



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

Module Title: The Digestive System		Date: 10/24/2023
<b>Product Deliverable(s):</b> <input checked="" type="checkbox"/> Preliminary Design Document <input type="checkbox"/> Detailed Design Document <input type="checkbox"/> Practical Exercise <input type="checkbox"/> Pre-Test <input type="checkbox"/> Answer Keys		<b>Design Team:</b> Anne-Marie Fiore, Ed.D. <b>PM:</b> Karin Bromley <b>Lead ISD:</b> Michelle Austin <b>Lead Developer:</b> Brandon Bates <b>Media Production Manager:</b> Madisyn Bradow <b>Lead QA:</b> Aimee Crouch
<b>Proponent: MEDCOE/DOTD</b>		<b>Courseware Link (if applicable):</b>
<b>Version number: 1.0</b>	<b>Phase:</b> <input checked="" type="checkbox"/> Draft Storyboard <input type="checkbox"/> Final Storyboard <input type="checkbox"/> Alpha IMI <input type="checkbox"/> Final IMI <input type="checkbox"/> Individual Trials <input type="checkbox"/> Group Trials <input type="checkbox"/> Final Packaging	
<b>TLO(s):</b>	TLO 18: Identify components, characteristics, and functions of the digestive system. TLO 19: Identify common digestive system pathophysiology.	
<b>ELO(s):</b>	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	10/24/2023	Initial Draft Submission	



## How to Use and Review this Preliminary Design Document

This document details the requirements for developing the eLearning module. Please download this file if you are viewing within Basecamp.

### Navigating the PDD

The easiest way to navigate the PDD is by using the Navigation Pane. It should automatically open upon opening the document. However, if it does not, you will need to take additional steps that will depend on whether you are opening the file in a browser or local application.

#### Browser instructions

Select the three-line menu in the upper left corner. The navigation pane will open with two options. The top icon allows you to navigate by page and the bottom allows you to navigate by component.

**MEDCoE 68W VLSP – Combat Medic Leadership Sustainment Course**  
**Module A: Decontamination Stations**

Module Title: Decontamination Stations		Date: 3/8/2023
<b>Product Deliverable(s):</b> <input checked="" type="checkbox"/> Storyboard <input type="checkbox"/> Practical Exercise <input type="checkbox"/> Pre-Test <input type="checkbox"/> Answer Keys	<b>Design Team:</b> Alexis Mayfield <b>PM:</b> Karin Bromley <b>Lead ISD:</b> Christy Case <b>Lead Developer:</b> Brandon Bates <b>Lead Graphic Designer:</b> Madisyn Bradow <b>Lead QA:</b> Aimee Crouch	
<b>Proponent:</b>	<b>Courseware Link (if applicable):</b>	
<b>Version number:</b> 1.0	<b>Phase:</b> <input checked="" type="checkbox"/> Draft Storyboard <input type="checkbox"/> Final Storyboard <input type="checkbox"/> Alpha IMI <input type="checkbox"/> Final IMI	<input type="checkbox"/> Individual Trials <input type="checkbox"/> Group Trials <input type="checkbox"/> Final Packaging
<b>TLO(s):</b>	Prepare a casualty decontamination station.	
<b>ELO(s):</b>	N/A	

**Version Control Log**

Version	Date	Changes & Comments	Update Author
1.0	3/8/2023	Initial Draft Submission	



## Local application instructions

If the navigation pane is not showing, press F4. This navigation pane contains three options for viewing. Select the middle icon, the bookmark, to navigate by component.

**MEDCoE 68W VLSP – Combat Medic Leadership Sustainment Course**  
**Module A: Decontamination Stations**

Module Title: Decontamination Stations		Date: 3/8/2023
<b>Product Deliverable(s):</b> <input checked="" type="checkbox"/> Storyboard <input type="checkbox"/> Practical Exercise <input type="checkbox"/> Pre-Test <input type="checkbox"/> Answer Keys		<b>Design Team:</b> Alexis Mayfield PM: Karin Bromley Lead ISD: Christy Case Lead Developer: Brandon Bates Lead Graphic Designer: Madisyn Bradow Lead QA: Aimee Crouch
<b>Proponent:</b>		<b>Courseware Link (if applicable):</b>
<b>Version number:</b> 1.0	<b>Phase:</b> <input checked="" type="checkbox"/> Draft Storyboard <input type="checkbox"/> Final Storyboard <input type="checkbox"/> Alpha IMI <input type="checkbox"/> Final IMI <input type="checkbox"/> Individual Trials <input type="checkbox"/> Group Trials <input type="checkbox"/> Final Packaging	
<b>TLO(s):</b>	Prepare a casualty decontamination station.	
<b>ELO(s):</b>	N/A	

**Version Control Log**

Version	Date	Changes & Comments	Update Author
1.0	3/8/2023	Initial Draft Submission	

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### Three (3) Sections

The PDD is composed of three (3) sections, including:

**Module Introduction Components:** This section contains a written summary of the module, the title of the module, objectives supported by the module, a brief description of the module introduction, details of the module motivator script, and a description of the establishing view and media for the module.

**Discussion Points:** The design of each Discussion Point will be outlined in this area. This includes known asset needs, learning step alignment, high-level instructional strategies, and checks on learning. For the checks on learning, only the question and correct answer are included, the distractors and learner feedback will be shown later in the Detailed Design Document (storyboard).

**Review and Reflect:** This area defines the final summary of the module.



This is an example of a discussion point:

## 2.0 Discussion Points

### Discussion Point 1



1. Initial Asset Requirements:

a. Scene Descriptor:

(1) [add description here]

b. Metahumans:

MH ID	Rank	Name	Age	M/F	Race	Use

c. Specific Assets:

(1) Images:

(a) [list here]

(2) 360 Images:

(a) [list here]

d. Injuries/Parts of the body:

(1) [describe any injuries that will be visible or close-ups of body parts]

2. Content and Strategies:

a. TLO/ELOs Addressed:

b. Summary:

c. Job Aids:

LSA Information [Copied from LA]	Primary Strategy (Treatment)


3. Checks on Learning:

[Note: Indicate which ELO is being assessed if more than one ELO is addressed in this DP.]

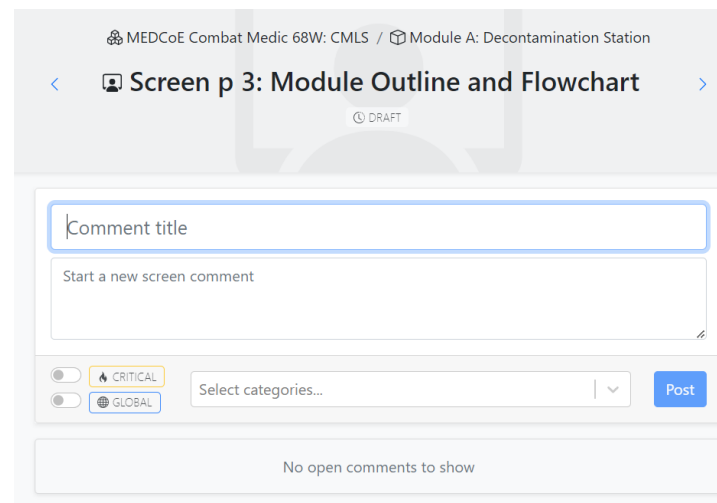
Type	Question	Correct Answer



## Commenting

Be sure to carefully read each section. In the upper right corner of each component, you will see a commenting icon (  ). Select this icon to provide feedback. **Please select this button EACH time you wish to leave a comment.** This will guarantee that you are making the comment in the correct location. **Be sure each time you comment that the title in the commenting tool matches the area in which you are commenting in the document.**

The first time you access the commenting tool, you will need to log in. Once logged in, you will see a screen that looks like this:



MEDCoE Combat Medic 68W: CMLS / Module A: Decontamination Station

< Screen p 3: Module Outline and Flowchart >

DRAFT

Comment title

Start a new screen comment

CRITICAL  GLOBAL Select categories... Post

No open comments to show

Ensure your comment includes the following:

- A title that indicates the issue (e.g., grammar, incorrect information, inappropriate image, etc.).
- A description of the exact location of the error (e.g., in Seq 1, On-Screen column; in Row titled [Hotspot 1], Audio column; etc.).
- A specific description of the problem AND the solution. If you would like to request a change in verbiage, please provide exactly what is expected. The more details, the better. Comments must be specific enough to be quickly actionable by the team.



## 1.0 Module Introduction Components

### Title

The Digestive System

### Objectives(s)

- TLO 18: Identify components, characteristics, and functions of the digestive system.
- TLO 19: Identify common digestive system pathophysiology.
- 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.

### Introduction

[An animated eMentor named Shurman](#) 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 10 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.

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.”

