

**Syracuse City School District
Career and Technical Education Program
Course Syllabus
HPP 100: Health Professions 100**



Program Overview

The Health Professions Program provides a preparatory pathway for students with a desire to enter a variety of health careers, including nursing, physical therapy, radiation therapy, respiratory therapy, physician's assistant, and many others. The learning environment is designed to prepare students for the rigors of the dynamic health care profession. Instruction will introduce students to infection control, medical terminology, human growth and development, anatomy and physiology, the structure and function of body systems, the study of diseases and the disease process, technology in healthcare, medical ethics and jurisprudence, standards of professional conduct, patient communication and the fundamentals of patient care.

Course Description

This course provides an introduction to the biomedical sciences through hands-on projects and problems. Students will investigate human body systems and various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. This course is designed to provide an overview of all the courses in the Health Professions Program and lay the scientific foundation for subsequent courses.

Pre-Requisites

NA

Course Objectives

Upon completion of the course students will:

1. Determine the factors that led to the death of a fictional person and investigate lifestyle choices and medical treatments that might have prolonged the person's life.
2. Gain a beginning understanding of human physiology, medicine, research processes and bioinformatics through activities and projects.
3. Learn key biological concepts including homeostasis, metabolism, inheritance of traits, and defense against disease.
4. Apply engineering principles including the design process, feedback loops, and the relationship of structure to function.

Integrated Academics

N/A

Equipment and Supplies

TBD

Textbook

N/A

Grading

Each marking period counts as 25% of a student's final grade, with a comprehensive final exam at the end of the course, created and scored by Project Lead the Way. Grades for each marking period will be determined according to the following chart. Tests count twice as much as quizzes.

30%	In-Class Activities
30%	Laboratory Experiments
40%	Quizzes/Tests

Additional Course Policies

Attendance and Lateness

All rules regarding attendance and lateness will be followed according to the SCSD Code of Conduct. All absences will be counted as unexcused unless the school receives proper notification.

Students must report to class on time or they will be marked late. If students have illegal absences or are late, they will receive a “0” for any assigned work, quizzes or tests missed during that period.

Make-up

It is the **student's** responsibility to make up any work missed due to an excused absence within 5 days of returning to school. This includes absences in which the student was not in school as well as missing a class due to participation in a sport, extracurricular activity and attending class trips or any other school event.

Time will be given in class to complete the activities and projects but any assignments not completed in class **must** be completed for homework. The items that are due for each assignment will be specified by the teacher during the lesson and posted on the board. It is the student's responsibility to complete and hand in assignments on time. Some activities and projects will be completed in groups and each person is responsible for taking notes and answering all conclusion questions. All assignments must be handed in when they are due. Failure to do so can result in a reduced grade or a zero for that assignment.

Quizzes and tests will be given throughout the course. The material covered on each test will be based on the essential questions, vocabulary and content covered in each activity.

Lab Activity

If a student misses a class lab activity that cannot be made up during class time, an alternate or modified assignment may be given. In some cases, students will have to use classroom equipment to complete makeup assignments which will require that they come in after regular school hours. It is important that the makeup work is completed as soon as possible to keep up with the class material.

PLEASE NOTE: Not all lab activities can be made up. Some labs require extensive and complicated teacher preparation and some solutions and materials cannot be recreated.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• The Mystery: Investigating a Crime Scene• DNA Analysis• The Findings<ul style="list-style-type: none">○ Autopsy Analysis○ Patients' Rights
2	<ul style="list-style-type: none">• What is Diabetes?• The Science of Food• Life with Diabetes• Sickle Cell Disease
3	<ul style="list-style-type: none">• It's in the Genes• Chromosomes• Inheritance• Heart Structure
4	<ul style="list-style-type: none">• The Heart at Work• Heart Dysfunction• Heart Intervention• Infection• Analyzing Anna

**Syracuse City School District
Career and Technical Education Program
Scope and Sequence
HPP 100: Health Professions 100**



