CCPS Science Unit Plan

Grade	10-12	**Subject: Human Anatomy & Physiology**	Science	**Unit #**	4
Unit Name	**Transport:** Cardiovascular, Respiratory, Urinary and Digestive Systems		**Timeline**	4 weeks	
How to use the Framework	This Framework should be used to implement daily science instruction. The resources and instructional strategies reflected in the Framework will provide a foundation for effective implementation and student mastery of standards. Please see the hyperlinked abbreviation document to ensure understanding all abbreviations used with this framework.				
Unit Overview	**This unit introduces the learner to the general processes that support the cardiovascular, respiratory, digestive and urinary systems.** 1. Students begin this unit by learning about the anatomy of the heart and learning the names of all of the major chambers, valves, and vessels. They will then take that knowledge and apply it to learning how those components help blood cycle through the body and how that cycle is controlled by an electrical impulse generated inside of the heart. Finally, they will learn the variety of disorders and diseases that a person with an unhealthy heart might be exposed to. 2. Next, students learn about the anatomy of the respiratory system, (including: nose, nasopharynx, oropharynx, hypopharynx, larynx, trachea, carina, primary bronchi, secondary bronchi, bronchioles, alveoli, lungs, and diaphragm) and their corresponding roles in respiration. Students will then learn about the major functions of the respiratory system and how each structure plays a role in inspiration and expiration, how gasses are exchanged at the alveolar-capillary membrane, and how the oxygen brought into the body is ultimately used for cellular respiration. Finally, they will learn the variety of disorders and diseases that may affect the respiratory system. 3. Students continue this unit with an exploration of the digestive system (including: mouth, pharynx, esophagus, stomach, small intestine [duodenum, jejunum, and ileum], large intestine, rectum, anus, pancreas, liver, gallbladder, salivary glands) and their corresponding roles. Students will then explore the 4 major digestive functions: ingestion, digestion, absorption, and excretion and the implications of each of these functions to the body as a whole. Lastly, they will investigate the disorders and diseases that may affect the digestive system as well as the natural decline of these organs due to senescence. 4. Students will wrap up unit 4 with the urinary system. Students will learn about the kidneys, ureters, urinary bladder, and urethra and their contributions to urinary processes. Students will further explore the anatomy of the neuron: the functional unit of the kidney and explore the process of urine formation: filtration, reabsorption, and secretion. Students will gain hands-on learning experience with a kidney dissection. They will conclude the unit by learning about urinary disorders and diseases, as well as the effects of senescence on the urinary system. **Prior to beginning this unit, check for the following equipment/supplies. Communicate with your department chair if you are unable to locate any necessary materials.** • Lab apron • goggles • latex gloves • Sheep heart specimens (1 specimen per 3 students) • Sheep kidney specimens (1 specimen per 3 students) • Dissection Tray • Forceps • dissecting pins • scalpel • paper towel • scissors				

	• (blunt) probe
Lesson Plan guidance document and template	Department of Science Guidance Document Lesson Plan Template Week View GADOE Science Updates

3Dimensional Instruction

GSE	Science and Engineering Practices	Crosscutting Concepts
SAP4. Obtain, evaluate, and communicate information to analyze the processing of matter and energy in the cardiovascular, respiratory, digestive and urinary systems. **a.** Plan and carry out an investigation to explore the structures and role of the cardiovascular and respiratory systems in obtaining oxygen, transporting nutrients, and removing waste. **b.** Develop and use models to explain the relationship between the structure and function of the digestive and urinary systems as they utilize matter to derive energy and eliminate waste. **c.** Ask questions about the interdependence of the cardiovascular, respiratory, urinary and digestive systems. (Clarification statement: Questions should address the homeostatic mechanisms, as well as the effects of and responses to aging, diseases, and disorders).	**HS-LS1-2:** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. **HS-LS1-3**: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	**Systems and System Models** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