### Motivator Script

ID#		Scene(s) #		
[40-MOT-001]		40		
Scene Description and Needs				
Location	Set Description	Talent Required	Wardrobe Needed	Props Needed
Military Base Tent	A tent filled with organized chaos; medical supplies on tables, stretchers in corners, medics attending.	Combat Medics, Soldiers	Army Uniforms	Medical supplies, tables, stretchers
Military Base Tent	A tent filled with organized chaos; medical supplies on tables, stretchers in corners, medics attending	Female Soldier	Army Uniform	N/A
Medical Counter	Counter with medical supplies neatly arranged.	Combat Medic	Army Medic Uniform	Medical counter, medical supplies
Military Base Tent	Same as Scene 1 but focusing on pained expression of female Soldier	Female Soldier	Army Uniform	Medical supplies, tables, stretchers



Script				
Shot #	Still or Motion	Action	Audio Script	On-Screen Text, if any
1	Motion	A medical tent bustling with activity on a military base. Combat medics are tending to various injuries.	N/A	N/A
2	Motion	A female Soldier strides into the med tent, gripping her abdomen tightly.	“In walks a female Soldier, a portrait of strength in the face of agony. Her grip on her stomach is tight – as tight as her grip on her resolve. Each step she takes may be a painful endeavor, but her courage propels her forward.”	N/A
3	Still	Combat medic addressing the female Soldier at the medical counter.	“Sergeant, you look like you’re in severe pain. What’s the issue? We need to address this immediately.”	N/A
4	Motion	Camera focuses on female Soldier’s pained face and zooms out to show the medical tent’s full scale.	N/A	N/A
5	Motion	Camera zooms out, and screen fades to black for a moment before the next scene appears.  The female Soldier’s pained expression for a final moment, it gradually zooms out to show the	N/A	N/A



		full scale of the medical tent's operations. The atmosphere is one of disciplined urgency, a ballet of medical expertise and human resilience.		
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**Example Imagery and Videos**

 <p>Female Soldier 25 - 30 Asian Sun <a href="#">68W_MetaHuman_Roster-COPY 08282023.xlsx (sharepoint.com)</a></p>	 <p>Male Soldier 30 - 35 Caucasian Cooper <a href="#">68W_MetaHuman_Roster-COPY 08282023.xlsx (sharepoint.com)</a></p>
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**Additional Comments and Direction**

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After this motivator, focus for the learner will transition to the eMentor, who emphasizes the need to identify structure/function of human anatomy in order for the 68W to begin the assessment process.

### **Transition Narration for eMentor Animation**

“Facing this challenge, what knowledge of human anatomy and physiology is essential to provide assistance? Let’s explore the intricacies of the human digestive system and gain insights into the common ailments that medics should consider in scenarios like this.”

### **Establishing Scene for Instructional Content**

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, vomiting, nausea, virus, abdomen, abdominal wound, eating disorder, bulimia, anorexia, poison, and toxic liver.



## 2.0 Discussion Points



### DP 1: Identify components, characteristics, and functions of the digestive system

Source: TLO 18, ELO A, LSA 1

#### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course: Shurman](#)
- c. Specific Assets:
  - (1) Images: N/A
  - (2) 360 Images:
    - (a) The on-screen graphic 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) On the right side, a schematic representation of the digestive process is shown. It illustrates the sequential movement of food through the digestive tract (animation). 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 and provides the learner with the opportunity to “identify” items described in the learning objectives. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
- d. Injuries/Parts of the body: No injuries/parts of the body listed above.

#### 2. Content and Strategies

- a. LSA Information: ELO 18-A, LSA 1
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to the digestive system are displayed in a side-by-side approach (structure on one side, function on the other), and interactive hotspots are available for the learner to select that



reveal content in popup windows or navigate the learner to screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 1: Identify components, characteristics, and functions of the digestive system</b>	
<i>Source: TLO 18, ELO A, LSA 1</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<p>Structure (Anatomy):</p> <ol style="list-style-type: none"><li>1. Define the gastrointestinal tract.<ul style="list-style-type: none"><li>• The GI tract is one continuous tube that runs from the mouth to the anus. It is found in both the thoracic and abdominopelvic cavities and is also known as the alimentary canal.</li></ul></li><li>2. Identify the organs of the gastrointestinal tract.<ul style="list-style-type: none"><li>• In order from top to bottom, the organs of the GI tract are the mouth, pharynx, esophagus, stomach, small intestine, large intestine, and anus.</li></ul></li><li>3. Identify the accessory digestive organs.<ul style="list-style-type: none"><li>• The accessory organs participating in the digestive process are the teeth, tongue, salivary glands, liver, gallbladder, and pancreas.</li></ul></li></ol>	<ol style="list-style-type: none"><li>1. Organs of the Gastrointestinal Tract and Their Importance in Digestion:<ol style="list-style-type: none"><li>a. Mouth: The mouth plays a crucial role in digestion by physically breaking down food through chewing and mixing it with saliva. Saliva contains enzymes like amylase, which begin the digestion of carbohydrates.</li><li>b. Pharynx: The pharynx serves as a passageway for both food and air. Its role is to direct the food from the mouth to the esophagus, ensuring that it enters the digestive system and not the respiratory system.</li><li>c. Esophagus: The esophagus is a muscular tube that transports food from the pharynx to the stomach through peristaltic contractions. Its primary function is to facilitate the movement of food to the stomach.</li><li>d. Stomach: The stomach continues digestion by mixing food with gastric juices, including hydrochloric acid and pepsin. These substances break down proteins and sterilize the ingested food.</li></ol></li></ol>



- e. Small Intestine: The small intestine is where most nutrient absorption occurs. It receives partially digested food from the stomach and continues digestion through the action of enzymes. Nutrient absorption happens through the intestinal walls.
- f. Large Intestine: The large intestine primarily focuses on absorbing water, electrolytes, and vitamins produced by gut bacteria. It helps in the formation of feces and reabsorption of useful substances.
- g. Anus: The anus is the endpoint of the GI tract, where feces are stored until they can be eliminated from the body. It controls the release of feces during defecation.

## 2. Accessory Digestive Organs and Their Importance:

- a. a. Teeth: Teeth break down food into smaller, more manageable pieces through mastication, increasing the surface area for enzyme action in the mouth.
- b. Tongue: The tongue assists in the mechanical breakdown of food and helps mix it with saliva. It also aids in forming a bolus (a small rounded mass of food) for swallowing.
- c. Salivary Glands: Salivary glands produce saliva, which contains enzymes like amylase that initiate the digestion of carbohydrates. Saliva also moistens food for easier swallowing.
- d. Liver: The liver plays a vital role in digestion by producing bile, which is stored in the gallbladder. Bile is essential for the emulsification of fats, breaking them



	<p>down into smaller droplets for better digestion by enzymes.</p> <p>e. Gallbladder: The gallbladder stores and releases bile into the small intestine when needed, especially when there is a fatty meal, aiding in fat digestion and absorption.</p> <p>f. Pancreas: The pancreas secretes digestive enzymes (lipase, amylase, and proteases) into the small intestine, contributing to the digestion of fats, carbohydrates, and proteins. It helps ensure complete digestion.</p> <p>These organs and accessory structures work together harmoniously to break down food, extract essential nutrients, and facilitate their absorption into the bloodstream, ensuring that the body receives the necessary energy and building blocks for maintaining health and vitality.</p>
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### 3. Check on Learning: Digestive System Challenge

Type	Question	Correct Answer
Click & Place	<p>Check on Learning: Click &amp; Place</p> <p>Instructions: Click and place each part of the digestive system to the left in its correct location on the image of the digestive system to the right.</p> <p>Parts of the digestive system:</p> <ul style="list-style-type: none"><li>• Mouth: The process of digestion begins in the mouth, where food is broken down into smaller pieces by chewing and mixed with saliva.</li><li>• Salivary Glands: These glands produce saliva, which contains enzymes that help start the digestion of carbohydrates.</li><li>• Pharynx: The pharynx is a shared passage for both food and air, directing food from the mouth to the esophagus.</li></ul>	1. Image will reflect the human body digestive system with the items listed highlighted as targets for placement.





	<ul style="list-style-type: none"><li>• Esophagus: This muscular tube carries food from the pharynx to the stomach through a series of coordinated contractions called peristalsis.</li><li>• Stomach: The stomach is a pouch-like organ that continues the digestion process by mixing food with gastric juices and breaking down proteins.</li><li>• Small Intestine: The small intestine is where most of the digestion and nutrient absorption occurs. It consists of three parts: the duodenum, jejunum, and ileum.</li><li>• Duodenum: The first part of the small intestine, where digestive enzymes from the pancreas and bile from the liver are added to further break down food.</li><li>• Liver: The liver produces bile, which is stored in the gallbladder and released into the duodenum to aid in the digestion of fats.</li><li>• Gallbladder: The gallbladder stores and releases bile into the small intestine when needed for fat digestion.</li><li>• Pancreas: The pancreas produces digestive enzymes and releases them into the duodenum to break down carbohydrates, proteins, and fats.</li><li>• Appendix: Although its exact function is not fully understood, the appendix is a small pouch-like structure attached to the cecum, a part of the large intestine.</li><li>• Large Intestine (Colon): The large intestine absorbs water and electrolytes from undigested food, forming feces and preparing them for elimination.</li><li>• Rectum and Anus: These parts of the digestive system are responsible for storing feces until they can be eliminated from the body through the anus.</li></ul>	
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## DP 2: Identify the components, functions, and anatomy of accessory organs that assist with digestion

Source: TLO 18, ELO 18-A, LSA 3

### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman](#)
- c. Specific Assets
  - (1) Images: N/A
  - (2) 360 Images:
    - (a) 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. Possible image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) 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. Possible Image Source: 3D human anatomy ultimate (turbosquid.com)

Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-B: LSA 1
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a



topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 2: Identify the components, functions, and anatomy of accessory organs that assist with digestion</b>	
<i>Source: TLO 18, ELO 18-A, LSA 3</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Define the peritoneum and its anatomy.<ol style="list-style-type: none"><li>a. The peritoneum lines the abdominal cavity and consists of two layers:</li><li>b. Simple squamous epithelium (mesothelium)</li><li>c. Underlying supporting layer of areolar connective tissue</li></ol></li><li>2. The peritoneum is divided into two parts:<ol style="list-style-type: none"><li>a. Parietal peritoneum (lining the abdominal cavity)</li><li>b. Visceral peritoneum (covering individual organs)</li></ol></li><li>3. The peritoneal cavity separates the parietal and visceral portions of the peritoneum and contains lubricating serous fluid.</li><li>4. Identify the anatomy of the mouth (buccal cavity).<ol style="list-style-type: none"><li>a. Cheeks: The lateral walls of the oral cavity, protected externally by skin and internally by a mucous membrane.</li><li>b. Lips (labia): The fleshy folds around the opening of the mouth.</li><li>c. Hard palate: The anterior portion of the roof of the mouth.</li><li>d. Soft palate: An arch-shaped muscular partition comprising the posterior portion of the roof of the mouth.</li><li>e. Tongue: Provides the floor of the oral cavity.</li></ol></li></ol>	<ol style="list-style-type: none"><li>1. Define the function of the peritoneum.<ol style="list-style-type: none"><li>a. 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.</li><li>b. It provides a protective lining for the abdominal cavity and its organs, shielding them from potential injuries and infections.</li><li>c. The peritoneal fluid within the peritoneal cavity prevents friction between organs, facilitating smooth movement during digestion and other physical activities.</li></ol></li><li>2. Define the function of the mouth.<ol style="list-style-type: none"><li>a. The mouth, or oral cavity, serves as the entrance point for food and liquids into the digestive system.</li></ol></li></ol>



### 3. Checks on Learning: Anatomy of the Mouth Challenge

Type	Question	Correct Answer
Matching	<p>Instructions: Your task is to match each description of a mouth anatomy part to its correct term. Match the terms to their corresponding descriptions.</p> <p>Description:</p> <ol style="list-style-type: none"><li>1. The lateral walls of the oral cavity, protected externally by skin and internally by a mucous membrane.</li><li>2. The fleshy folds around the opening of the mouth.</li><li>3. The anterior portion of the roof of the mouth.</li><li>4. An arch-shaped muscular partition comprising the posterior portion of the roof of the mouth.</li><li>5. Provides the floor of the oral cavity.</li></ol>	<ol style="list-style-type: none"><li>1. Cheeks</li><li>2. Lips (labia)</li><li>3. Hard palate</li><li>4. Soft palate</li><li>5. Tongue</li></ol>



### DP 3: Identify the components, functions, and anatomy of accessory organs that assist with digestion

Source: TLO 18, ELO 18-B, LSA 3

#### 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 digestive system's components and their significance.
- b. Metahumans: Selected eMentor for the A&P course named Shurman
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
  - (2) 360 Images:
    - (a) 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 (or an animation) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com)
- d. Injuries/Parts of the body: No injuries/body parts listed above.

#### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-B: LSA 3
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.
- c. Adaptive Strategy: Job Aids for download for all instructional content



<b>DP 3: Identify the components, functions, and anatomy of accessory organs that assist with digestion</b>	
<i>Source: TLO 18, ELO 18-B, LSA 3</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify the anatomy of the pharynx.<ol style="list-style-type: none"><li>a. The pharynx is made up of skeletal muscle.</li><li>b. It is lined by a mucous membrane.</li><li>c. The pharynx has three parts:<ol style="list-style-type: none"><li>(1) Nasopharynx</li><li>(2) Oropharynx</li><li>(3) Laryngopharynx</li></ol></li></ol></li><li>2. Define the esophagus and its anatomy.<ol style="list-style-type: none"><li>a. The esophagus is a collapsible muscular tube.</li><li>b. It links the pharynx and the stomach.</li></ol></li></ol>	<ol style="list-style-type: none"><li>1. Define the function of the pharynx.<ol style="list-style-type: none"><li>a. The pharynx is a duct that serves as a passage for both food and air.</li><li>b. It starts at the internal nares, extends partway down the neck, and opens into the esophagus (posteriorly) and the larynx (anteriorly)</li><li>c. The pharynx is a crucial part of the swallowing process, where swallowed food passes through its different regions to reach the esophagus and stomach.</li></ol></li><li>2. Define the function of the esophagus.<ol style="list-style-type: none"><li>a. The esophagus is primarily responsible for transporting food from the pharynx to the stomach.</li><li>b. It does not participate in any digestive processes but secretes mucus to aid in the smooth passage of food to the stomach.</li></ol></li><li>3. Define swallowing (deglutition) and its function.<ol style="list-style-type: none"><li>a. Swallowing is the process of moving food from the mouth to the stomach.</li><li>b. During swallowing, muscles are activated to propel food downward, aided by the secretion of saliva and mucus in the mouth, pharynx, and esophagus.</li><li>c. Swallowing occurs in three stages:<ol style="list-style-type: none"><li>(1) Voluntary stage: The bolus is passed into the oropharynx actively by the person eating</li></ol></li></ol></li></ol>



	<p>(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.</p> <p>(3) Esophageal stage: The bolus is involuntarily moved through the esophagus into the stomach via peristalsis.</p>
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### 3. Checks on Learning: Swallowing Stages

Type	Question	Correct Answer
Sorting	<p>Digestive System Challenge - Swallowing Stages Question: Click and place the stages of swallowing (deglutition) in the correct order of occurrence.</p> <p>Stages of Swallowing:</p> <ul style="list-style-type: none"><li>• Pharyngeal stage</li><li>• Esophageal stage</li><li>• Voluntary stage</li></ul>	<ol style="list-style-type: none"><li>1. Voluntary stage</li><li>2. Esophageal stage</li><li>3. Pharyngeal stage</li></ol>



#### DP 4: Identify the functions and processes of the digestive system

Source: TLO 18, ELO 18-C, LSA 1

##### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
  - (2) 360 Images:
    - (a) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) 3D Stomach Structure: 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
- d. Injuries/Parts of the body: No injuries/body parts listed above.

##### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-C, LSA 1 Should be deleted.
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which





reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 4: Identify the functions and processes of the digestive system.</b>	
<i>Source: TLO 18, ELO 18-C, LSA 1</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<p>1. Identify the anatomy of the stomach:</p> <ul style="list-style-type: none"><li>a. Cardia: Links the opening of the esophagus to the bladder of the stomach.</li><li>b. Fundus: The rounded portion located superiorly and to the left of the cardia, responsible for storing stomach gases</li><li>c. Body: The large central portion of the stomach associated with holding food.</li><li>d. Pylorus: The lowest part of the stomach, connecting it to the duodenum and controlling the transfer of food to the small intestine.</li><li>e. Pyloric antrum: Connects to the body of the stomach.<ul style="list-style-type: none"><li>(1) Pyloric canal: Leads to the third region of the pylorus.</li><li>(2) Pyloric sphincter: Connects to the duodenum.</li></ul></li></ul>	<p>1. Define the stomach and its function.</p> <ul style="list-style-type: none"><li>a. 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.</li><li>b. Functions of the stomach include:<ul style="list-style-type: none"><li>(1) Forming chyme: Mixing saliva, food, and gastric juice to create a semi-fluid mixture for further digestion.</li><li>(2) Holding food in reserve: Temporarily store food before it moves into the small intestine.</li><li>(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.</li><li>(4) Secreting gastrin: A hormone released into the blood to regulate stomach functions.</li></ul></li></ul>



### 3. Checks on Learning: Stomach Anatomy Challenge

Type	Question	Correct Answer
Matching	<p>Check on Learning Stomach Anatomy Challenge</p> <p>Instructions: Match the parts of the stomach to the correct descriptions.</p> <p>Parts of the Stomach:</p> <ul style="list-style-type: none"><li>a. Cardia</li><li>b. Fundus</li><li>c. Body</li><li>d. Pylorus</li><li>e. Pyloric antrum</li><li>f. Pyloric canal</li><li>g. Pyloric sphincter</li></ul>	<ul style="list-style-type: none"><li>a. Links the opening of the esophagus to the bladder of the stomach.</li><li>b. The rounded portion is located superiorly and to the left of the cardia, responsible for storing stomach gases.</li><li>c. The large central portion of the stomach is associated with holding food.</li><li>d. The lowest part of the stomach, connecting it to the duodenum and controlling the transfer of food to the small intestine.</li><li>e. Connects to the body of the stomach.</li><li>f. It leads to the third region of the pylorus. Connects to the duodenum.</li><li>g. Connects to the duodenum</li></ul>



## DP 5: Identify the components, functions, and anatomy of the digestive system

Source: TLO 18, ELO 18-C, LSA 3

### 1. 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 named Shurman.](#)
- c. Specific Assets:
  - (1) Images: N/A
  - (2) 360 images:
    - (a) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
      - [1] 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.
      - [2] 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.
      - [3] 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.
      - [4] 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:
      - [5] 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.



