D Image Description: In this 3D image, you can explore the salivary glands from various angles, providing a more dynamic view of their spatial arrangement within the head and neck region. The parotid glands are prominent on each side of the face, with their distinctive shape and location. The submandibular glands are showcased beneath the mandible, and the sublingual glands are depicted underneath the tongue. These glands collectively contribute to the production of saliva, which is essential for various functions, including digestion and maintaining oral health. Ducts originating from the glands are evident, illustrating their pathway towards the oral cavity. These ducts transport saliva, which contains enzymes that initiate the digestion of starches and other components of ingested food. This comprehensive representation of the salivary glands emphasizes their vital role in the digestive process and overall oral well-being.
d. Injuries/Parts of the body:
    i. Motivator
    ii. PE

i. Content and Strategies

a. LSA Information: [LA and ELO] ELO C: LSA 9-10
b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_08 TLO_18 ELO C: LSA 9-10 Identify the functions and processes of the digestive system.

STRUCTURE	FUNCTION
Learning Step/Activity a. Identify the anatomy of salivary glands: i. Parotid glands: Found inferior and anterior to the ears, between the skin and the masseter muscle. ii. Parotid glands secrete saliva into the oral cavity via a parotid duct that pierces the buccinator muscle, opening into the vestibule opposite the second maxillary (upper) molar tooth. b. b. Submandibular glands: Located in the floor of the mouth, medial and partly inferior to the body of the mandible. i. The submandibular ducts run under the mucosa on either side of the midline of the floor of the mouth, entering the oral cavity proper lateral to the lingual frenulum. c. Sublingual glands: Located beneath the tongue and superior to the submandibular glands. i. The lesser sublingual ducts enter into the floor of the mouth in the oral cavity proper.	Learning Step/Activity a. Define salivary glands and their function. b. Salivary glands release a secretion called saliva into the oral cavity. c. Saliva serves multiple functions: i. Maintaining the moisture of the mucous membranes of the mouth and pharynx. ii. Cleaning the mouth and teeth. iii. Increasing in response to food to initiate the chemical breakdown of food.

Checks on Learning: Glands Round Up

Type	Question	Correct Answer
MC	**Level 1** Question 1: Where are the parotid glands located in relation to the ears? Question 2: How do parotid glands release saliva into the oral cavity? Question 3: Where are the submandibular glands located? Question 4: How do submandibular ducts enter the oral cavity? Question 5: Where are the sublingual glands located? Question 6: How do lesser sublingual ducts enter the oral cavity? Level 2: Salivary Glands Function Question 7: What is the primary function of salivary glands? Question 8: Which of the following is NOT a function of saliva? Question 9: What triggers an increase in saliva production?	**Level 1** Question 1: Where are the parotid glands located in relation to the ears? Answer: c) Inferior and anterior Question 2: How do parotid glands release saliva into the oral cavity? Answer: b) Via a parotid duct Question 3: Where are the submandibular glands located? Answer: b) Inferior to the body of the mandible Question 4: How do submandibular ducts enter the oral cavity? Answer: a) Lateral to the lingual frenulum Question 5: Where are the sublingual glands located? Answer: c) Beneath the tongue Question 6: How do lesser sublingual ducts enter the oral cavity? Answer: d) Through the buccinator muscle Level 2: Salivary Glands Function Question 7: What is the primary function of salivary glands?

		Answer: a) Initiating digestion of food Question 8: Which of the following is NOT a function of saliva? Answer: c) Aiding in vision Question 9: What triggers an increase in saliva production? Answer: c) Chewing gum

9: DP_09 TLO_18 ELO C: LSA 11-12 Identify the functions and processes of the digestive system.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. Image of function
        2. Image of structure
    ii. 360 Images:
        1. 2D Image Description: In this 2D image of the liver, you'll see a cross-sectional view that highlights the organ's internal structures. The liver appears as a reddish-brown organ with a smooth surface. The image showcases different segments of the liver, including the left and right lobes. Blood vessels, indicated by branching lines, are visible within the liver tissue. Gallbladder, bile ducts, and hepatic veins might also be discernible in the image, providing context to the liver's function in metabolism and bile production.
        2. 3D Image Description: In this 3D image of the liver, you'll experience a more comprehensive view that offers depth and perspective. The liver is a three-dimensional organ with various features. The surface of the liver is not uniform; instead, it displays a mix of lobes, fissures, and impressions. The left and right lobes are distinct, and you can observe the connections between them. Blood vessels, including the portal vein and hepatic artery, are shown branching throughout the liver tissue. The gallbladder, connected to the liver by bile ducts, may also be visible. This 3D representation helps in visualizing the liver's complex anatomy and its vital role in detoxification, digestion, and metabolic processes.
d. Injuries/Parts of the body:
    iii. [describe any injuries that will be visible or close-ups of body parts]
    iv. [Example: Irritated skin on their back and has developed blisters on their feet, irritated skin on their back so severely that it has led to bleeding.]
    v.
j. Content and Strategies
    a. LSA Information: [LA and ELO] ELO C: LSA 11-12

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_09 TLO_18 ELO C: LSA 11-12 Identify the functions and processes of the digestive system.