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-4 The Mystery: Investigating a Crime Scene	<ul style="list-style-type: none"> • What can be done at a scene of a mysterious death to help reconstruct what happened? • How do the clues found at a scene of a mysterious death help investigators determine what might have occurred and help identify or exonerate potential suspects? • How do scientists design experiments to find the most accurate answer to the question they are asking? • How are bloodstain patterns left at a crime scene used to help investigators establish the events that took place during a crime? 	<ul style="list-style-type: none"> • Describe how to process a crime scene including purposeful documentation of the conditions at the scene and the collection of any physical evidence. • Describe how evidence at a crime scene, such as blood, hair, fingerprints, and shoeprints can help forensic investigators determine what might have occurred and help identify or exonerate potential suspects. • Analyze key information gathered at a simulated crime scene. • Explain why all external variables in an experiment need to be controlled. • Design a controlled experiment. • Explain how bloodstain patterns left at a crime scene can help investigators establish the events that took place during the crime. • Graph and analyze experimental data to determine the height associated with bloodstain patterns. 	<ul style="list-style-type: none"> • Laboratory Reports • Worksheets • Quiz • Career Journals 	Career Ready Practices CRP 1,2,4,6,7,8,11,12 Cluster Standards HL 2,4 Pathway Standards HL-BRD 2,3 HL-DIA 2	ELA 9-10R 1,2 9-10W 1,2,4,6 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science
Weeks 5-7 DNA Analysis	<ul style="list-style-type: none"> • What is DNA? • How do scientists isolate DNA in order to study it? • How does DNA differ from person to person? • How can tools of molecular biology be used to compare the DNA of two individuals? • What are restriction enzymes? • What are restriction fragment length polymorphisms? • What is gel electrophoresis and how can the results of this technique be interpreted? 	<ul style="list-style-type: none"> • Describe the relationship between DNA, genes, and chromosomes. • Describe the structure of DNA. • Describe the structure of a nucleotide. • Explain how restriction enzymes cut DNA. • Describe how gel electrophoresis separates DNA fragments. • Explain how gel electrophoresis can be used to examine DNA differences between individuals. • Demonstrate how restriction enzymes work. • Demonstrate the steps of gel electrophoresis and analyze the resulting restriction fragment length polymorphisms (RFLPs). 	<ul style="list-style-type: none"> • Laboratory Reports • Simulation • Practices Worksheet • Career Journal • Quiz 	Career Ready Practices CRP 2,4,6,7,8,11,12 Cluster Standards HL 1,5,6 Pathway Standards HL-BRD 2,6	ELA 9-10R 1,2,8 9-10W 1,2,4,5,6 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS3-1

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 8-9 The Findings <ul style="list-style-type: none"> Autopsy Analysis Patients' Rights 	<ul style="list-style-type: none"> What is an autopsy and how can it be used to determine the cause of death? How can the manner of death be determined? What biomedical science professionals are involved in crime scene analysis and determination of manner of death? Why is confidentiality of patient information important? Who should keep patient information confidential? Is there ever a time when patient confidentiality should be broken? 	<ul style="list-style-type: none"> Describe how an autopsy is performed and the types of information it provides to officials regarding the manner and cause of death. Interpret information from an autopsy report to predict the manner of death. Explain how a variety of biomedical science professionals are involved in crime scene analysis and determination of manner of death in mysterious death cases. Explain the importance of confidentiality when dealing with patients, and describe the major patient protections written into the Health Insurance Portability and Accountability Act (HIPAA). Analyze patient confidentiality scenarios. 	<ul style="list-style-type: none"> Formal Case Report Case Studies and Discussion Practices Worksheets Test 	Career Ready Practices CRP 2,4,5,8,11,12	ELA 9-10R 1,7 9-10W 1,2,4,5,6 9-10L 1,2,3a,6
				Cluster Standards HL 3,5	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-BRD 6 HL-DIA 1	Science HS-LS1-2 HS-LS1-3
Weeks 10-12 What is Diabetes?	<ul style="list-style-type: none"> What is diabetes? How does the body regulate the level of blood glucose? How is glucose tolerance testing used to diagnose diabetes? How does the development of Type 1 and Type 2 diabetes relate to how the body produces and uses insulin? What is the relationship between insulin and glucose? How does insulin assist with the movement of glucose into body cells? What is homeostasis? What does feedback refer to in the human body? 	<ul style="list-style-type: none"> Explain the role of insulin in the transfer of glucose into body cells. Explain how blood glucose levels are regulated by the feedback action of the hormones insulin and glucagon. Graph laboratory blood glucose and insulin level data and interpret results. Compare Type 1 and Type 2 diabetes. Demonstrate the role of insulin in transferring glucose from blood into cells. Diagram the feedback relationship of blood glucose and the hormones insulin and glucagon. Evaluate web resources to determine their level of credibility. 	<ul style="list-style-type: none"> Laboratory Reports Simulated Diagnostic Testing Practices Worksheets Career Journals Quiz 	Career Ready Practices CRP 2,4,6,7,8,11	ELA 9-10R 1,2,8,9 9-10W 1,2,4,5,6,7 9-10L 1,2,3a,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-DIA 5	Science HS-LS1-3
Weeks 13-15 The Science of Food	<ul style="list-style-type: none"> What are the main nutrients found in food? How can carbohydrates, lipids, and proteins be detected in foods? What types of foods supply sugar, starch, proteins, and lipids? 	<ul style="list-style-type: none"> Describe basic nutritional terms as well as identify the role of each nutrient in the body. Describe which foods are high in carbohydrates, lipids, and proteins. Analyze food labels and food choices for nutritional content. Explain how the nutritional content of 	<ul style="list-style-type: none"> Laboratory Reports Modeling Concept Maps Quiz 	Career Ready Practices CRP 2,3,4,7,8,11	ELA 9-10R 1,2,4,8 9-10W 1,2,4,5,6,7 9-10L 1,2,3a,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards	Science