- [6] 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.
- [7] 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.
- [8] Vitamin and Mineral Absorption: In addition to nutrients, the small intestines also absorb important vitamins like vitamin B12 and certain minerals such as iron.
- [9] 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: No injuries/body parts listed above.

## 2. Content and Strategies

a. LSA Information: [LA and ELO] ELO 18-C, LSA 3

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion

c. Adaptive Strategy: Job Aids for download for all instructional content.

<b>DP 5: Identify the components, functions, and anatomy of the digestive system</b>	
<i>Source: TLO 18, ELO 18-C, LSA 3</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<p>1. Identify the anatomy of the small intestine:</p> <ul style="list-style-type: none"><li>a. Duodenum: A C-shaped tube that begins at the pyloric sphincter of the stomach and extends until it merges with the jejunum.</li><li>b. Jejunum: Follows the duodenum and is part of the small intestine.</li><li>c. Ileum: Connects the jejunum to the large intestine.</li></ul>	<p>1. Define the small intestine and its function.</p> <ul style="list-style-type: none"><li>a. 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.</li><li>b. The small intestine plays a vital role in the digestion and absorption of nutrients.</li></ul> <p>2. Functions of the small intestine include:</p>



	<ul style="list-style-type: none"> <li>a. 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.</li> <li>b. Digestion of nutrients: The small intestine completes the digestion of carbohydrates, proteins, and lipids. Additionally, it initiates the digestion of nucleic acids.</li> <li>c. Absorption: The small intestine is responsible for absorbing approximately 90% of the nutrients and water that pass through the digestive system.</li> </ul>
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### 3. Checks on Learning: Small Intestine Anatomy & Function Challenge

Type	Question	Correct Answer
Matching	<p><b>Small Intestine Anatomy &amp; Function Challenge</b></p> <p>Instructions: Match the following descriptions to the correct part or function of the small intestine.</p> <p>Descriptions:</p> <ul style="list-style-type: none"> <li>1. A C-shaped tube that begins at the pyloric sphincter of the stomach.</li> <li>2. Connects to the large intestine.</li> <li>3. Completes the digestion of carbohydrates, proteins, and lipids.</li> <li>4. Responsible for absorbing approximately 90% of the nutrients and water.</li> </ul>	<p>Answers:</p> <ul style="list-style-type: none"> <li>1. Duodenum</li> <li>2. Ileum</li> <li>3. Digestion of nutrients</li> <li>4. Absorption</li> <li>5. Segmentation movements</li> <li>6. Jejunum</li> <li>7. Digestion of nucleic acids</li> <li>8. Peristalsis</li> </ul>



	<ol style="list-style-type: none"><li>5. Contractions that mix and break down chyme with digestive juices.</li><li>6. Follows the duodenum and is part of the small intestine.</li><li>7. Initiates the digestion of nucleic acids.</li><li>8. Propels chyme through the small intestine.</li></ol>	
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## DP 6: Identify the functions and processes of the digestive system

Source: TLO 18, ELO 18-C, LSA 5

### 1. 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 named Shurman.](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
  - (2) 360 Images:
    - (a) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) 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 is the haustra, which creates 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com)

d. Injuries/Parts of the body: No injuries/body parts listed above.

## 2. Content and Strategies

a. LSA Information: [LA and ELO] ELO 18-C, LSA 5

b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 6: Identify the functions and processes of the digestive system</b>	
<i>Source: TLO 18, ELO 18-C, LSA 5</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify the anatomy of the large intestine:<ol style="list-style-type: none"><li>a. Cecum: Hangs inferior to the ileocecal valve.</li><li>b. Colon: A long tube that merges with the open end of the cecum and is divided into four parts:<ol style="list-style-type: none"><li>(1) Ascending portion</li><li>(2) Transverse portion</li><li>(3) Descending portion</li><li>(4) Sigmoid portion</li></ol></li></ol></li><li>2. Rectum: Lies anterior to the sacrum and coccyx.</li><li>3. Anal canal: The terminal end of the large intestine, arranged in longitudinal folds.</li></ol>	<ol style="list-style-type: none"><li>1. Define the large intestine and its function.<ol style="list-style-type: none"><li>a. The large intestine is the final portion of the GI tract, extending from the ileum of the small intestine to the anus.</li><li>b. Functions of the large intestine include:<ol style="list-style-type: none"><li>(1) Haustral churning, peristalsis, and mass peristalsis drive the contents of the colon into the rectum.</li><li>(2) Bacteria in the large intestine convert proteins to amino acids, break down amino acids, and produce some B vitamins and vitamin K.<ol style="list-style-type: none"><li>(a) Absorption of some water, ions, and vitamins takes place in the large intestine.</li></ol></li></ol></li></ol></li></ol>





	<p>(b) The large intestine is responsible for the formation of feces.</p> <p>(c) It plays a role in the process of defecation, which involves emptying the rectum.</p>
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### 3. Checks on Learning: Anatomy Adventure

TYPE	QUESTION	CORRECT ANSWER
Multiple Choice	<p>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.</p> <p>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?”</p> <p>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?”</p> <p>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?”</p>	<p>Path A: Cecum Conundrum The correct answer is Cecum.</p> <p>Path B: Function Junction The correct answer is absorption of water, ions, and vitamins.</p> <p>Path C: Enzyme Expedition 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.</p>



## DP 7: Identify the components, functions, and anatomy of accessory organs that assist with digestion

Source: TLO 18, ELO 18-C, LSA 7

### 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 digestive system's components and their significance.

b. Metahumans: [Selected eMentor for the A&P course named Shurman.](#)

c. Specific Assets:

(1) Images: N/A

(2) 360 Images:

(c) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)

(d) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)

d. Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies



- a. LSA Information: [LA and ELO] ELO 18-C, LSA 7
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.
- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 7: Identify the components, functions, and anatomy of accessory organs that assist with digestion</b>	
<i>Source: TLO 18, ELO 18-C, LSA 7</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify the anatomy of teeth:<ol style="list-style-type: none"><li>a. Crown: The visible portion of the tooth above the level of the gums.</li><li>b. Roots: Embedded in the socket, there can be one to three roots per tooth.</li><li>c. Neck: The constricted junction of the crown and root near the gum line.</li></ol></li><li>2. Define tongue and its anatomy:<ol style="list-style-type: none"><li>a. The tongue is a large skeletal muscle covered by mucous membrane found on the floor of the oral cavity.</li><li>b. It has two lateral halves separated by a median septum that extends the entire length of the tongue.</li><li>c. The tongue is attached inferiorly to the hyoid bone, styloid process of the temporal bone, and mandible.</li><li>d. Both sides of the tongue have identical extrinsic and intrinsic muscles.</li></ol></li></ol>	<ol style="list-style-type: none"><li>1. Identify the purpose of the accessory digestive organs.<ol style="list-style-type: none"><li>a. Teeth physically break down food by cutting, shredding, crushing, and grinding it.</li><li>b. The tongue assists in chewing and swallowing.</li></ol></li><li>2. Define teeth and their function.<ol style="list-style-type: none"><li>a. Teeth are composed of calcified connective tissue embedded in bony sockets (alveolar processes).</li><li>b. Gingivae (gums) cover the alveolar processes and extend partly into the sockets.</li><li>c. Periodontal ligament lines the sockets, anchoring the teeth and acting as a shock absorber during chewing.</li></ol></li><li>3. Define tongue and its function.<ol style="list-style-type: none"><li>a. The tongue, with its associated muscles, forms the floor of the oral cavity and helps in chewing and swallowing.</li><li>b. 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.</li></ol></li></ol>



	<p>They also maintain the tongue’s position and form the floor of the mouth.</p> <p>c. Intrinsic muscles of the tongue change its shape and size for swallowing and speech.</p>
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### 3. Checks on Learning: Teeth and Tongue Challenge

Type	Question	Correct Answer
Multiple Choice	<p><b>Level 1: Teeth Anatomy</b></p> <ol style="list-style-type: none"> <li>1. What is the visible portion of the tooth above the level of the gums called?</li> <li>2. How many roots can a tooth have embedded in its socket?</li> <li>3. What is the constricted junction of the crown and root near the gum line known as?</li> <li>4. What term describes the calcified connective tissue in which teeth are embedded?</li> </ol> <p><b>Level 2: Tongue Anatomy and Function</b></p> <ol style="list-style-type: none"> <li>5. What is the primary purpose of the tongue in the digestive process?</li> <li>6. The tongue is a large skeletal muscle covered by:</li> <li>7. What anatomical structure separates the two lateral halves of the tongue?</li> <li>8. Which type of muscles change the shape and size of the tongue for functions like swallowing and speech?</li> </ol>	<p><b>Level 1: Teeth Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Crown</li> <li>2. Two</li> <li>3. Neck</li> <li>4. Alveolar process</li> </ol> <p><b>Level 2: Tongue Anatomy and Function</b></p> <ol style="list-style-type: none"> <li>5. Chewing food</li> <li>6. Mucous membrane</li> <li>7. Median septum</li> <li>8. Intrinsic muscles</li> </ol>