STRUCTURE	FUNCTION
a. Identify the anatomy of the liver: i. When viewed from above, two lobes are visible: the right and the left. ii. When viewed from below, two additional lobes are found under the right lobe: the caudate lobe and quadrate lobe. b. The major functional cells of the liver are hepatocytes, responsible for various metabolic, secretory, and endocrine functions. c. Bile canaliculi are small ducts between hepatocytes that collect bile produced by the hepatocytes. d. Blood flow in the liver is through hepatic sinusoids, permeable blood capillaries receiving oxygenated blood from the hepatic artery and nutrient-rich deoxygenated blood from the hepatic portal vein. e. Identify the anatomy of the gallbladder:	a. Define the liver and its function. b. The liver, situated under the diaphragm in the right upper quadrant, performs numerous essential functions: i. Bile production: To aid in the digestion of lipids and waste removal. ii. Synthesis of plasma proteins. iii. Interconversion of nutrients. iv. Detoxification of substances. v. Storage of glycogen, iron, and vitamins. vi. Phagocytosis of worn-out blood cells and bacteria. vii. Synthesis of the active form of vitamin c. Define the gallbladder and its function. i. The gallbladder, located below the liver, stores bile and empties it through the cystic duct when needed for digestion.

i. Fundus: Projects inferiorly beyond the inferior border of the liver. ii. Body: The central portion of the gallbladder. iii. Neck: The tapered portion connecting to the cystic duct. f. Identify the anatomy of the pancreas: i. Head: The expanded portion of the pancreas near the curve of the duodenum. ii. Body: Located superior to and to the left of the head. iii. Tail: Positioned superior to and to the left of the head and body.	d. Define the pancreas and its function. i. The pancreas, a soft oblong organ along the greater curvature of the stomach, serves as both an exocrine gland, secreting pancreatic juice, and an endocrine gland, producing insulin, glucagon, somatostatin, and pancreatic polypeptide.

Checks on Learning: Digestive Organ Explorer

Type	Question	Correct Answer
MC	Check on Learning: Digestive Organ Explorer As you explore the fascinating world of the liver, gallbladder, and pancreas, your understanding of their anatomy and functions will guide you. Your expertise in these organs' roles in digestion and metabolism is pivotal. Let's see how well you can navigate the complexities of digestive organs! Level 1: Anatomy of Liver, Gallbladder, and Pancreas Question 1: How many lobes are visible when the liver is viewed from above?	Answer Key Level 1: Anatomy of Liver, Gallbladder, and Pancreas Question 1: How many lobes are visible when the liver is viewed from above? Answer: b) Two lobes Question 2: Which two additional lobes are found under the right lobe of the liver when viewed from below? Answer: a) Quadrate lobe and caudate lobe

	Question 2: Which two additional lobes are found under the right lobe of the liver when viewed from below? Question 3: What are the major functional cells of the liver called? Question 4: What are bile canaliculi? Question 5: How is blood flow in the liver facilitated? Question 6: Where is the fundus of the gallbladder located? Question 7: Which part of the pancreas is located near the curve of the duodenum? Level 2: Functions of Liver, Gallbladder, and Pancreas Question 8: What is the primary function of the liver? Question 9: What is the function of the gallbladder? Question 10: The pancreas serves as both an exocrine gland and an endocrine gland. What does it secrete as an exocrine gland?	Question 3: What are the major functional cells of the liver called? Answer: d) Hepatocytes Question 4: What are bile canaliculi? Answer: c) Small ducts between hepatocytes collecting bile Question 5: How is blood flow in the liver facilitated? Answer: c) Through hepatic sinusoids Question 6: Where is the fundus of the gallbladder located? Answer: c) Inferiorly beyond the liver's border Question 7: Which part of the pancreas is located near the curve of the duodenum? Answer: a) Head Level 2: Functions of Liver, Gallbladder, and Pancreas Question 8: What is the primary function of the liver? Answer: a) Synthesis of plasma proteins Question 9: What is the function of the gallbladder? Answer: c) Storing bile

		Question 10: The pancreas serves as both an exocrine gland and an endocrine gland. What does it secrete as an exocrine gland? Answer: c) Pancreatic juice

10: DP_10 TLO_18 ELO C: LSA 13-14 Identify the functions and processes of the digestive system.

Initial Asset Requirements:

d. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
e. Metahumans: Selected eMentor for the A&P course. Shurman
f. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Description of Digestive System Functions: Imagine a flat diagram depicting the digestive system's functions. At the top, you have the mouth where mechanical digestion starts through chewing. Enzymes in saliva begin breaking down carbohydrates. The diagram shows a tube-like structure representing the esophagus, which carries the chewed food to the stomach. In the stomach, gastric juices aid in breaking down proteins. The diagram then portrays the small intestine, where most digestion and nutrient absorption occur. Enzymes from the pancreas and bile from the liver help break down fats, proteins, and carbohydrates. Nutrients are absorbed into blood vessels and lymphatics. Further down the diagram, the large intestine is depicted, where water absorption takes place, and beneficial bacteria aid in digestion. The diagram concludes with the rectum and anus, where waste materials are eliminated.
        2. 3D Description of Digestive System Functions: Envision a dynamic 3D model of the digestive system. Starting at the mouth, the model demonstrates how the teeth and tongue mechanically break down food while enzymes in saliva initiate chemical digestion. The model then follows the food down the esophagus using peristaltic movements to reach the stomach. Here, gastric juices mix and churn food, breaking down proteins. The model then zooms into the small intestine, revealing its intricate folds and structures. Enzymes from the pancreas and bile from the liver enter to assist in further digestion. Nutrient molecules are shown being absorbed into the bloodstream through the intestinal walls. As the model travels through the large intestine, it highlights the absorption of water and the role of beneficial bacteria. Finally, the model illustrates the rectum and anus, showcasing the process of waste elimination.
g. Injuries/Parts of the body:
    i. n/a

k. Content and Strategies
    a. LSA Information: [LA and ELO] ELO C: LSA 13-14

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_10 TLO_18 ELO C: LSA 13-14: Identify the functions and processes of the digestive system.