NGSS Alignment	NGSS Alignment to Disciplinary Core Ideas

Weekly Lesson Tasks

Week 1	
GSE: SAP4a, SAP4c	**Focused Concept: Cardiovascular System**

	• The major Cardiovascular structures (cellular, tissue, and organ composition) and their corresponding functional roles
	  ○ Heart
	  ○ Blood: plasma, red blood cells, white blood cells, and platelets
	  ○ Blood vessels: arteries, veins, and capillaries
	• Pathologies that disrupt typical structural makeup and/or functional abilities of the Cardiovascular system
	• The interdependence of the cardiovascular system and the digestive, urinary, and respiratory systems

Phenomenon: How do substances move around the body?	**DQ:** **1. What are the major structures and functions of the Cardiovascular system?** **2. How do the structures of the cardiovascular system work together to achieve transportation of substances throughout the entire body?** **3. How do pathologies and senescence affect the anatomy and physiology of the cardiovascular system?** **4. How does the cardiovascular system depend on the actions of the respiratory, digestive, and urinary systems?**
SEP: HS-LS1-2, HS-LS1-3	**CCC: Systems and System Models, Structure and Function, Stability and Change**

	Day 1	Day 2	Day 3	Day 4	Day 5
Learning Targets **The students will be able to:**	1. Identify the major structures and functions of the cardiovascular system 2. Differentiate between the anatomy and physiology of the atria, ventricles, and major blood vessels of the heart.	1. Demonstrate their knowledge of the anatomy of the heart 2. Trace the pathway of blood through the heart.	1. Identify and describe the roles of the 4 major components of blood. 2. Name and describe the 5 major functions of blood: transportation, pH stabilization, temperature regulation, immune defense, and clotting.	1. Differentiate between the 3 major types of blood vessels: arteries, veins, and capillaries.	1. Name and describe the affects of pathologies on the anatomy and physiology of the cardiovascular system. 2. Discuss the affects of senescence on the cardiovascular system.
Opening **(10-15 minutes)** ***TTW: "the teacher will"*** ***TSW: "the student will"*** ***Show students the Phenomenon Unit 4 Ppt Daily***	**Introduction to the Cardiovascular System and the anatomy of the heart** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students:	**The Pathway of Blood Through the Heart** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what	**Introduction to Blood: Plasma and Formed Elements and the 5 major functions of the cardiovascular system** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking.	**3 Major Blood Vessels of the Body** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what	**Cardiovascular Pathologies and Senescence** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What

	What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Systemic circulation • Pulmonary circulation • Pericardium • Epicardium • Myocardium • Endocardium • Atria • Ventricle • Septum • Tricuspid • Sinoatrial node • Pacemaker • Atrioventricular node • AV bundle • Purkinje fibers • Electrocardiogram **Hole's Essentials Reference Pages: 460-472**	you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Mitral valve • Aorta • Aortic valve • Coronary artery • Cardiac veins • Coronary sinus • Systole • Diastole • Cardiac cycle • Lub-dup • Papillary muscle • Pulmonary valve **Hole's Essentials Reference Pages: 473-480**	• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Vasoconstriction • Vasodilation • conduction system • Blood volume • Viscosity • Formed elements • platelets • plasma • red blood cells • white blood cells **Hole's Essentials Reference Pages: 428-449**	you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Artery • Arteriole • Capillary • Venule • Veins • Vasoconstriction • Vasodilation • Capillary exchange • Jugular • Carotid • Iliac • Femoral • Mesenteric • Ulnar **Hole's Essentials Reference Pages: 481-488**	do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • cardiomyopathy • heart failure • heart attack • heart disease • cardiovascular exercise **Hole's Essentials Reference Pages: 437, 443, 472, 483**
Guided Practice/ Transition (20 minutes) TTW ask clarifying questions to increase students' engagement and check for understanding throughout the lesson. **Transition to Work Session**	**TTW provide direct instruction over an introduction to the Cardiovascular System. TTW then give an overview of the anatomy of the human heart, emphasizing:** • **pulmonary vs. systemic circulation** • **atria** • **ventricles**	**TTW facilitate a quick class review of the pathway that blood takes as it moves through the heart, lungs, and body.** **TTW emphasize important vocabulary pertinent to the dissection.** **TTW lead students to**	**TTW provide direct instruction over the anatomy and physiology of the components of vascular tissue (blood)** • **plasma** • **red blood cells** • **white blood cells** • **platelets** • **antigens** • **antibodies**	**TTW provide direct instruction over the 3 major types of blood vessels and their anatomical and physiological differences:** • **arteries** • **veins** • **capillaries**	**TTW provide direct instruction over the pathologies and senescence of the cardiovascular system, emphasizing ways in which we can keep the cardiovascular system healthy.**