## DP 8: Identify the functions and processes of the digestive system

Source: TLO 18, ELO 18-C, LSA 9

### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (e) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (f) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (e) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (f) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
- d. Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-C, LSA 9



- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.
- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 8: Identify the functions and processes of the digestive system</b>	
<i>Source: TLO 18, ELO 18-C, LSA 9</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ul style="list-style-type: none"><li>1. Identify the anatomy of salivary glands:<ul style="list-style-type: none"><li>a. Parotid glands: Found inferior and anterior to the ears, between the skin and the masseter muscle.</li><li>b. 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.</li></ul></li><li>2. b. Submandibular glands: Located on the floor of the mouth, medial and partly inferior to the body of the mandible.<ul style="list-style-type: none"><li>a. 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.</li></ul></li><li>3. Sublingual glands: Located beneath the tongue and superior to the submandibular glands.<ul style="list-style-type: none"><li>a. The lesser sublingual ducts enter into the floor of the mouth in the oral cavity proper.</li></ul></li></ul>	<ul style="list-style-type: none"><li>1. Define salivary glands and their function.<ul style="list-style-type: none"><li>a. Salivary glands release a secretion called saliva into the oral cavity.</li><li>b. Saliva serves multiple functions:<ul style="list-style-type: none"><li>(1) Maintaining the moisture of the mucous membranes of the mouth and pharynx.</li><li>(2) Cleaning the mouth and teeth.</li><li>(3) Increasing in response to food to initiate the chemical breakdown of food.</li></ul></li></ul></li></ul>



### 3. Checks on Learning: Glands Round Up

Type	Question	Correct Answer
Multiple Choice	<ol style="list-style-type: none"><li>1. Where are the parotid glands located in relation to the ears?</li><li>2. How do parotid glands release saliva into the oral cavity?</li><li>3. Where are the submandibular glands located?</li><li>4. How do submandibular ducts enter the oral cavity?</li><li>5. Where are the sublingual glands located?</li><li>6. How do lesser sublingual ducts enter the oral cavity?</li><li>7. What is the primary function of salivary glands?</li><li>8. Which of the following is NOT a function of saliva?</li><li>9. What triggers an increase in saliva production?</li></ol>	<ol style="list-style-type: none"><li>1. Inferior and anterior</li><li>2. Via a parotid duct</li><li>3. Inferior to the body of the mandible</li><li>4. Lateral to the lingual frenulum</li><li>5. Beneath the tongue</li><li>6. Through the buccinator muscle</li><li>7. Initiating digestion of food</li><li>8. Aiding in vision</li><li>9. Chewing gum</li></ol>



## DP 9: Identify the functions and processes of the digestive system

Source: TLO 18, ELO 18-C, LSA 11

### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman.](#)
- c. Specific Assets:
  - (1) Images:
    - (a) Image of function
    - (b) Image of structure
  - (2) 360 Images:
    - (a) 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. . Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) 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.. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (c) Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-C, LSA 11
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a





topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 9: Identify the functions and processes of the digestive system.</b>	
<i>Source: TLO 18, ELO 18-C, LSA 11</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify the anatomy of the liver:<ol style="list-style-type: none"><li>a. When viewed from above, two lobes are visible: the right and the left.</li><li>b. When viewed from below, two additional lobes are found under the right lobe: the caudate lobe and quadrate lobe.</li><li>c. The major functional cells of the liver are hepatocytes, responsible for various metabolic, secretory, and endocrine functions.</li><li>d. Bile canaliculi are small ducts between hepatocytes that collect bile produced by the hepatocytes.</li><li>e. 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.</li></ol></li><li>2. Identify the anatomy of the gallbladder:<ol style="list-style-type: none"><li>a. Fundus: Projects inferiorly beyond the inferior border of the liver.</li><li>b. Body: The central portion of the gallbladder.</li><li>c. Neck: The tapered portion connecting to the cystic duct.</li></ol></li></ol>	<ol style="list-style-type: none"><li>1. Define the liver and its function.</li><li>2. The liver, situated under the diaphragm in the right upper quadrant, performs numerous essential functions:<ol style="list-style-type: none"><li>a. Bile production: To aid in the digestion of lipids and waste removal.</li><li>b. Synthesis of plasma proteins.</li><li>c. Interconversion of nutrients.</li><li>d. Detoxification of substances.</li><li>e. Storage of glycogen, iron, and vitamins.</li><li>f. Phagocytosis of worn-out blood cells and bacteria.</li><li>g. Synthesis of the active form of vitamin</li></ol></li><li>3. Define the gallbladder and its function.<ol style="list-style-type: none"><li>a. The gallbladder, located below the liver, stores bile and empties it through the cystic duct when needed for digestion.</li></ol></li><li>4. Define the pancreas and its function.<ol style="list-style-type: none"><li>a. 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,</li></ol></li></ol>



<p>3. Identify the anatomy of the pancreas:</p> <ol style="list-style-type: none"> <li>Head: The expanded portion of the pancreas near the curve of the duodenum.</li> <li>Body: Located superior to and to the left of the head.</li> <li>Tail: Positioned superior to and to the left of the head and body.</li> </ol>	<p>producing insulin, glucagon, somatostatin, and pancreatic polypeptide.</p>
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3. Checks on Learning: Digestive Organ Explorer

Type	Question	Correct Answer
<p>Multiple Choice</p>	<p>Check on Learning: Digestive Organ Explorer</p> <p>As you explore the fascinating world of the liver, gallbladder, and pancreas, your understanding of structure and function 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!</p> <p><b>Level 1: Anatomy of Liver, Gallbladder, and Pancreas</b></p> <ol style="list-style-type: none"> <li>How many lobes are visible when the liver is viewed from above?</li> <li>Which two additional lobes are found under the right lobe of the liver when viewed from below?</li> <li>What are the major functional cells of the liver called?</li> <li>What are bile canaliculi?</li> <li>How is blood flow in the liver facilitated?</li> </ol>	<p><b>Level 1: Anatomy of Liver, Gallbladder, and Pancreas</b></p> <ol style="list-style-type: none"> <li>Two lobes</li> <li>Quadrante lobe and caudate lobe</li> <li>Hepatocytes</li> <li>Small ducts between hepatocytes collecting bile</li> <li>Through hepatic sinusoids</li> <li>Inferiorly beyond the liver's border</li> <li>Head</li> </ol> <p><b>Level 2: Functions of Liver, Gallbladder, and Pancreas</b></p> <ol style="list-style-type: none"> <li>Synthesis of plasma proteins</li> </ol>



	<p>6. Where is the fundus of the gallbladder located?</p> <p>7. Which part of the pancreas is located near the curve of the duodenum?</p> <p><b>Level 2: Functions of Liver, Gallbladder, and Pancreas</b></p> <p>8. What is the primary function of the liver?</p> <p>9. What is the function of the gallbladder?</p> <p>10. The pancreas serves as both an exocrine gland and an endocrine gland. What does it secrete as an exocrine gland?</p>	<p>9. Storing bile</p> <p>10. Pancreatic juice</p>
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## DP 10: Identify the functions and processes of the digestive system

Source: TLO 18, ELO 18-C, LSA 13

### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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. [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (b) 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. [3D human anatomy ultimate \(turbosquid.com\)](#)
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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. [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (b) 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. [3D human anatomy ultimate \(turbosquid.com\)](#)
- d. Injuries/Parts of the body: No injuries/parts of the body listed above.

### 2. Content and Strategies



- a. LSA Information: [LA and ELO] ELO 18-C, LSA 13
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.
- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 10: Identify the functions and processes of the digestive system</b>	
<i>Source: TLO 18, ELO 18-C, LSA 13</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify the functions/processes performed by the digestive system:<ol style="list-style-type: none"><li>a. Ingestion: The process of taking foods and liquids into the mouth.</li><li>b. Secretion: The release of digestive aids, including water, acid, buffers, and enzymes, into the lumen of the GI tract.</li><li>c. Motility: The ability of the GI tract to mix and move material along its length through smooth muscle contractions and relaxations.</li><li>d. Digestion: The breaking down of food into its molecular components for use by body cells, involving mechanical and chemical processes.</li><li>e. 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.</li></ol></li></ol>	<ol style="list-style-type: none"><li>1. Define ingestion:<ol style="list-style-type: none"><li>a. Ingestion is the process of taking foods and liquids into the mouth.</li></ol></li><li>2. Define secretion:<ol style="list-style-type: none"><li>a. Secretion is the release of digestive aids, including water, acid, buffers, and enzymes, into the lumen of the GI tract.</li></ol></li><li>3. Define motility:<ol style="list-style-type: none"><li>a. 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.</li></ol></li><li>4. Define digestion:<ol style="list-style-type: none"><li>a. Digestion is the process of breaking down food into its molecular components for use by body cells. It involves both mechanical and chemical processes.</li><li>b. Mechanical digestion includes the physical destruction of food by teeth and churning movements in the small intestine</li></ol></li></ol>