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • How can food labels be used to evaluate dietary choices? • What role do basic nutrients play in the function of the human body? • What are basic recommendations for a diabetic diet? • What are the main structural components of carbohydrates, proteins, and lipids? • What is dehydration synthesis and hydrolysis? • How do dehydration synthesis and hydrolysis relate to harnessing energy from food? • How is the amount of energy in a food determined? 	<p>food helps individuals make decisions about diet and maintain good health.</p> <ul style="list-style-type: none"> • Explain how the structure of macromolecules is related to their function in the human body. • Demonstrate the processes of dehydration synthesis and hydrolysis. • Explain the process of calorimetry and how it is used to measure the amount of energy in a food. • Perform calorimetric measurements on food items and interpret the results. 		HL-BRD 2 HL-THR 3	HS-LS1-6
Weeks 16-18 Life with Diabetes	<ul style="list-style-type: none"> • What are several ways the life of someone with diabetes is impacted by the disorder? • What are potential short- and long-term complications of diabetes? • How do Type I and Type II diabetes differ? • What are the current treatments for Type I and Type II diabetes? • How do the terms hyperglycemia and hypoglycemia relate to diabetes? • What might happen to cells that are exposed to high concentrations of sugar? • What innovations are available to help diabetics manage and treat their disease? • What is the importance of checking blood sugar 	<ul style="list-style-type: none"> • Diagram complications of diabetes on a human body graphic organizer. • Compare Type 1 and Type 2 diabetes. • Demonstrate how water moves across a cell membrane to balance the level of dissolved solutes on either side. • List and describe the wide variety of treatment and management medical interventions that are available to diabetics. • Explain how the regulation of blood sugar helps to avoid severe and life-threatening diabetic emergencies. • Explain how to advise a patient newly diagnosed with diabetes on treating and living with the disease. • Assess the qualities of a successful oral and visual presentation. 	<ul style="list-style-type: none"> • Patient Education Brochure/Websites • Case Studies • Practices Worksheets • Test 	Career Ready Practices CRP 2,4,5,6,7,8,11 Cluster Standards HL 1 Pathway Standards HL-BRD 1,5	ELA 9-10R 1,8 9-10W 2,4,5,6,7 9-10SL 1,2,3,4,5 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-3