	• **superior and inferior vena cava** • **pulmonary artery** • **pulmonary vein** • **aorta** **TSW take free notes in their notebook, ask and answer questions, and participate in content checkpoints.**	**recall important lab safety protocols before distributing the specimen and beginning the lab activity.** ***TTW will prepare the lab for students to identify brain structures.*** **Supplies Needed:** • Dissection Tray • Forceps • dissecting pins • labels • scalpel • paper towel • scissors • (blunt) probe • apron and goggles • nitrile gloves • Sheep Heart specimen			
Independent Practice (45-50 minutes) **TTW circulate the room to monitor the students performance and clarify instruction as needed with daily independent practice.** **Refer to supplemental resources for additional assignments during idle time**	**TSW engage in an activity that reinforces their understanding of the anatomy of the heart in preparation for the following day's dissection.** Virtual activity Physical Handout See Hole's Essential Teacher Manual **pages 244-247** for additional guidance.	Sheep Heart Dissection Lab	**Hole's Essentials Blood Doping Case Study CER: pg.429**	**Build-a-Spinner** See Hole's Essential Teacher Manual **page 250** for hands-on activity that allows for practice with vocabulary terms. Blood Vessel Close Read and Venn Diagram	**Hole's Essential Chapter Review Questions pg. 506-508.** **After completing the assessment, TSW complete a Respiratory graphic organizer that introduces the Respiratory System.**
Assessment Summary (5-10 minutes) ***Formative Assessment should have between 15 to 20 questions***	Exit Ticket	**TSW submit individual lab reports to demonstrate their mastery of the content.**	Exit Ticket	Exit Ticket	Exit Ticket
Small Group Tasks (TBA)	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.

Week 2					
GSE: SAP4a, SAP4c	**Focused Concept: Respiratory System** • The major Respiratory structures (cellular, tissue, and organ composition) and their corresponding functional roles • The diffusion that occurs at the alveolar-capillary membrane that allows the cells of the body to receive the oxygen brought in during inspiration • Pathologies that disrupt typical structural makeup and/or functional abilities of the Respiratory System • The interdependence of the cardiovascular and respiratory systems				
Phenomenon: How does oxygen actually keep us alive? What are we doing with it once we inhale it?	**DQ:** **1. What are the major structures and functions of the Respiratory system?** **2. How do the structures of the respiratory system work together to make respiration possible?** **3. How do pathologies and senescence affect the anatomy and physiology of the respiratory system?** **4. How does the respiratory system depend on the cardiovascular system in order to function successfully and vice versa?**				
SEP: Develop and Use Models **Construct an Explanation** **Plan and Carry out an Investigation**	**CCC: Systems and System Models, Structure and Function, Stability and Change**				
	Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Learning Targets **The students will be able to:**	1. Identify the major structures and functions of the respiratory system 2. Explain the significance of respiration	1. Name and describe the role of each of the respiratory structures.	1. Discuss the significance of each step of respiration: pulmonary ventilation, external respiration, and internal/cellular respiration.	1. Name and describe the effects of pathologies on the anatomy and physiology of the respiratory system. 2. Discuss the effects of senescence on the respiratory system.	1. Demonstrate their mastery of content through formative assessment.
Opening **(10-15 minutes)**	**Intro to the Respiratory System** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you	**Respiratory System Structures** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you	**Respiratory System Functions** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you	**Respiratory Pathologies and Senescence and Review** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What	**Cardiovascular and Respiratory Quiz** **TTW answer questions to prepare students for their formative assessment.**

	think about what you are seeing? What does it make you wonder?
	• TTW provide students opportunities to share observations and develop questions.
	• TTW record students' questions to direct instruction.
	• TTW ask questions to connect concepts from the previous weeks' instruction.
	