STRUCTURE	FUNCTION
a. Identify the functions/processes performed by the digestive system: i. Ingestion: The process of taking foods and liquids into the mouth. ii. Secretion: The release of digestive aids, including water, acid, buffers, and enzymes, into the lumen of the GI tract. iii. Motility: The ability of the GI tract to mix and move material along its length through smooth muscle contractions and relaxations. iv. Digestion: The breaking down of food into its molecular components for use by body cells, involving mechanical and chemical processes. v. Absorption: The transition of the products of digestion from the lumen of the GI tract into the blood or lymph for circulation throughout the body. vi. Defecation: The expulsion of solid waste, known as feces or stool, from the body.	a. Define ingestion: i. Ingestion is the process of taking foods and liquids into the mouth. b. Define secretion: i. Secretion is the release of digestive aids, including water, acid, buffers, and enzymes, into the lumen of the GI tract. c. Define motility: i. Motility refers to the ability of the GI tract to mix and move material along its length through smooth muscle contractions and relaxations. This creates sectioning and propulsion of the food mass towards the anus. d. Define digestion: i. Digestion is the process of breaking down food into its molecular components for use by body cells. It involves both mechanical and chemical processes. ii. Mechanical digestion includes the physical destruction of food by teeth and churning movements in the small intestine

	iii. Chemical digestion involves the splitting of larger molecules by hydrolysis, carried out by enzymes produced by various digestive organs. e. Define absorption: i. Absorption is the process of transferring the products of digestion from the lumen of the GI tract into the blood or lymph for distribution throughout the body. ii. Not all substances require digestion before absorption. f. Define defecation: i. Defecation is the elimination of solid waste, including wastes, indigestible substances, bacteria, sloughed cells from the GI tract lining, and materials not absorbed during the digestive process. ii. The expelled material is called feces or stool.

Checks on Learning: Digestive System Quiz Challenge

Type	Question	Correct Answer
MC	1. What is the process of taking foods and liquids into the mouth called? 2. What is the release of digestive aids, including water, acid, buffers, and enzymes, into the GI tract lumen known as?	What is the process of taking foods and liquids into the mouth called? Correct Answer: c) Ingestion What is the release of digestive aids, including water, acid, buffers, and enzymes, into the GI tract lumen known as? Correct Answer: c) Secretion Which function of the digestive system involves mixing and moving material through smooth muscle contractions? Correct Answer: c) Motility

Type	Question	Correct Answer
	3. Which function of the digestive system involves mixing and moving material through smooth muscle contractions 4. What process breaks down food into its molecular components for use by body cells? 5. What is the expulsion of solid waste from the body known as?	What process breaks down food into its molecular components for use by body cells? Correct Answer: d) Digestion What is the expulsion of solid waste from the body known as? Correct Answer: d) Defecation

11: DP_11 TLO 18 ELO 18-D: LSA 1-2 Identify the impact of the digestive system on homeostasis.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance.
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: Imagine a flat diagram illustrating the impact of the digestive system on homeostasis. The diagram showcases the digestive system as a series of interconnected organs, starting from the mouth and ending at the anus. Arrows indicate the flow of food and digestive processes along the digestive tract. A separate section of the diagram displays the concept of homeostasis, with representations of various body systems like temperature regulation, blood sugar control, and pH balance. Lines connect the digestive system to these systems, symbolizing the influence of digestion on maintaining balance and stability within the body.
        2. 3D Image Description: Envision a dynamic 3D model representing the digestive system's impact on homeostasis. The digestive system is shown in detail, with the mouth, esophagus, stomach, small intestine, large intestine, and other associated organs. As food travels through the digestive tract, interactive arrows depict the release of enzymes, absorption of nutrients, and elimination of waste. Concurrently, other parts of the model display key homeostatic processes. For instance, a miniature representation of the body shows temperature-regulating mechanisms, insulin release to manage blood sugar, and pH regulation. You can observe connections between the digestive system and these processes, symbolizing how digestion influences and supports the body's overall balance.
d. Injuries/Parts of the body:
    iii. Motivator
    iv. PE:
l. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 18-D: LSA 1-2

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_11 TLO 18 ELO 18-D: LSA 1-2 Identify the impact of the digestive system on homeostasis.	
STRUCTURE	**FUNCTION**
01. Learning Step/Activity a. Identify how the digestive system impacts the other systems of the body to maintain homeostasis: i. Integumentary System: Excess dietary calories are stored as triglycerides (fats) in adipose cells in the dermis and subcutaneous layer. ii. Skeletal System: The small intestine absorbs dietary calcium and phosphorus salts required to build the bone's extracellular matrix. b. Muscular System: i. The liver can convert lactic acid (created by muscles during exercise) to glucose. ii. Protein processed by the digestive system is essential for muscle growth and development. c. Nervous System: i. Gluconeogenesis in the liver, along with digestion and absorption of dietary carbohydrates, provides glucose required for adenosine triphosphate (ATP) production by neurons. d. Endocrine System: i. The liver inactivates some hormones, ending their activity. ii. Pancreatic islets release insulin and glucagon.	01. Learning Step/Activity a. Identify how the digestive system impacts homeostasis of the whole body: i. The digestive system breaks down dietary nutrients into forms that can be absorbed and used by body cells to produce ATP and build body tissues. ii. It absorbs water, minerals, and vitamins needed for the growth and function of body tissues. iii. The digestive system eliminates waste from body tissues in feces.

iii. Cells in the mucosa of the stomach and small intestine release hormones that regulate digestive activities. iv. The liver produces angiotensinogen, a hormone that regulates blood pressure. e. Cardiovascular System: i. The GI tract absorbs excess water that helps maintain blood volume and iron needed for the synthesis of hemoglobin in red blood cells. ii. Bilirubin from hemoglobin breakdown is partially excreted in feces. iii. The liver synthesizes most plasma proteins. f. Lymphatic System and Immunity: i. Acidity of gastric juices destroys bacteria and most toxins in the stomach. ii. Lymphatic nodules in the lamina propria of the gastrointestinal tract destroy microbes. g. Respiratory System: i. Pressure of abdominal organs against the diaphragm helps expel air quickly during forced exhalation. h. Urinary System: i. Absorption of water by the GI tract provides the water needed to excrete waste products in urine. i. Reproductive System: i. Digestion and absorption provide adequate nutrients, including fats, for the normal development of reproductive structures, production of gametes (oocytes and sperm), and fetal growth and development during pregnancy.	