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	levels for a diabetic? • How can an insulin pump help a diabetic?				
Weeks 18-20 Sickle Cell Disease	<ul style="list-style-type: none"> • What is sickle cell disease? • How is anemia diagnosed? • What is sickle cell anemia? • Why does the sickling of red blood cells cause health problems? • How does sickle cell disease affect daily life? 	<ul style="list-style-type: none"> • Explain the function of each of the major components of blood. • Explain anemia and its relationship to blood cells or hemoglobin. • Explain what a hematocrit test shows about red blood cells and their relationship to the volume of whole blood. • Compare normal vs. sickle-shaped red blood cells. • Demonstrate how sickle-shaped red blood cells lead to decreased oxygen flow to body tissues. • Create diary entries for a sickle cell patient and reflect on what living with sickle cell anemia is like. 	<ul style="list-style-type: none"> • Simulated Diagnostic Testing • Laboratory Reports • Career Journals • Fictional Patient Diary Entries • Quiz 	Career Ready Practices CRP 2,4,7,8,11	ELA 9-10R 1,2,4 9-10W 1,2,3,4,6 9-10L 1,2,3a,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-DIA 5	Science HS-LS1-2
Weeks 21-23 It's in the Genes	<ul style="list-style-type: none"> • What is the DNA code? • What is the connection between genes and proteins? • How are proteins produced in a cell? • How does the sequence of nucleotides in DNA determine the sequence of amino acids in a protein? • What is a mutation? • What determines the shape of a protein? • How is the shape of a protein affected by its surrounding environment? • How does a change in the DNA code affect the shape of a protein? • How can changing just one nucleotide in a gene change the shape of a protein? 	<ul style="list-style-type: none"> • Explain how the sequence of nucleotides in DNA determines the sequence of amino acids in a protein. • Explain the process of protein synthesis. • Explain how changes in the b-globin protein are due to the mutation associated with sickle cell disease. • Demonstrate transcription and translation to create a simulated protein. • Analyze the effect that base pair mutations have on a simulated protein. • Manipulate computer simulated proteins to visualize the interactions between amino acids and analyze protein structural changes. 	<ul style="list-style-type: none"> • Laboratory Reports • Practices Worksheets • Computer Simulated Model Building • Quiz 	Career Ready Practices CRP 2,4,7,8,11	ELA 9-10R 1,2,8 9-10W 1,2,4,6 9-10L 1,2,3a,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-BRD 2,3	Science HS-LS3-1 HS-LS3-2
Weeks 24-25 Chromosomes	<ul style="list-style-type: none"> • How is DNA passed to new cells during cell division? • What is a chromosome? • How are traits passed through the generations? 	<ul style="list-style-type: none"> • Explain the process of cellular division, including the transfer of exact copies of DNA to the resulting daughter cells. • Explain how chromosomes in reproductive cells contain numerous 	<ul style="list-style-type: none"> • Debate • Laboratory Reports • Practices Worksheets • Career Journals • Quiz 	Career Ready Practices CRP 1,2,4,7,8,11	ELA 9-10R 1,4,8 9-10W 1,2,4,6 9-10SL 1,2,4,6 9-10L 1,2,3a,6
				Cluster Standards	Literacy