	Vocabulary: TSW add terms to the Digital KIM Chart
	• respiration
	• inspiration
	• expiration
	• cellular respiration
	• ATP
	
	Hole's Essentials Reference Pages: 600-602
		think about what you are seeing? What does it make you wonder?
		• TTW provide students opportunities to share observations and develop questions.
		• TTW record students' questions to direct instruction.
		• TTW ask questions to connect concepts from the previous day's instruction.
		
		Vocabulary: TSW add terms to the Digital KIM Chart
		• nose
		• nasal cavity
		• pharynx: nasopharynx, oropharynx, & hypopharynx
		• larynx
		• trachea
		• carina
		• bronchi
		• bronchioles
		• alveoli
		• lungs
		• diaphragm
		
		Hole's Essentials Reference Pages: 602-611
			think about what you are seeing? What does it make you wonder?
			• TTW provide students opportunities to share observations and develop questions.
			• TTW record students' questions to direct instruction.
			• TTW ask questions to connect concepts from the previous day's instruction.
			
			Vocabulary: TSW add terms to the Digital KIM Chart
			• alveolar-capillary membrane
			• pulmonary ventilation
			• external respiration
			• internal (cellular) respiration
			• medulla oblongata
			  ○ inspiratory center
			  ○ expiratory center
			  ○ rhythmicity center
			
			Hole's Essentials Reference Pages: 612-629
				do you see? What do you think about what you are seeing? What does it make you wonder?
				• TTW provide students opportunities to share observations and develop questions.
				• TTW record students' questions to direct instruction.
				• TTW ask questions to connect concepts from the previous day's instruction.
				
				Vocabulary: TSW add terms to the Digital KIM Chart
				• hantavirus
				• COPD
				• bronchitis
				• coronavirus
				• flu
				• hayfever
				• asthma
				• emphysema
				• pneumothorax
				• lung cancer
				
				Hole's Essentials Reference Pages: 605, 607, 617, 624	

Guided Practice/Transition (20 minutes) TTW ask clarifying questions to increase students' engagement and check for understanding throughout the lesson. Transition to Work Session	**TTW provide direct instruction over an introduction to the Respiratory System, emphasizing:** • **major structures** • **the 3 steps of respiration: external respiration, internal respiration, and cellular respiration** • **gas exchange of oxygen and carbon dioxide**	**TTW provide direct instruction over the structures of the respiratory system** • **nose** • **pharynx** • **larynx** • **trachea** • **bronchi** • **bronchioles** • **alveoli** • **lungs** • **diaphragm**	**TTW provide direct instruction over the functions of the respiratory system, emphasizing:** • **inspiration and expiration** • **the 3 steps of respiration: external respiration, internal respiration, and cellular respiration** • **the gas exchange that**	**TTW provide direct instruction over the pathologies and senescence of the respiratory system, emphasizing ways in which we can keep the respiratory system healthy.**	**TTW answers any student questions to prepare them for their formative assessment.**

	between body and environment **TSW take notes, ask and answer questions, and participate in content checkpoints.**		**occurs at the alveolar-capillary membrane** **TTW also discuss the brain's control over respiratory processes.**		
Independent Practice (45-50 minutes) TTW circulate the room to monitor the students performance and clarify instruction as needed with daily independent practice. **Refer to supplemental resources for additional assignments during idle time**	**Hole's Essentials Vaping Case Study CER: pg. 600-601** **TSW read the background information on Vaping vs Smoking on page 600. They will then complete their claim and begin collecting their evidence.**	**Lung Model Activity** See Hole's Essential Teacher Manual **page 310** for guidance. **TSW create a model of the lungs using the materials listed below.** Please Note: Before instruction, you may want to create your own model as an example. **Materials needed:** • Straws • balloons • plastic water bottles • rubber gloves • tape • modeling clay **TSW create a key to accompany their lung model showing which material represents parts of the lungs.**	**In groups of 4, TSW create a Giant Respiratory Graphic Organizer.** • Structure Cards • Function Cards Please Note: Before instruction, prepare copies of both the structure cards (print 4 slides per page) and function cards. **Materials needed:** • Giant post-it • Respiratory structure cards • Respiratory functions sheet • Glue • Scissors • Markers **TTW circulate the room to provide feedback, emphasizing the importance of demonstrating relationships between terms.**	**Hole's Essentials Vaping Case Study CER: pg. 600-601** **TSW complete the Evidence and Reasoning portions of the CER.** **Hole's Essential Chapter Review Questions pg. 632-633.** **TSW complete the review questions in preparation for the next day's assessment.**	**After completing the assessment, TSW complete guided notes that introduce them to the Digestive and Urinary systems.** ****Note**** Students can access the documents via "DocHub" for better formatting.
Assessment/Summary (5-10 minutes) ***Formative Assessment should have between 15 to 20 questions***	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**	**Exit Ticket** • Respiratory Bingo Please Note before instruction: Prepare a printed copy for students to rotate around the classroom. • Prepare the last **15-20 minutes** of class for the review game**	**Formative Assessment:** **Quiz 7: Cardiovascular and Respiratory** **(Google Form Assessment can be created using questions from** Hole's Essentials of Human Anatomy & Physiology