Checks on Learning: Homeostasis and Digestive System Quiz Challenge

Type	Question	Correct Answer
MC	How does the digestive system impact the Urinary System? How does the Digestive System impact the Endocrine System? Which system benefits from the acidity of gastric juices in the stomach? What is the role of the digestive system in the Muscular System? How does the Digestive System affect the Cardiovascular System?	A) Absorption of water by the GI tract provides the water needed for digestion. A) The liver produces angiotensinogen, a hormone that regulates blood pressure. B) Lymphatic System and Immunity C) Digestion provides nutrients essential for muscle growth. C) The GI tract absorbs excess water that helps maintain blood volume.

TRANSITION TO PATHOPHYSIOLOGY

12: DP_12 TLO_19 ELO_A LSA 1-2: Identify the cause of abdominal pain based on patient signs and symptoms.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significanc
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: Visualize a flat diagram illustrating the causes of abdominal pain. The diagram is divided into sections, each representing different potential causes of abdominal pain. One section depicts gastrointestinal causes, including gastritis, ulcers, and inflammatory bowel disease. Another section focuses on reproductive system causes, such as ovarian cysts and ectopic pregnancies. The urinary system-related causes, like kidney stones and urinary tract infections, are also highlighted. The diagram includes arrows connecting these causes to the abdominal region, indicating the source of pain. Labels and brief descriptions accompany each section, providing a comprehensive overview of the diverse factors contributing to abdominal discomfort.
        2. 3D Image Description: Envision a dynamic 3D model displaying the causes of abdominal pain. The model provides a lifelike representation of the abdominal cavity and its organs. Each organ associated with potential causes is displayed in detail, such as the stomach, intestines, ovaries, kidneys, and more. Interactive elements within the model allow you to zoom in on specific organs. For instance, you can explore the stomach and observe signs of gastritis or ulcers. Similarly, you can examine the reproductive organs for conditions like ovarian cysts. As you navigate through the model, text overlays provide information about the various causes and their effects. This three-dimensional view helps you understand how different factors within the body can lead to abdominal discomfort.
d. Injuries/Parts of the body:
    i. Motivator
    ii. PE
m. Content and Strategies
    a. LSA Information: [LA and ELO] ELO A: LSA 1-2

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_12 TLO_19 ELO_A LSA 1-2: Identify the cause of abdominal pain based on patient signs and symptoms.	
CONDITION	**SYMPTOMS**
Learning Step / Activity: a. Esophagitis i. Definition: Inflammation or infection of the esophagus ii. Causes: Reflux of gastric contents iii. Infectious organisms (e.g., Candida species, cytomegalovirus, herpes simplex virus) iv. Corrosive agents or direct contact with swallowed pills b. Gastroesophageal reflux disease (GERD) i. Definition: Constellation of symptoms or complications resulting from gastric contents reflux into the esophagus ii. Causes: Inadequate closure of lower esophageal sphincter after food enters the stomach c. Gastrointestinal hemorrhage i. Definition: Bleeding in the gastrointestinal tract ii. Causes: Vascular injury or erosion iii. Gastrointestinal disorders iv. Anticoagulant use v. Alcohol intake d. Gallstones (Biliary Tract Disease) i. Definition: Formation of stones in the gallbladder or biliary tract ii. Causes: Excessive cholesterol or bilirubin e. Appendicitis	Learning Step / Activity a. Severe pain with swallowing b. Dysphagia (difficulty swallowing) c. Nausea and vomiting d. Heartburn (burning sensation near the heart) e. Radiating pain to the back and neck f. Diaphoresis (excessive sweating), dyspnea (shortness of breath) g. Chronic cough and wheezing h. Abdominal distension and tenderness i. Black, tarry stools (melena) after bleeding stops j. Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic) k. Constant pain, worsens with movement (acute cholecystitis) l. Similar symptoms to acute cholecystitis (emphysematous cholecystitis) m. Asymptomatic but may have a history of colic attacks (chronic cholecystitis) n. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain (appendicitis) o. Anorexia, nausea, and vomiting (appendicitis) p. Pain, nausea, vomiting, and low-grade fever (diverticulitis Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation (small bowel obstruction) q. Severe abdominal pain (peritonitis)

i. Definition: Inflammation of the appendix ii. Causes: Luminal obstruction leading to bacterial overgrowth and distention f. Diverticular Disease, Diverticulosis, and Diverticulitis i. Definition: Inflammation of diverticula in the colon ii. Causes: Weakness in the muscularis of the colon wall g. Small bowel obstruction i. Definition: Bowel occlusion at one or more points in the small intestine ii. Causes: Entrapment of bowel in a hernia (closed-loop obstruction) h. Peritonitis i. Definition: Acute inflammation of the peritoneum ii. Causes: Contamination of the peritoneum by infectious microbes (bacteria)	r. Abdominal bloating and mild diffuse abdominal discomfort (functional constipation) s. Passage of hard stool and rectal bleeding (functional constipation)

Checks on Learning: Symptoms and Their Medical Causes Quiz

Type	Question	Correct Answer
MC	Symptoms: Severe pain with swallowing Which condition is most likely causing these symptoms? Symptoms: Nausea and vomiting Which condition is most likely causing these symptoms? Symptoms: Radiating pain to the back and neck Which condition is most likely causing these symptoms? Symptoms: Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic)	Question 1: a) Gastroesophageal reflux disease (GERD) Great job! You correctly identified the condition associated with the given symptoms. Question 2: d) Peritonitis Well done! You matched the symptoms to the appropriate condition accurately. Question 3:

Type	Question	Correct Answer
	Which condition is most likely causing these symptoms? Symptoms: Chronic cough and wheezing Which condition is most likely causing these symptoms? Symptoms: Abdominal distension and tenderness Which condition is most likely causing these symptoms? Symptoms: Diffuse periumbilical discomfort progressing to localized right lower quadrant pain Which condition is most likely causing these symptoms? Symptoms: Black, tarry stools (melena) after bleeding stops Which condition is most likely causing these symptoms? Symptoms: Constant pain, worsens with movement Which condition is most likely causing these symptoms? Symptoms: Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation Which condition is most likely causing these symptoms?	b) Gallstones (Biliary Tract Disease) Keep up the good work! Your understanding of the symptoms and their causes is impressive. Question 4: c) Gallstones (Biliary Tract Disease) Nice work! You demonstrated a solid understanding of how symptoms can point to specific conditions. Question 5: d) Gastroesophageal reflux disease (GERD) You're on the right track! Remember to carefully consider the symptoms to determine the correct condition.

13 DP_13 TLO_19 ELO 19-A LSA 3-4: Identify the cause of abdominal pain based on patient signs and symptoms.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance
b. Metahumans: Selected eMentor for the A&P course. Shurman
    a. Specific Assets:
        i. Images:
            1. n/a
        ii. 360 Images:
            1. 2D Image Description: Imagine a side-by-side diagram depicting the structure and function of a human body, juxtaposed with the impact of abdominal wounds and trauma on the digestive system. On the left side, you'll see a simplified anatomical diagram of the human body, highlighting major organs such as the stomach, intestines, liver, and spleen. Arrows and labels indicate the flow of food through the digestive tract and the key functions of each organ. On the right side, the diagram showcases the aftermath of abdominal wounds and trauma. This includes visual representations of external wounds, broken ribs, and internal injuries. Arrows connect these traumatic areas to the affected digestive organs, illustrating the disruption of their normal functions. Brief descriptions highlight the potential consequences, such as impaired digestion, internal bleeding, and organ dysfunction.
            2. 3D Image Description: Envision a dynamic 3D model presenting a side-by-side view of the human body's structure and function, along with the impact of abdominal wounds and trauma on the digestive system. The model provides intricate details of the body's internal systems. On one side, you can explore the digestive system, observing the movement of food, the secretion of digestive juices, and the absorption of nutrients. On the other side, the model displays the effects of abdominal wounds and trauma. You can zoom in to see the damaged areas, fractured bones, and bruised tissues. As you navigate through the model, interactive elements highlight the disrupted connections between the injured areas and the digestive organs. Text annotations provide explanations for how trauma can lead to complications like internal bleeding, inflammation, and reduced digestive function.
    b. Injuries/Parts of the body:
        i. Motivator;
        ii. PE:

c. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 19-A: LSA 3-4
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_13 TLO_19 ELO 19-A LSA 3-4: Identify the cause of abdominal pain based on patient signs and symptoms.

STRUCTURE	FUNCTION
Learning Step Activity a. Wounds: i. Evaluation Considerations for Stable Penetrating Trauma ii. Concerns with Penetrating Abdominal Trauma iii. Areas of Abdominal Injury iv. Approximate Percentage of Organs Injured with Penetrating Trauma b. Hypovolemic Shock: i. Overview of Circulatory Shock Types ii. Hypovolemic Shock - Hinshaw and Cox Classification iii. Signs and Symptoms of Hypovolemic Shock	Learning Step Activity a. Wounds: i. This section discusses the considerations used in evaluating patients with stable penetrating trauma, including factors such as the location of the injury, the type of weapon used, serial examinations, and the availability of local diagnostic and surgical resources. ii. It also addresses the primary concerns associated with penetrating abdominal trauma, which are peritonitis and hemodynamic instability. It explains how blood and abdominal organ contents released during trauma can cause inflammation and infection of peritoneal surfaces. The section also mentions that the energy expended causing the wound can indicate the extent of damage, with military weapons typically

	causing more damage than lower caliber weapons. iii. The areas of the abdomen where injury may occur are listed, along with the intraperitoneal and retroperitoneal organs that may be affected. iv. The approximate percentage of organs injured in different types of penetrating trauma (stab wounds and gunshot wounds) is provided. b. Hypovolemic Shock: i. This section introduces the concept of shock as the most severe circulatory dysfunction and explains that there are four types of circulatory shock: hypovolemic, cardiogenic, distributive, and obstructive. The focus is on hypovolemic shock. ii. It lists the different causes of hypovolemic shock based on the Hinshaw and Cox classification. iii. The section describes various signs and symptoms used to assess and diagnose hypovolemic shock, such as vital signs (respiratory rate, blood pressure, heart rate), orthostatic blood pressure, pulse pressure, and the importance of history and physical examination in identifying circulatory abnormalities.

Checks on Learning: Abdominal Wound Round Up

Type	Question	Correct Answer
MC	1. What are the primary concerns associated with penetrating abdominal trauma?	Answers: 1. Peritonitis and hemodynamic instability

	2. Which of the following is NOT a consideration for evaluating patients with stable penetrating trauma? 3. What is the main focus of the Hypovolemic Shock section? 4. In penetrating trauma, what factor can indicate the extent of damage caused by the wound? 5. What are the four types of circulatory shock mentioned in the content? 6. What do signs and symptoms of hypovolemic shock include? 7. Which classification is used to identify different causes of hypovolemic shock? 8. What can blood and abdominal organ contents released during trauma cause?	2. Availability of local diagnostic and surgical resources 3. Hypovolemic shock 4. The energy expended causing the wound 5. Hypovolemic, Cardiogenic, Distributive, and Obstructive shock 6. Orthostatic blood pressure, pulse pressure, and tachycardia 7. Hinshaw and Cox Classification 8. Peritonitis and hemodynamic instability