<p>f. Defecation: The expulsion of solid waste, known as feces or stool, from the body.</p>	<p>c. Chemical digestion involves the splitting of larger molecules by hydrolysis, carried out by enzymes produced by various digestive organs.</p> <p>d. Define absorption:</p> <p>5. 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.</p> <p>6. Not all substances require digestion before absorption.</p> <p style="padding-left: 20px;">a. Define defecation:</p> <p>7. 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.</p> <p>8. The expelled material is called feces or stool.</p>
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### 3. Checks on Learning: Digestive System Quiz Challenge

Type	Question	Correct Answer
Multiple Choice	1. What is the process of taking foods and liquids into the mouth called?	1. Ingestion
	2. What is the release of digestive aids, including water, acid, buffers, and enzymes, into the GI tract lumen known as?	2. Secretion
	3. Which function of the digestive system involves mixing and moving material through smooth muscle contractions	3. Motility
	4. What process breaks down food into its molecular components for use by body cells?	4. Digestion
	5. What is the expulsion of solid waste from the body known as?	5. Defecation





## DP 11: Identify the impact of the digestive system on homeostasis

Source: TLO 18, ELO 18-D, LSA 1

### 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 digestive system's components and their significance.
- b. Metahumans: [Selected eMentor for the A&P course named Shurman.](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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 (or animation) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (b) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#)
  - (1) Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 18-D, LSA 1
- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (structure on one side, function on the other) and interactive hotspots are available for the learner to select which





reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which structure/function content they want to learn about in a non-sequential fashion.

c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 11: Identify the impact of the digestive system on homeostasis.</b>	
<i>Source: TLO 18, ELO 18-D, LSA 1</i>	
<b>STRUCTURE</b>	<b>FUNCTION</b>
<ol style="list-style-type: none"><li>1. Identify how the digestive system impacts the other systems of the body to maintain homeostasis:<ol style="list-style-type: none"><li>a. Digestive System: Excess dietary calories are stored as triglycerides (fats) in adipose cells in the dermis and subcutaneous layer.</li><li>b. Skeletal System: The small intestine absorbs dietary calcium and phosphorus salts required to build the bone's extracellular matrix.</li></ol></li><li>2. Muscular System:<ol style="list-style-type: none"><li>a. The liver can convert lactic acid (created by muscles during exercise) to glucose.</li><li>b. Protein processed by the digestive system is essential for muscle growth and development.</li></ol></li><li>3. Nervous System:<ol style="list-style-type: none"><li>a. Gluconeogenesis in the liver, along with digestion and absorption of dietary carbohydrates, provides glucose required for adenosine triphosphate (ATP) production by neurons.</li></ol></li><li>4. Endocrine System:<ol style="list-style-type: none"><li>a. The liver inactivates some hormones, ending their activity.</li><li>b. Pancreatic islets release insulin and glucagon.</li><li>c. Cells in the mucosa of the stomach and small intestine release hormones that regulate digestive activities.</li><li>d. The liver produces angiotensinogen, a hormone that regulates blood pressure.</li></ol></li><li>5. Cardiovascular System:</li></ol>	<ol style="list-style-type: none"><li>1. Identify how the digestive system impacts homeostasis of the whole body:<ol style="list-style-type: none"><li>a. 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.</li><li>b. It absorbs water, minerals, and vitamins needed for the growth and function of body tissues.</li><li>c. The digestive system eliminates waste from body tissues in feces.</li></ol></li></ol>



<ul style="list-style-type: none"><li>a. The GI tract absorbs excess water that helps maintain blood volume and iron needed for the synthesis of hemoglobin in red blood cells.</li><li>b. Bilirubin from hemoglobin breakdown is partially excreted in feces.</li><li>c. The liver synthesizes most plasma proteins.</li></ul> <p>6. Lymphatic System and Immunity:</p> <ul style="list-style-type: none"><li>a. The acidity of gastric juices destroys bacteria and most toxins in the stomach.</li><li>b. Lymphatic nodules in the lamina propria of the gastrointestinal tract destroy microbes.</li></ul> <p>7. Respiratory System:</p> <ul style="list-style-type: none"><li>a. Pressure of abdominal organs against the diaphragm helps expel air quickly during forced exhalation.</li></ul> <p>8. Urinary System:</p> <ul style="list-style-type: none"><li>a. Absorption of water by the GI tract provides the water needed to excrete waste products in urine.</li></ul> <p>9. Reproductive System:</p> <ul style="list-style-type: none"><li>a. 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.</li></ul>	
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### 3. Checks on Learning: Homeostasis and Digestive System Quiz Challenge

Type	Question	Correct Answer
Multiple Choice	<ul style="list-style-type: none"><li>1. How does the digestive system impact the urinary system?</li><li>2. How does the digestive system impact the endocrine system?</li><li>3. Which system benefits from the acidity of gastric juices in the stomach?</li></ul>	<ul style="list-style-type: none"><li>1. Absorption of water by the GI tract provides the water needed for digestion.</li><li>2. The liver produces angiotensinogen, a hormone that regulates blood pressure.</li><li>3. Lymphatic system and immunity</li></ul>



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	<ol style="list-style-type: none"><li>4. What is the role of the digestive system in the muscular system?</li><li>5. How does the digestive system affect the cardiovascular system?</li></ol>	<ol style="list-style-type: none"><li>4. Digestion provides nutrients essential for muscle growth.</li><li>5. The GI tract absorbs excess water that helps maintain blood volume.</li></ol>
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## TRANSITION TO PATHOPHYSIOLOGY

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### **Metahumans:**

Selected eMentor for the A&P course. (Shurman) not a metahuman video but still images of Shurman in different positions/expressions with audio narration voice-over



## DP 12: Identify the cause of abdominal pain based on patient signs and symptoms

Source: TLO 19, ELO 19-A, LSA 1

### 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 digestive system's components and their significance in pathophysiology of digestive system symptoms and conditions.
- b. Metahumans: Selected eMentor for the A&P course. Shurman
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
  - (2) 360 Images:
    - (a) 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. [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com/3d-models/3d-human-anatomy-ultimate/)
    - (b) 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 the learner navigates 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com/3d-models/3d-human-anatomy-ultimate/). Additional images available for use may be repurposed from other courses in the 68W pathophysiology curriculum (see LA crosswalk).
- b. Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 19-A, LSA 1



- b. Primary Strategy (Treatment): Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (conditions on one side, symptoms on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which condition/symptom content they want to learn about in a non-sequential fashion.
- c. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 12: Identify the cause of abdominal pain based on patient signs and symptoms.</b>	
<i>Source: TLO 19, ELO 19-A, LSA 1</i>	
<b>CONDITION</b>	<b>SYMPTOMS</b>
<ol style="list-style-type: none"><li>1. Esophagitis</li><li>2. Gastroesophageal Reflux Disease (GERD)</li><li>3. Gastrointestinal Hemorrhage</li><li>4. Gallstones (Biliary Tract Disease)</li><li>5. Appendicitis</li><li>6. Diverticular Disease, Diverticulosis, and Diverticulitis</li><li>7. Small Bowel Obstruction</li><li>8. Peritonitis</li></ol>	<ol style="list-style-type: none"><li>1. Esophagitis<ol style="list-style-type: none"><li>a. Severe pain with swallowing</li><li>b. Dysphagia (difficulty swallowing)</li><li>c. Nausea and vomiting</li><li>d. Heartburn (burning sensation near the heart)</li><li>e. Radiating pain to the back and neck</li><li>f. Diaphoresis (excessive sweating), dyspnea (shortness of breath)</li><li>g. Chronic cough and wheezing</li></ol></li><li>2. Gastroesophageal Reflux Disease (GERD)<ol style="list-style-type: none"><li>a. Severe pain with swallowing</li><li>b. Dysphagia (difficulty swallowing)</li><li>c. Nausea and vomiting</li><li>d. Heartburn (burning sensation near the heart)</li><li>e. Chronic cough and wheezing</li></ol></li><li>3. Gastrointestinal Hemorrhage<ol style="list-style-type: none"><li>a. Black, tarry stools (melena) after bleeding stops</li></ol></li><li>4. Gallstones (Biliary Tract Disease)<ol style="list-style-type: none"><li>a. Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic)</li><li>b. Constant pain, worsens with movement (acute cholecystitis)</li></ol></li></ol>



	<ul style="list-style-type: none"> <li>c. Similar symptoms to acute cholecystitis (emphysematous cholecystitis)</li> <li>d. Asymptomatic but may have a history of colic attacks (chronic cholecystitis)</li> </ul> <ul style="list-style-type: none"> <li>5. Appendicitis           <ul style="list-style-type: none"> <li>a. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain</li> <li>b. Anorexia, nausea, and vomiting</li> <li>c. Pain, nausea, vomiting, and low-grade fever</li> </ul> </li> <li>6. Diverticular Disease, Diverticulosis, and Diverticulitis           <ul style="list-style-type: none"> <li>a. Abdominal bloating and mild diffuse abdominal discomfort</li> <li>b. Passage of hard stool and rectal bleeding</li> </ul> </li> <li>7. Small Bowel Obstruction           <ul style="list-style-type: none"> <li>a. Severe abdominal pain</li> <li>b. Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation</li> <li>c. Severe abdominal pain</li> </ul> </li> <li>8. Peritonitis           <ul style="list-style-type: none"> <li>a. Severe abdominal pain</li> </ul> </li> </ul>
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### 3. Checks on Learning: Symptoms and Their Medical Causes Quiz

Type	Question	Correct Answer
Multiple Choice	1. Symptoms: Severe pain with swallowing Which condition is most likely causing these symptoms?	1. Severe pain may indicate gastroesophageal reflux disease (GERD).
	2. Symptoms: Nausea and vomiting Which condition is most likely causing these symptoms?	2. Nausea and vomiting may indicate peritonitis.
	3. Symptoms: Radiating pain to the back and neck	3. Radiating pain in the back and neck may indicate gallstones (Biliary Tract Disease).