Small Group Tasks (TBA)	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	**Questions may be modified for students in small groups and/ or time in half should be provided to those students whose accommodations permits.**

Week 3					
GSE: SAP4b, SAP4c	**Focused Concept: The Digestive System** • The major Digestive structures (cellular, tissue, and organ composition) and their corresponding functional roles • The diffusion of nutrients that occurs in the jejunum of the small intestine allows the cells of the body to receive the nutrients they need to synthesize energy, hormones, tissue repairs, etc. • Pathologies that disrupt typical structural makeup and/or functional abilities of the digestive System • The interdependence of the cardiovascular and digestive systems				
Phenomenon: You are what you eat! Your body uses broken down molecular components of the food you ate to build your body!	**DQ:** **1. What are the major structures and functions of the Digestive system?** **2. How do the structures of the digestive system work together to make digestion, absorption, and excretion possible?** **3. How do pathologies and senescence affect the anatomy and physiology of the digestive system?** **4. How does the digestive system depend on the cardiovascular system in order to function successfully and vice versa?**				
SEP: Develop and Use Models **Construct an Explanation** **Plan and Carry out an Investigation**	**CCC: Systems and System Models, Structure and Function, Stability and Change**				
	Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Learning Targets **The students will be able to:**	1. Identify the major structures and functions of the digestive system 2. Explain the significance of digestion and its implications for the body as a whole.	1. Name and describe the role of each of the respiratory structures. 2. Explain the difference between the digestive tract and the accessory organs.	1. Discuss the processes of ingestion, digestion, absorption, and excretion and explain their significance to the system as a whole.	1. Name and describe the effects of pathologies on the anatomy and physiology of the digestive system. 2. Discuss the effects of senescence on the digestive system.	1. Identify the major structures and functions of the urinary system 2. Explain the significance of urine formation to the body as a whole.
Opening (10-15 minutes)	**Introduction to Digestive System** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt***	**Structures of the Digestive System** **Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt***	**Functions of the Digestive System And Introduction to Nutrients** **Phenomenon:** ***Show students the***	**Digestive Pathologies and Senescence and Review** **Phenomenon:** ***Show students the***	**Introduction to Urinary System and Kidney Anatomy** **Phenomenon:**

	• TTW Use the See-Think-Wonder protocol to guide student thinking.
	• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder?
	• TTW provide students opportunities to share observations and develop questions.
	• TTW record students' questions to direct instruction.
	• TTW ask questions to connect concepts from the previous weeks' instruction.
	
	Vocabulary: TSW add terms to the Digital KIM Chart
	• alimentary canal
	• chyme
	• nutrients
	• digestion
	• ingestion
	• absorption
	• excretion
	• villi
	• peristalsis
	• segmentation
	• lumen
	• mucous membrane
	• submucosa
	• muscularis
	• serosa
	
	Hole's Essentials Reference Pages: 546-550
		• TTW Use the See-Think-Wonder protocol to guide student thinking.
		• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder?
		• TTW provide students opportunities to share observations and develop questions.
		• TTW record students' questions to direct instruction.
		• TTW ask questions to connect concepts from the previous day's instruction.
		