14: DP_14: TLO 19: ELO B: LSA 1-2: Identify the impact of abdominal wounds and other trauma on the digestive system.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: Imagine a flat diagram illustrating the effects of abdominal wounds and the body's reaction to trauma. The diagram shows a simplified representation of the abdomen, with visual indications of wounds, such as lacerations or punctures. Arrows and labels highlight the surrounding tissues, blood vessels, and organs potentially affected by the wounds. Adjacent to the depiction of wounds, another section of the diagram focuses on the body's reaction to trauma. This includes visual representations of inflammation, swelling, and the activation of the body's stress response. Captions provide concise explanations of the physiological changes that occur in response to trauma, such as increased heart rate and hormonal releases.
        2. 3D Image Description: Envision a dynamic 3D model presenting a detailed view of abdominal wounds and the body's reaction to trauma. The model provides a three-dimensional representation of the abdomen, allowing you to explore the layers of tissue, muscles, and organs. Some areas are highlighted to indicate wound sites, including variations in wound depth and severity. Adjacent to the wounded areas, the model showcases the body's reaction to trauma. You can observe the release of inflammatory markers, the dilation of blood vessels, and the activation of stress hormones. Interactive elements within the model allow you to focus on specific physiological changes and their impact on nearby structures. Text annotations provide explanations for the processes involved, such as how blood clotting is initiated to control bleeding.
b. Injuries/Parts of the body:
    i. Motivator
    ii. PE

d. Content and Strategies
    a. LSA Information: [LA and ELO] ELO 19-B: LSA 1-2
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content

DP_14: TLO 19: ELO B: LSA 1-2: Identify the impact of abdominal wounds and other trauma on the digestive system.

CONDITION	SYMPTOMS
Learning Step Activity b. Wounds: i. Evaluation Considerations for Stable Penetrating Trauma ii. Concerns with Penetrating Abdominal Trauma iii. Areas of Abdominal Injury iv. Approximate Percentage of Organs Injured with Penetrating Trauma c. Hypovolemic Shock: iv. Overview of Circulatory Shock Types v. Hypovolemic Shock - Hinshaw and Cox Classification vi. Signs and Symptoms of Hypovolemic Shock	02. Learning Step Activity a. Wounds: i. This section discusses the considerations used in evaluating patients with stable penetrating trauma, including factors such as the location of the injury, the type of weapon used, serial examinations, and the availability of local diagnostic and surgical resources. ii. It also addresses the primary concerns associated with penetrating abdominal trauma, which are peritonitis and hemodynamic instability. It explains how blood and abdominal organ contents released during trauma can cause inflammation and infection of peritoneal surfaces. The section also mentions that the energy expended causing the wound can indicate the extent of damage, with military weapons typically causing more damage than lower caliber weapons.

	iii. The areas of the abdomen where injury may occur are listed, along with the intraperitoneal and retroperitoneal organs that may be affected. iv. The approximate percentage of organs injured in different types of penetrating trauma (stab wounds and gunshot wounds) is provided. b. Hypovolemic Shock: i. This section introduces the concept of shock as the most severe circulatory dysfunction and explains that there are four types of circulatory shock: hypovolemic, cardiogenic, distributive, and obstructive. The focus is on hypovolemic shock. ii. It lists the different causes of hypovolemic shock based on the Hinshaw and Cox classification. iii. The section describes various signs and symptoms used to assess and diagnose hypovolemic shock, such as vital signs (respiratory rate, blood pressure, heart rate), orthostatic blood pressure, pulse pressure, and the importance of history and physical examination in identifying circulatory abnormalities.

Checks on Learning: Shock and Penetrating Trauma Knowledge Challenge

Type	Question	Correct Answer
MC	Question 1: What are the primary concerns associated with penetrating abdominal trauma? Question 2:	**Answer Key and Student Feedback** **01.** Peritonitis and hemodynamic instability

Type	Question	Correct Answer
	Which of the following is NOT a consideration for evaluating patients with stable penetrating trauma? Question 3: What is the main focus of the Hypovolemic Shock section? Question 4: In penetrating trauma, what factor can indicate the extent of damage caused by the wound? Question 5: What are the four types of circulatory shock mentioned in the content? Question 6: What do signs and symptoms of hypovolemic shock include? Question 7: Which classification is used to identify different causes of hypovolemic shock? Question 8: What can blood and abdominal organ contents released during trauma cause?	**02.** Availability of local diagnostic and surgical resources **03.** Hypovolemic shock **04.** The energy expended causing the wound **05.** Hypovolemic, Cardiogenic, Distributive, and Obstructive shock **06.** Orthostatic blood pressure, pulse pressure, and tachycardia **07.** Hinshaw and Cox Classification **08.** Peritonitis and hemodynamic instability

15: DP_15 TLO_19 ELO 19-C: LSA 1-2 Identify eating disorders.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significance
b. Metahumans: Selected eMentor for the A&P course. Shurman
    d. Specific Assets:
        i. Images:
            1. n/a
        ii. 360 Images:
            1. 2D Image Description: Visualize a flat diagram illustrating the digestive system alongside representations of common eating disorders. The digestive system is depicted as a series of interconnected organs, including the mouth, esophagus, stomach, small intestine, and large intestine. Arrows and labels highlight the flow of food and the key functions of each organ in the digestive process. Interwoven with the digestive system are depictions of eating disorders like anorexia nervosa, bulimia nervosa, and binge eating disorder. Visual cues indicate the characteristics of each disorder, such as distorted body image, excessive exercise, binge-purge cycles, and emotional triggers. Captions provide concise explanations of how these disorders can disrupt the normal digestive process and impact overall health.
            2. 3D Image Description: Envision a dynamic 3D model showcasing the digestive system and its relationship with eating disorders. The digestive system is presented in intricate detail, allowing you to explore the anatomical structure of each organ. As you navigate through the model, you can witness the movement of food, enzyme secretions, and nutrient absorption. Intertwined within the model are representations of individuals with eating disorders. Each disorder is visualized separately, providing a closer look at the behaviors and emotions associated with it. You can zoom in to observe the physical effects of these disorders on the body, such as malnutrition, organ damage, and electrolyte imbalances. Interactive elements offer insights into how eating disorders disrupt the digestive process and contribute to serious health consequences.
    e. Injuries/Parts of the body:
        i. Motivator
        ii. PE

e. Content and Strategies
    a. LSA Information: [LA and ELO] ELO C: LSA 1-2
    b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
    c. Adaptive Strategy: Job Aids for download for all instructional content
    d.