	<p>Which condition is most likely causing these symptoms?</p> <p>4. Symptoms: Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic) Which condition is most likely causing these symptoms?</p> <p>5. Symptoms: Chronic cough and wheezing Which condition is most likely causing these symptoms?</p> <p>6. Symptoms: Abdominal distension and tenderness Which condition is most likely causing these symptoms?</p> <p>7. Symptoms: Diffuse periumbilical discomfort progressing to localized right lower quadrant pain Which condition is most likely causing these symptoms?</p> <p>8. Symptoms: Black, tarry stools (melena) after bleeding stops Which condition is most likely causing these symptoms?</p> <p>9. Symptoms: Constant pain, worsens with movement Which condition is most likely causing these symptoms?</p> <p>10. Symptoms: Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation Which condition is most likely causing these symptoms?</p>	<p>4. Intermittent pain in the upper abdomen or radiating to the right shoulder blade may indicate gallstones (Biliary Tract Disease).</p> <p>5. Gastroesophageal reflux disease (GERD).</p> <p>6. Constipation, irritable bowel syndrome (IBS), or abdominal bloating.</p> <p>7. This could be a sign of appendicitis.</p> <p>8. Melena can be a sign of upper gastrointestinal bleeding, which may be caused by conditions such as peptic ulcers, gastritis, or esophageal varices.</p> <p>9. Constant abdominal pain may be muscle strains, hernias, or even inflammatory conditions like appendicitis.</p> <p>10. These symptoms could be indicative of a bowel obstruction.</p>
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## DP 13: Identify the impact of abdominal wounds and other trauma on the digestive system

Source: TLO 19, ELO 19-B, LSA 1

### 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 digestive system's components and their significance
- b. Metahumans: [Selected eMentor for the A&P course named Shurman](#)
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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. Possible Image Source [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (b) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#). Additional images available for use may be repurposed from other courses in the 68W pathophysiology curriculum (see LA crosswalk).
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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. Possible Image Source [3D human anatomy ultimate \(turbosquid.com\)](#)
      - (b) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](#). Additional images available for use may be repurposed from other courses in the 68W pathophysiology curriculum (see LA crosswalk).
- d. Injuries/Parts of the body: Wounds/abdominal cavity

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 19-B, LSA 1
- b. Primary Strategy (Treatment):



- c. Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (conditions on one side, symptoms on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which condition/symptom content they want to learn about in a non-sequential fashion
- d. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 14: Identify the impact of abdominal wounds and other trauma on the digestive system.</b>	
<i>Source: TLO 19, ELO 19-B, LSA 1</i>	
<b>CONDITION</b>	<b>SYMPTOMS</b>
<ul style="list-style-type: none"><li>1. Wounds:<ul style="list-style-type: none"><li>a. Evaluation Considerations for Stable Penetrating Trauma</li><li>b. Concerns with Penetrating Abdominal Trauma</li><li>c. Areas of Abdominal Injury</li><li>d. Approximate Percentage of Organs Injured with Penetrating Trauma</li></ul></li><li>2. Hypovolemic Shock:<ul style="list-style-type: none"><li>a. Overview of Circulatory Shock Types</li><li>b. Hypovolemic Shock - Hinshaw and Cox Classification</li><li>c. Signs and Symptoms of Hypovolemic Shock</li></ul></li></ul>	<ul style="list-style-type: none"><li>1. Wounds:<ul style="list-style-type: none"><li>a. 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.</li><li>b. The primary concerns associated with penetrating abdominal trauma 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 energy expended causing the wound can indicate the extent of damage, with military weapons typically causing more damage than lower caliber weapons.</li><li>c. The areas of the abdomen where injury may occur are listed, along with the intraperitoneal and retroperitoneal organs that may be affected.</li><li>d. stab wounds VS gunshot wounds</li></ul></li><li>2. Hypovolemic Shock:</li></ul>



- a. the concept of shock as the most severe circulatory dysfunction and explains that there are four types of circulatory shock:
  - (1) hypovolemic,
  - (2) cardiogenic,
  - (3) distributive, and
  - (4) obstructive.
3. The Hinshaw and Cox classification typically includes several categories, such as:
  - a. **Type I:** These are simple abscesses, often resulting from a localized infection. They are confined to a single organ or space within the abdomen or pelvis.
  - b. **Type II:** These abscesses are considered as postoperative or post-traumatic. They develop as a complication after surgical procedures or injuries and may involve multiple organs or spaces.
  - c. **Type III:** Type III abscesses are complex and often result from perforated viscera (such as a ruptured appendix or diverticulitis). They can be associated with generalized peritonitis and are usually more severe.
  - d. **Type IV:** Type IV abscesses are also complex but are associated with underlying diseases like Crohn's disease or cancer. They are often chronic and challenging to manage.
  - e. Various signs and symptoms used to assess and diagnose hypovolemic shock, such as
    - (1) vital signs (respiratory rate, blood pressure, heart rate),
    - (2) orthostatic blood pressure, pulse pressure, and
    - (3) the importance of history and physical examination in identifying circulatory abnormalities.



### 3. Checks on Learning: Shock and Penetrating Trauma Knowledge Challenge

Type	Question	Correct Answer
Multiple Choice	<ol style="list-style-type: none"><li>1. What are the primary concerns associated with penetrating abdominal trauma?</li><li>2. Which of the following is NOT a consideration for evaluating patients with stable penetrating trauma?</li><li>3. What is the main focus of the Hypovolemic Shock section?</li><li>4. In penetrating trauma, what factor can indicate the extent of damage caused by the wound?</li><li>5. What are the four types of circulatory shock mentioned in the content?</li><li>6. What do signs and symptoms of hypovolemic shock include?</li><li>7. Which classification is used to identify different causes of hypovolemic shock?</li><li>8. What can blood and abdominal organ contents released during trauma cause?</li></ol>	<ol style="list-style-type: none"><li>1. Peritonitis and hemodynamic instability</li><li>2. Availability of local diagnostic and surgical resources</li><li>3. Hypovolemic shock</li><li>4. The energy expended causing the wound</li><li>5. Hypovolemic, Cardiogenic, Distributive, and Obstructive shock</li><li>6. Orthostatic blood pressure, pulse pressure, and tachycardia</li><li>7. Hinshaw and Cox Classification</li><li>8. Peritonitis and hemodynamic instability</li></ol>



## DP 15: Identify eating disorders

Source: TLO 19, ELO 19-C, LSA 1

### 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 digestive system's components and their significance
- b. Metahumans: Selected eMentor for the A&P course. Shurman
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
  - (2) 360 Images:
    - (a) 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. [3D human anatomy ultimate \(turbosquid.com\)](#)
    - (b) 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. [3D human anatomy ultimate \(turbosquid.com\)](#). Additional images available for use may be repurposed from other courses in the 68W pathophysiology curriculum (see LA crosswalk).
- d. Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 19-C, LSA 1



- b. Primary Strategy (Treatment):
- c. Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (conditions on one side, symptoms on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which condition/symptom content they want to learn about in a non-sequential fashion.
- d. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 15: Identify eating disorders</b>	
<i>TLO 19, ELO 19-C, LSA 1</i>	
<b>CONDITION</b>	<b>SYMPTOMS</b>
<ul style="list-style-type: none"><li>1. Esophagitis<ul style="list-style-type: none"><li>a. Definition: Inflammation or infection of the esophagus</li><li>b. Causes: Reflux of gastric contents, infectious organisms (e.g., Candida species, cytomegalovirus, herpes simplex virus), corrosive agents or direct contact with swallowed pills</li></ul></li><li>2. Gastroesophageal reflux disease (GERD)<ul style="list-style-type: none"><li>a. Definition: Constellation of symptoms or complications resulting from gastric contents reflux into the esophagus</li><li>b. Causes: Inadequate closure of lower esophageal sphincter after food enters the stomach</li></ul></li><li>3. Gastrointestinal hemorrhage<ul style="list-style-type: none"><li>a. Definition: Bleeding in the gastrointestinal tract</li><li>b. Causes: Vascular injury or erosion, gastrointestinal disorders, anticoagulant use, alcohol intake</li></ul></li><li>4. Gallstones (Biliary Tract Disease)</li></ul>	<p>Symptoms:</p> <ul style="list-style-type: none"><li>1. Severe pain with swallowing</li><li>2. Dysphagia (difficulty swallowing)</li><li>3. Nausea and vomiting</li><li>4. Heartburn (burning sensation near the heart)</li><li>5. Radiating pain to the back and neck</li><li>6. Diaphoresis (excessive sweating), dyspnea (shortness of breath)</li><li>7. Chronic cough and wheezing</li><li>8. Abdominal distension and tenderness</li><li>9. Black, tarry stools (melena) after bleeding stops</li><li>10. Intermittent pain in the upper abdomen or radiating to the right shoulder blade (biliary colic)</li><li>11. Constant pain, worsens with movement (acute cholecystitis)</li><li>12. Similar symptoms to acute cholecystitis (emphysematous cholecystitis)</li></ul>