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> Should a person have rights to their organs and tissues? (Optional) 	<ul style="list-style-type: none"> genes that carry traits through the generations. Demonstrate the processes of mitosis and meiosis. Model the inheritance of genetic diseases. Analyze genotype to determine phenotype. Use proper techniques to examine, count, and measure chromosomes. Evaluate the rights a person has to the use of his or her tissues and/or organs. (Optional) 		HL 1,3,6 Pathway Standards HL-BRD 1,2,3	RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS3-1 HS-LS3-2 HS-LS3-3
Weeks 26-27 Inheritance	<ul style="list-style-type: none"> How are pedigrees used to track diseases? Why does sickle cell disease run in families, yet is not present in every generation? How can doctors and genetic counselors calculate the probability of a child inheriting a disease? How does the presence of malaria in a region affect the frequencies of normal versus sickle cell alleles? 	<ul style="list-style-type: none"> Explain how pedigrees can be used to determine the mode of inheritance of genetic diseases. Draw and analyze pedigree charts to illustrate passage of a trait through generations. Determine and compare the experimental probability and the theoretical probability of inheriting a trait. Analyze pedigrees to calculate the probability of inheriting a trait or disease. 	<ul style="list-style-type: none"> Laboratory Reports Case Studies Career Journals Test 	Career Ready Practices CRP 2,4,7,8,11 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 5 HL-THR 3	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS3-1 HS-LS3-2 HS-LS3-3
Weeks 28-29 Heart Structure	<ul style="list-style-type: none"> What are the structures that make up the human heart and how are they organized? How do the heart and lungs work together to pick up and deliver oxygen to the cells? What is the pathway that blood takes as it passes through the heart? What is the function of valves in the heart? How does the structure of arteries and veins relate to their functions? 	<ul style="list-style-type: none"> Identify the main structures of the heart and describe their functions. Outline the path of the major blood vessels to and from the heart. Explain how heart valves function to keep blood moving in the proper direction. Explain how arteries move blood away from the heart and veins carry blood back to the heart. Compare the structure and function of arteries and veins. 	<ul style="list-style-type: none"> Detailed Scientific Drawings Laboratory Reports Career Journals Quiz 	Career Ready Practices CRP 2 4 7 8 11 Cluster Standards HL 1 Pathway Standards HL-DIA 5	ELA 9-10R 1,4,8 9-10W 1,2,4 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-2
Weeks 30-31	<ul style="list-style-type: none"> What factors can influence 	<ul style="list-style-type: none"> Explain that the heartbeat is caused by 	<ul style="list-style-type: none"> Laboratory Reports 	Career Ready Practices CRP 2,4,7,8,11	ELA 9-10R 1,2,8

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
The Heart at Work	<ul style="list-style-type: none"> heart rate? • Why is it important to monitor the rate at which the heart beats? • What is blood pressure? • How do systolic and diastolic blood pressure values relate to the movement of blood in arteries? • What factors can influence blood pressure? • In what ways can technology be used to collect and analyze cardiovascular data? • What is an EKG? • How can an EKG be used in the diagnosis and treatment of heart disease? 	<ul style="list-style-type: none"> the contraction of muscle cells and results in the movement of blood from the heart to the arteries and the rest of the body. • Explain that heart rate is the number of heart contractions per unit of time, usually per minute. • Explain that blood pressure is a measure of the force put on the vascular walls by the blood as it is pushed by the cardiac muscles through the blood vessels. • Explain how the electrical activity of the heart can be measured and recorded by an electrocardiogram (EKG or ECG). • Analyze EKG readings and relate resultant data to heart function. • Describe how internal and external factors can affect heart function and can contribute to the development of heart disease. • Explain why all external variables in an experiment need to be controlled. • Design controlled experiments to test the effect of factors such as exercise or body position on heart rate and blood pressure. • Measure heart rate and blood pressure manually and with scientific software and probes. 	<ul style="list-style-type: none"> • Simulated Diagnostic Testing • Career Journal • Quiz 	<p>Cluster Standards HL 1</p> <p>Pathway Standards HL-THR 3</p>	<p>9-10W 1,2,4,5,6 9-10L 1,2,3a,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-1 HS-LS1-2</p>
Weeks 32-33 Heart Dysfunction	<ul style="list-style-type: none"> • What is cholesterol? • What roles does cholesterol play in our cells and in the body? • What are LDL and HDL? • How are LDL, HDL, and cholesterol related to heart disease? • How do doctors interpret the results of a cholesterol test? • What is familial hypercholesterolemia and how is it inherited? • How does the heart work as a pump? • How can cholesterol plaques affect the overall function of the heart? 	<ul style="list-style-type: none"> • Explain how cholesterol is transported in the blood by protein complexes called high density lipoprotein (HDL) and low-density lipoprotein (LDL). • Describe how cholesterol buildup can impact blood flow through arteries. • Compare and contrast the role of HDL and LDL in the body and how each relates to health. • Design a controlled experiment to demonstrate how cholesterol plaques impact flow rate in blood vessels. • Describe how restriction enzymes and gel electrophoresis can be used to analyze genetic information. • Use proper laboratory techniques to separate DNA fragments by gel electrophoresis. • Analyze the results of the gel 	<ul style="list-style-type: none"> • Patient Education Materials • Case Studies • Laboratory Reports • Practices Worksheets 	<p>Career Ready Practices CRP 2,3,4,7,8,11</p> <p>Cluster Standards HL 1</p> <p>Pathway Standards HL-DIA 1,2</p>	<p>ELA 9-10R 1,2,4,8 9-10W 1,2,4,5,6 9-10SL 1,2,5 9-10L 1,2,3a,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-3 HS-LS3-1 HS-LS3-2 HS-LS3-3</p>