DP_15 TLO_19 ELO 19-C LSA 1-2: Identify eating disorders.

CONDITION	SYMPTOMS
Learning Step/Activity 1, Esophagitis **a.** Definition: Inflammation or infection of the esophagus **b.** Causes: Reflux of gastric contents, infectious organisms (e.g., Candida species, cytomegalovirus, herpes simplex virus), corrosive agents or direct contact with swallowed pills 2. Gastroesophageal reflux disease (GERD) **a.** Definition: Constellation of symptoms or complications resulting from gastric contents reflux into the esophagus **b.** Causes: Inadequate closure of lower esophageal sphincter after food enters the stomach 3. Gastrointestinal hemorrhage **a.** Definition: Bleeding in the gastrointestinal tract	Learning Step/Activity Symptoms: **a.** Severe pain with swallowing **b.** Dysphagia (difficulty swallowing) **c.** Nausea and vomiting **d.** Heartburn (burning sensation near the heart) **e.** Radiating pain to the back and neck **f.** Diaphoresis (excessive sweating), dyspnea (shortness of breath) **g.** Chronic cough and wheezing **h.** Abdominal distension and tenderness **i.** Black, tarry stools (melena) after bleeding stops **j.** Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic) **k.** Constant pain, worsens with movement (acute cholecystitis)

b. Causes: Vascular injury or erosion, gastrointestinal disorders, anticoagulant use, alcohol intake 4, Gallstones (Biliary Tract Disease) **a.** Definition: Formation of stones in the gallbladder or biliary tract **b.** Causes: Excessive cholesterol or bilirubin 4. Appendicitis **a.** Definition: Inflammation of the appendix **b.** Causes: Luminal obstruction leading to bacterial overgrowth and distention 5. Diverticular Disease, Diverticulosis, and Diverticulitis **a.** Definition: Inflammation of diverticula in the colon **b.** Causes: Weakness in the muscularis of the colon wall 6. Small bowel obstruction **a.** Definition: Bowel occlusion at one or more points in the small intestine **b.** Causes: Entrapment of bowel in a hernia (closed-loop obstruction) 7. Peritonitis **a.** Definition: Acute inflammation of the peritoneum **b.** Causes: Contamination of the peritoneum by infectious microbes (bacteria)	**l.** Similar symptoms to acute cholecystitis (emphysematous cholecystitis) **m.** Asymptomatic but may have a history of colic attacks (chronic cholecystitis) **n.** Diffuse periumbilical discomfort progressing to localized right lower quadrant pain (appendicitis) **o.** Anorexia, nausea, and vomiting (appendicitis) **p.** Pain, nausea, vomiting, and low-grade fever (diverticulitis) **q.** Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation (small bowel obstruction) **r.** Severe abdominal pain (peritonitis) **s.** Abdominal bloating and mild diffuse abdominal discomfort (functional constipation) **t.** Passage of hard stool and rectal bleeding (functional constipation)

Checks on Learning: Abdominal Pain and Symptoms Challenge

Type	Question	Correct Answer
Matching	Abdominal Pain and Symptoms Level: Instructions: In this assessment, you'll be presented with various conditions and their corresponding symptoms related to abdominal pain. Match each symptom with the correct condition. Select the correct condition from the list provided for each symptom. a. Esophagitis b. Gastroesophageal reflux disease (GERD) c. Gastrointestinal hemorrhage d. Gallstones (Biliary Tract Disease) e. Appendicitis f. Diverticular Disease, Diverticulosis, and Diverticulitis g. Small bowel obstruction h. Peritonitis Symptoms: a. Severe pain with swallowing b. Dysphagia (difficulty swallowing) c. Nausea and vomiting d. Heartburn (burning sensation near the heart) e. Radiating pain to the back and neck f. Diaphoresis (excessive sweating), dyspnea (shortness of breath) g. Chronic cough and wheezing h. Abdominal distension and tenderness i. Black, tarry stools (melena) after bleeding stops	Abdominal Pain and Symptoms Level **Answer Key and Learner Feedback** a. Esophagitis b. Gastrointestinal hemorrhage c. Gastroesophageal reflux disease (GERD) d. Gallstones (Biliary Tract Disease) e. Appendicitis f. Diverticular Disease, Diverticulosis, and Diverticulitis g. Small bowel obstruction h. Peritonitis i. Peritonitis j. Diverticular Disease, Diverticulosis, and Diverticulitis Student Feedback: Great job! You've successfully matched the symptoms with their corresponding conditions related to abdominal pain. Your understanding of these conditions and their symptoms is commendable. Keep up the good work!

	j. Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic) k. Constant pain, worsens with movement (acute cholecystitis) l. Similar symptoms to acute cholecystitis (emphysematous cholecystitis) m. Asymptomatic but may have a history of colic attacks (chronic cholecystitis) n. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain (appendicitis) o. Anorexia, nausea, and vomiting (appendicitis) p. Pain, nausea, vomiting, and low-grade fever (diverticulitis) q. Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation (small bowel obstruction) r. Severe abdominal pain (peritonitis) s. Abdominal bloating and mild diffuse abdominal discomfort (functional constipation) t. Passage of hard stool and rectal bleeding (functional constipation) Assessment: For each symptom below, select the correct condition from the list above. a. Severe pain with swallowing: b. Nausea and vomiting: c. Chronic cough and wheezing: d. Intermittent pain in the upper abdomen or radiating to the right shoulder blade: e. Abdominal distension and tenderness:	

	f. Black, tarry stools (melena) after bleeding stops: g. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain: h. Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation: i. Severe abdominal pain: j. Passage of hard stool and rectal bleeding:	

16: DP_16 TLO_19 ELO_19-D LSA 1-2: Identify the impact of biologic poisoning and liver toxicity on the digestive system.