		Vocabulary: TSW add terms to the Digital KIM Chart
		• salivary glands
		• moth
		• pharynx
		• esophagus
		• stomach
		• small intestine
		  ○ duodenum
		  ○ jejunum
		  ○ ileum
		• large intestine
		• rectum
		• anus
		• pancreas
		• gallbladder
		• liver
		
		Hole's Essentials Reference Pages: 551-581
			Phenomenon Unit 4 Ppt
			• TTW Use the See-Think-Wonder protocol to guide student thinking.
			• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder?
			• TTW provide students opportunities to share observations and develop questions.
			• TTW record students' questions to direct instruction.
			• TTW ask questions to connect concepts from the previous day's instruction.
			
			Vocabulary: TSW add terms to the Digital KIM Chart
			• chemical digestion
			• mechanical digestion
			• mastication
			• bolus
			• nutrients
			• carbohydrates
			• lipids
			• proteins
			• vitamins
			• minerals
			• adequate diets
			
			Hole's Essentials Reference Pages: 582-592
				Phenomenon Unit 4 Ppt
				• TTW Use the See-Think-Wonder protocol to guide student thinking.
				• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder?
				• TTW provide students opportunities to share observations and develop questions.
				• TTW record students' questions to direct instruction.
				• TTW ask questions to connect concepts from the previous day's instruction.
				
				Vocabulary: TSW add terms to the Digital KIM Chart
				• intolerance
				• allergy
				• Irritable Bowel Syndrome
				• Celiac
				• Crohn's
				• diarrhea
				• constipation
				• eating disorders
				• hernia
				• ulcers
				
				Hole's Essentials Reference Pages: 555, 562, 569, 581, 593
					Show students the Phenomenon Unit 4 Ppt
					• TTW Use the See-Think-Wonder protocol to guide student thinking.
					• TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder?
					• TTW provide students opportunities to share observations and develop questions.
					• TTW record students' questions to direct instruction.
					• TTW ask questions to connect concepts from the previous day's instruction.
					
					Vocabulary: TSW add terms to the Digital KIM Chart
					• filtration
					• reabsorption
					• secretion
					• excretion
					• kidney
					• ureter
					• urinary bladder
					• urethra
					
					Hole's Essentials Reference Pages: 634-640

Guided Practice/Transition (20 minutes) TTW ask clarifying	**TTW provide direct instruction over an introduction to the Digestive System,**	**TTW provide direct instruction over the structures of the digestive system and their**	**TTW review the major functions of the digestive system: ingestion, digestion, absorption, and**	**TTW provide direct instruction over the pathologies and senescence of the digestive**	**TTW provide direct instruction over an introduction to the Urinary System,**

questions to increase students' engagement and check for understanding throughout the lesson. **Transition to Work Session**	**emphasizing:** • major structures and functions • histology of alimentary canal layers • the difference between the digestive tract and the accessory organs	**individual contributions to the collective digestive functions.**	**excretion. TTW then provide instruction on the vital nutrients our body obtains from our diet, and how our bodies use those nutrients. TTW emphasize:** • carbohydrates • lipids • proteins • vitamins • minerals	**system, emphasizing ways in which we can keep the digestive system healthy. TTW emphasize healthy and normal digestive activity, including the Bristol stool chart.**	**emphasizing:** • similarities and differences between the digestive and urinary systems • major structures and functions of the urinary system • structure and function of the kidneys • renal blood supply
Independent Practice (45-50 minutes) **TTW circulate the room to monitor the students performance and clarify instruction as needed with daily independent practice.** **Refer to supplemental resources for additional assignments during idle time**	**Hole's Essentials Fecal Transplant Case Study CER: pg. 544-545** **TSW read the background information on Gut Microbiomes on page 544. They will then complete their claim and begin collecting their evidence.**	**In groups of 4, TSW create a Giant Digestive Graphic Organizer.** Please Note: Before instruction, prepare copies of both the structure cards (print 4 slides per page) and function cards. **Materials needed:** • Giant post-it • Colorful notecards/construction paper • Glue • Scissors • Markers **TTW circulate the room to provide feedback, emphasizing the importance of demonstrating relationships between terms**	**TSW perform a close read of "Eating Extremes: Undereating and Overeating" Hole's Essentials pg. 593 and answer the concept connections.** **As an extension of this assignment, the teacher can:** • **facilitate a class or group discussion(s) about disordered eating** • **provide students with the opportunity to research the BMI scale an assess its validity as a measure of health** • **provide students the opportunity to self-reflect about their own eating habits**	**Hole's Essential Chapter Review Questions pg. 598-599.**	Please Note: Before instruction, prepare copies of the kidney image or post a virtual image for students to reference. **TTW provide students with an unlabeled diagram of a kidney.** Per pg. 326 of the Hole's Essentials Teacher Manual, the following structures should be included: • medulla • renal artery • renal pyramid • renal calyx • renal vein • renal pelvis • ureter • cortex **TSW label each structure and comment on the function of each.**
Assessment/Summary (5-10 minutes) ***Formative Assessment should have between 15 to 20 questions***	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**