<ul style="list-style-type: none"> <li>a. Definition: Formation of stones in the gallbladder or biliary tract</li> <li>b. Causes: Excessive cholesterol or bilirubin</li> </ul> <p>5. Appendicitis</p> <ul style="list-style-type: none"> <li>a. Definition: Inflammation of the appendix</li> <li>b. Causes: Luminal obstruction leading to bacterial overgrowth and distention</li> </ul> <p>6. Diverticular Disease, Diverticulosis, and Diverticulitis</p> <ul style="list-style-type: none"> <li>a. Definition: Inflammation of diverticula in the colon</li> <li>b. Causes: Weakness in the muscularis of the colon wall</li> </ul> <p>7. Small bowel obstruction</p> <ul style="list-style-type: none"> <li>a. Definition: Bowel occlusion at one or more points in the small intestine</li> <li>b. Causes: Entrapment of bowel in a hernia (closed-loop obstruction)</li> </ul> <p>8. Peritonitis</p> <ul style="list-style-type: none"> <li>a. Definition: Acute inflammation of the peritoneum</li> <li>b. Causes: Contamination of the peritoneum by infectious microbes (bacteria)</li> </ul>	<p>13. Asymptomatic but may have a history of colic attacks (chronic cholecystitis)</p> <p>14. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain (appendicitis)</p> <p>15. Anorexia, nausea, and vomiting (appendicitis)</p> <p>16. Pain, nausea, vomiting, and low-grade fever (diverticulitis)</p> <p>17. Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation (small bowel obstruction)</p> <p>18. Severe abdominal pain (peritonitis)</p> <p>19. Abdominal bloating and mild diffuse abdominal discomfort (functional constipation)</p> <p>20. Passage of hard stool and rectal bleeding (functional constipation)</p>
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### 3. Checks on Learning: Abdominal Pain and Symptoms Challenge

Type	Question	Correct Answer
Matching	Instructions: In this assessment, you'll be presented with various conditions and their corresponding symptoms related to abdominal pain.	<ul style="list-style-type: none"> <li>a. Esophagitis</li> <li>b. Gastrointestinal hemorrhage</li> </ul>



	<p>Match each symptom with the correct condition. Select the correct condition from the list provided for each symptom.</p> <p>Condition</p> <ul style="list-style-type: none"><li>a. Esophagitis</li><li>b. Gastroesophageal reflux disease (GERD)</li><li>c. Gastrointestinal hemorrhage</li><li>d. Gallstones (Biliary Tract Disease)</li><li>e. Appendicitis</li><li>f. Diverticular Disease, Diverticulosis, and Diverticulitis</li><li>g. Small bowel obstruction</li><li>h. Peritonitis</li></ul> <p>Symptom</p> <ul style="list-style-type: none"><li>a. Severe pain with swallowing</li><li>b. Nausea and vomiting</li><li>c. Chronic cough and wheezing</li><li>d. Intermittent pain in the upper abdomen or radiating to the right shoulder blade</li><li>e. Abdominal distension and tenderness</li><li>f. Black, tarry stools (melena) after bleeding stops</li><li>g. Diffuse periumbilical discomfort progressing to localized right lower quadrant pain</li><li>h. Colicky abdominal pain, nausea, vomiting, abdominal distension, and obstipation</li><li>i. Severe abdominal pain</li><li>j. Passage of hard stool and rectal bleeding</li></ul>	<ul style="list-style-type: none"><li>c. Gastroesophageal reflux disease (GERD)</li><li>d. Gallstones (Biliary Tract Disease)</li><li>e. Appendicitis</li><li>f. Diverticular Disease, Diverticulosis, and Diverticulitis</li><li>g. Small bowel obstruction</li><li>h. Peritonitis</li><li>i. Peritonitis</li><li>j. Diverticular Disease, Diverticulosis, and Diverticulitis</li></ul>
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## DP 16: Identify the impact of biologic poisoning and liver toxicity on the digestive system

Source: TLO 19, ELO 19-C, LSA 1

### 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 digestive system's components and their significance.
- b. Metahumans: Selected eMentor for the A&P course. Shurman
- c. Specific Assets:
  - (1) Images:
    - (a) N/A
    - (2) 360 Images:
      - (a) 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. Possible Image Source: [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com)
      - (b) 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. Possible Imager Source: [3D human anatomy ultimate \(turbosquid.com\)](https://www.turbosquid.com). Additional images available for use may be repurposed from other courses in the 68W pathophysiology curriculum (see LA crosswalk
  - (1) Injuries/Parts of the body: No injuries/body parts listed above.

### 2. Content and Strategies

- a. LSA Information: [LA and ELO] ELO 19-D, LSA 1
- b. Primary Strategy (Treatment):



- c. Interactive high-resolution anatomical images of body parts specific to digestive system are displayed in a side-by-side approach (conditions on one side, symptoms on the other) and interactive hotspots are available for the learner to select which reveal content in popup windows or navigate the learner to additional screens with audio narration and additional content/images using a topic menu structure. This strategy is engaging, self-paced, and provides the learner with choice as to which condition/symptom content they want to learn about in a non-sequential fashion.
- d. Adaptive Strategy: Job Aids for download for all instructional content

<b>DP 16: Identify the impact of biologic poisoning and liver toxicity on the digestive system</b>	
<i>Source: TLO 19, ELO 19-C, LSA 1</i>	
<b>CONDITION</b>	<b>SYMPTOMS</b>
<p><b>Condition: Anthrax Exposure</b></p> <ol style="list-style-type: none"><li>1. Anthrax is a globally distributed zoonotic disease caused by spores.</li><li>2. It begins in livestock and wild herbivores and can pass to humans.</li><li>3. Anthrax spores can enter the body through skin abrasions, ingestion, inhalation, and even drug injection.</li><li>4. Once inside the body, anthrax spores are phagocytosed by macrophages and can cause massive septicemia.</li><li>5. Clinical manifestations of anthrax include cutaneous, oropharyngeal-gastrointestinal, and inhalational forms.</li><li>6. Cutaneous anthrax shows as a self-limited edematous ulcer on the skin.</li><li>7. Oropharyngeal-gastrointestinal anthrax results from consuming contaminated animal products and affects the oropharynx and GI tract.</li></ol>	<p><b>Symptoms: Anthrax Exposure – Cutaneous, Oropharyngeal-Gastrointestinal, Inhalational Forms</b></p> <ol style="list-style-type: none"><li>1. Cutaneous anthrax results in a self-limited edematous ulcer on the skin.</li><li>2. Oral and GI anthrax come from consuming contaminated animal products and cause ulcerative disease of the oropharynx and GI tract.</li><li>3. Inhalation anthrax is the most severe form, associated with deliberate biological attack through inhaling anthrax spores.</li><li>4. Inhalational form starts with protean systemic symptoms, rapidly advancing to mediastinitis, septic shock, meningitis, and death if untreated.</li></ol>



<p>8. Inhalation anthrax is the most severe form and involves protean systemic symptoms, mediastinitis, septic shock, meningitis, and death if untreated.</p>	
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### 3. Checks on Learning: Anthrax on the Loose

Type	Question	Correct Answer
Multiple Choice	<p>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.</p> <p>Which form of anthrax exposure are they likely experiencing?</p> <p><b>Options:</b></p> <ul style="list-style-type: none"><li>a. Cutaneous anthrax – Symptoms: Self-limited edematous ulcer, weakness, nausea, malaise.</li><li>b. Inhalation anthrax – Symptoms: Weakness, nausea, malaise, septic shock.</li><li>c. Oral and GI anthrax – Symptoms: Skin ulcer, septic shock, meningitis.</li><li>d. Inhalation anthrax – Symptoms: Ulcerative disease of the oropharynx, mediastinitis.</li></ul> <p>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</p>	<p><b>Correct Answer:</b> a. Cutaneous anthrax</p>



	spores, along with constitutional symptoms like weakness, nausea, and malaise.	
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### 3.0 Review and Reflect

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You have learned to identify the components, characteristics, and functions of the digestive system. [add scripting in storyboard to reflect back to motivator for relevance, this could be a still shot of eMentor (as a Flat Stanley) with voice-over].

As a review of what we have learned, let's summarize the objectives:

- We have learned to identify the components, characteristics, and functions of the digestive system.
- We have gained knowledge in identifying common digestive system pathophysiology.
- We can now recognize the components, functions, and anatomy of the gastrointestinal tract.
- Our learning has enabled us to identify the components, functions, and anatomy of accessory organs that assist with digestion.
- We now understand the functions and processes of the digestive system.
- We have learned to recognize the impact of the digestive system on homeostasis.
- Our knowledge allows us to identify the cause of abdominal pain based on patient signs and symptoms.
- We can now identify the impact of abdominal wounds and other trauma on the digestive system.
- We have learned to identify eating disorders.
- Our understanding extends to identifying the impact of biologic poisoning and liver toxicity on the digestive system.