Initial Asset Requirements:

a. Scene Descriptor: a detailed visual representation of the digestive system is displayed. The organs are clearly illustrated, showcasing their interconnectedness and functions. Labels and annotations provide additional context, highlighting key structures and their roles within the system. This comprehensive depiction offers learners a clear and interactive understanding of the digestive system's components and their significanc
b. Metahumans: Selected eMentor for the A&P course. Shurman
c. Specific Assets:
    i. Images:
        1. n/a
    ii. 360 Images:
        1. 2D Image Description: Envision a flat diagram illustrating the impact of biologic poisoning and liver toxicity on the digestive system. The digestive system is represented with key organs like the mouth, esophagus, stomach, and intestines. Alongside this representation, visual cues indicate the introduction of toxic substances from sources such as contaminated food or chemical exposure. Arrows connect the toxic substances to the liver, highlighting its role in detoxification. Labels and captions explain how the liver processes toxins and the potential consequences of liver toxicity. Additional visuals depict the digestive process being disrupted, with altered enzyme activity, inflammation, and impaired nutrient absorption.
        2. 3D Image Description: Imagine a dynamic 3D model showcasing the digestive system and its interaction with biologic poisoning and liver toxicity. The model provides a detailed view of the organs and structures involved in digestion, from the mouth to the intestines. Interactive elements allow you to focus on specific areas, such as the liver, where toxins are processed. As you explore the model, you can observe the impact of biologic poisoning and liver toxicity. Visual representations show toxic substances being transported from the digestive tract to the liver for detoxification. You can witness changes in liver tissue and cellular function due to toxicity. Text annotations provide insights into how these disruptions can lead to inflammation, impaired metabolism, and reduced bile production.
e. Injuries/Parts of the body:
    i. Motivator
    ii. PE
f. Content and Strategies

a. LSA Information: [LA and ELO] ELO D: LSA 1-2
b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body part specific to integumentary system, using hotspots to display content and the topic menu structure. Utilizing a combination of narration and on-screen text for an engaging self-paced learning experience.
c. Adaptive Strategy: Job Aids for download for all instructional content

DP_16 TLO_19 ELO_19-D LSA 1-2: Identify the impact of biologic poisoning and liver toxicity on the digestive system

CONDITION	SYMPTOMS
Condition: Anthrax Exposure 1. Anthrax is a globally distributed zoonotic disease caused by spores. 2. It begins in livestock and wild herbivores and can pass to humans. 3. Anthrax spores can enter the body through skin abrasions, ingestion, inhalation, and even drug injection. 4. Once inside the body, anthrax spores are phagocytosed by macrophages and can cause massive septicemia. 5. Clinical manifestations of anthrax include cutaneous, oropharyngeal-gastrointestinal, and inhalational forms. 6. Cutaneous anthrax shows as a self-limited edematous ulcer on the skin. 7. Oropharyngeal-gastrointestinal anthrax results from consuming contaminated animal products and affects the oropharynx and GI tract.	**Symptoms: Anthrax Exposure - Cutaneous, Oropharyngeal-Gastrointestinal, Inhalational Forms** 1. Cutaneous anthrax results in a self-limited edematous ulcer on the skin. 2. Oral and GI anthrax come from consuming contaminated animal products and cause ulcerative disease of the oropharynx and GI tract. 3. Inhalation anthrax is the most severe form, associated with deliberate biological attack through inhaling anthrax spores. 4. Inhalational form starts with protean systemic symptoms, rapidly advancing to mediastinitis, septic shock, meningitis, and death if untreated.

8. Inhalation anthrax is the most severe form and involves protean systemic symptoms, mediastinitis, septic shock, meningitis, and death if untreated.	

Checks on Learning: Anthrax on the Loose

Type	Question	Correct Answer
MC	Imagine you are a combat medic investigating a case of potential anthrax exposure. You notice that the patient has developed a self-limited edematous ulcer on the skin of an area that was in contact with infectious spores. They also complain of weakness, nausea, and malaise. Which form of anthrax exposure are they likely experiencing, and what are the symptoms associated with this form? **Options:** a. Cutaneous anthrax - Symptoms: Self-limited edematous ulcer, weakness, nausea, malaise. b. Inhalation anthrax - Symptoms: Weakness, nausea, malaise, septic shock. c. Oral and GI anthrax - Symptoms: Skin ulcer, septic shock, meningitis. d. Inhalation anthrax - Symptoms: Ulcerative disease of the oropharynx, mediastinitis. Explanation: In the scenario described, the patient is showing signs of cutaneous anthrax exposure. This form is characterized by the presence of a self-limited edematous ulcer on the skin in contact with infectious	**Correct Answer:** a. Cutaneous anthrax - Symptoms: Self-limited edematous ulcer, weakness, nausea, malaise. b. Inhalation anthrax - Symptoms: Weakness, nausea, malaise, septic shock. c. Oral and GI anthrax - Symptoms: Skin ulcer, septic shock, meningitis. d. Inhalation anthrax - Symptoms: Ulcerative disease of the oropharynx, mediastinitis.

	spores, along with constitutional symptoms like weakness, nausea, and malaise.	