Small Group Tasks (TBA)	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	Students will be given accommodations based on IEP requirements.	**Questions may be modified for students in small groups and/ or time in half should be provided to those students whose accommodations permits.**

Week 4					
GSE: SAP4b, SAP4c	**Focused Concept: Urinary System** 1. The major Urinary structures (cellular, tissue, and organ composition) and their corresponding functional roles 2. The process of urine formation: filtration, reabsorption, and secretion and how it allows for both waste excretion and homeostasis regulation. 3. Pathologies that disrupt typical structural makeup and/or functional abilities of the Urinary System. 4. The interdependence of the cardiovascular and urinary systems.				
Phenomenon: Why does urine tell you so much about your body?	**DQ:** **1. What are the major structures and functions of the Urinary system?** **2. How does the structure of the neuron facilitate the process of urine formation?** **3. How do pathologies and senescence affect the anatomy and physiology of the urinary system?** **4. How does the urinary system depend on the cardiovascular system in order to function successfully and vice versa?**				
SEP: Develop and Use Models **Construct an Explanation** **Plan and Carry out an Investigation**	**CCC: Systems and System Models, Structure and Function, Stability and Change**				
	Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Learning Targets **The students will be able to:**	1. Identify the major structures of the nephron: glomerulus, convoluted tubules, collecting tubules. 2. Discuss the functions of each of the aforementioned nephron structures.	1. Demonstrate their knowledge of kidney anatomy.	1. Name and describe the effects of pathologies on the anatomy and physiology of the urinary system. 2. Discuss the effects of senescence on the urinary system.	1. Identify connections between the Cardiovascular Respiratory, Digestive, and Urinary systems	1. Demonstrate their mastery of content through formative assessment
Opening	**Nephron Anatomy and Urinary functions**	**Kidney Dissection Lab** **Phenomenon:**	**Urinary Pathologies and Senescence**	**Unit 4 Review** **Phenomenon:**	**Summative Assessment** **Unit 4 Exam**

	Phenomenon: ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous weeks' instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Kidney • urine • glomerulus • glomerular capsule • afferent arterioles • efferent arterioles • renal vein • juxtamedullary nephrons **Hole's Essentials Reference Pages: 636-659**	***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Kidney stones • renal medulla • renal cortex • renal pelvis • renal arteries • renal corpuscle • renal tubule **Hole's Essentials Reference Pages: 638**	**Phenomenon:** ***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction. **Vocabulary: TSW add terms to the Digital KIM Chart** • Urinary Tract Infection • Kidney stones • Kidney failure • Dialysis **Hole's Essentials Reference Pages: 660**	***Show students the Phenomenon Unit 4 Ppt*** • TTW Use the See-Think-Wonder protocol to guide student thinking. • TTW Ask students: What do you see? What do you think about what you are seeing? What does it make you wonder? • TTW provide students opportunities to share observations and develop questions. • TTW record students' questions to direct instruction. • TTW ask questions to connect concepts from the previous day's instruction.	
Guided Practice/Transition (20 minutes) **TTW ask clarifying questions to increase students' engagement and check for understanding throughout the lesson.**	**TTW provide direct instruction over nephrons, emphasizing the glomerulus, convoluted tubules, and collecting tubules and their roles in filtration, reabsorption and secretion.**	**TTW briefly review significant kidney structure vocabulary and lab safety practices before introducing the lab activity.**	**TTW provide direct instruction over the pathologies and senescence of the urinary system, emphasizing ways in which we can keep the kidneys healthy.**	**TTW answer any remaining student questions about any of the Unit 4 topics.** **TTW facilitate a class discussion about the relationships between the**	**TTW answers any student questions to prepare them for their formative assessment.**

Transition to Work Session				**cardiovascular, respiratory, digestive, and urinary systems.**	
Independent Practice (45-50 minutes) ****Lab Prep is needed this week.**** **TTW circulate the room to monitor the students performance and clarify instruction as needed with daily independent practice.**	**Group Activity: Game Show** See Hole's Essential Teacher Manual **page 327** for guidance. **TTW assign students to 3 groups:** 1. **kidney location and structure** 2. **kidney functions** 3. **nephrons** **TSW write questions related to their topic** **TTW facilitate a class competition once all questions have been written.**	**TSW engage in a lab dissection of the Sheep Kidney.** **Supplies Needed:** • Dissection Tray • Forceps • dissecting pins • scalpel • paper towel • scissors • (blunt) probe • nitrile gloves • apron and goggles • sheep kidney specimen	**Hole's Essential Chapter Review Questions pg. 663-664.**	**TTW lead the class through a review game/activity.** **TSW participate in the class review.** **Review Resources:** • Cardiovascular and Respiratory Quizizz • Cardiovascular and Respiratory Kahoot • Digestive and Urinary Quizizz • Digestive and Urinary Kahoot	1. **Unit 4 assessment** 2. **TSW** complete a guided note sheet based on a close reading about their upcoming study of **TSW** complete a guided note sheet based on a close reading about their upcoming study of **Unit 5:Reproductive System and Human Growth** a. Begin Cornell notes for the next unit. 3. Close Read of the next Unit with a graphic organizer.
Assessment/Summary ***Summative Assessment should have between 40 to 50 questions***	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**	**Exit Ticket**	**Summative Assessment** **Unit 4 Exam** **(Exam can be created via Illuminate using questions from** Hole's Essentials of Human Anatomy & Physiology pg #428- 663 Answer Key can be found in the teacher's manual #227-338
Small Group Tasks (TBA)					

Assessment Prep

Prepare students for assessment by reviewing the following Assessment Prep Presentation Topics:

Unit 4 Review

- The major Cardiovascular structures (cellular, tissue, and organ composition) and their corresponding functional roles
- Pathologies that disrupt typical structural makeup and/or functional abilities of the Cardiovascular system
- The interdependence of the cardiovascular system and the digestive, urinary, and respiratory systems
- The major Respiratory structures (cellular, tissue, and organ composition) and their corresponding functional roles
- The diffusion that occurs at the alveolar-capillary membrane that allows the cells of the body to receive the oxygen brought in during inspiration
- Pathologies that disrupt typical structural makeup and/or functional abilities of the Respiratory System

- The major Digestive structures (cellular, tissue, and organ composition) and their corresponding functional roles
- The diffusion of nutrients that occurs in the jejunum of the small intestine allows the cells of the body to receive the nutrients they need to synthesize energy, hormones, tissue repairs, etc.
- Pathologies that disrupt typical structural makeup and/or functional abilities of the digestive System
- The interdependence of the cardiovascular and digestive systems

Labs / Investigations		
Mandatory Labs	**Explore Learning Gizmo**	**Pivot Interactives/Phet**
1. Sheep Heart Dissection Lab • Virtual Sheep Heart Dissection Lab 2. Sheep Kidney Dissection Lab • Virtual Kidney Dissection Lab	Circulatory Gizmo	

Additional Resources/Tasks	
Supplemental Resources	1. Circulatory Diagram Poster 2. Circulation Game 3. Cornell Notes Review