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • What is atherosclerosis? • How can techniques of molecular biology be used to analyze DNA for the presence of the FH mutation? • What lifestyle changes may help a patient obtain healthy cholesterol levels? • What are the pros and cons of using cholesterol lowering medications? 	<ul style="list-style-type: none"> • electrophoresis to correctly diagnose the presence of the familial hypercholesterolemia mutation. • Generate ideas as a team to solve a problem. 			
Week 34 Heart Intervention	<ul style="list-style-type: none"> • What is heart disease? • What happens inside the heart to cause a heart attack? • How do doctors treat a blocked blood vessel? • What are risk factors for the development of heart disease? • What is metabolic syndrome? • How can a person decrease his or her risk of heart disease? 	<ul style="list-style-type: none"> • Describe the function of an angiogram in diagnosing blocked vessels. • Explain how blocked blood vessels can be treated surgically using procedures that tunnel through or around the areas that disrupt normal blood flow. • Demonstrate a technique used to open a blocked vessel. • Analyze medical data and brainstorm causes of death linked to the cardiovascular system. • Explain how lifestyle changes as well as medication or medical treatment may help decrease heart disease risk. • Analyze heart disease risk and design a risk reduction program. 	<ul style="list-style-type: none"> • Model • Patient Treatment Plan • Test 	Career Ready Practices CRP 2,4,7,8,11 Cluster Standards HL 1 Pathway Standards HL-DIA 1,2,5	ELA 9-10R 1,8 9-10W 1,2,4,6 9-10SL 1,4 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-1
Weeks 35-37 Infection	<ul style="list-style-type: none"> • How are infectious diseases spread through a population? • How does the immune system function to protect the human body from foreign invaders? • What is aseptic technique? • How can an unknown sample of bacteria be identified? 	<ul style="list-style-type: none"> • Describe the mode of transmission and mode of reproduction of various infectious agents. • Describe the prevention of and treatment for various infectious agents. • Identify the basic structures of a bacterial cell. • Describe how the immune system responds when an antigen enters the body. • Demonstrate the transmission of a simulated infectious agent. • Compare and contrast the biology and pathology of various infectious agents. • Use proper aseptic technique to isolate bacterial colonies. • Perform a gross examination of bacterial colonies to differentiate an unknown bacterial sample. • Use proper Gram staining and 	<ul style="list-style-type: none"> • Laboratory Reports • Simulated Diagnostic Testing • Quiz • Career Journal 	Career Ready Practices CRP 2,4,7,8,11 Cluster Standards HL 1,3 Pathways Standards HL-BRD 2,4 HL-DIA 2,5	ELA 9-10R 1,4,8 9-10W 1,2,4,6 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-1

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		microscope techniques to stain, observe, and classify bacteria. • Chemically examine and identify unknown bacteria.			
Weeks 38-40 Analyzing Anna	<ul style="list-style-type: none"> • What are examples of human body systems? • What organs make up the different body systems? • How do the different body systems interact to maintain good health? • What might be the consequence of malfunctions in any of the body systems? • How can prevention measures and medical interventions prolong life? 	<ul style="list-style-type: none"> • Explain the functions of different human body systems and list the major organs within each system. • Describe how multiple body systems are interconnected and how those interconnections and interactions are necessary for life. • Demonstrate the ways an illness affects the various body systems. • Analyze autopsy reports and medical history documents to determine cause of death. • Deliver a quality visual and oral presentation. 	<ul style="list-style-type: none"> • Laboratory Reports • Final Case Report for Anna Garcia 	Career Ready Practices CRP 2,4,7,8,11 Cluster Standards HL 1 Pathways Standards HL-DIA 1,2,5	ELA 9-10R 1,4,8 9-10W 1,2,4,5,6,7 9-10SL 1,2,4,5,6 9-10L 1,2,3a,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-1 HS-LS1-2

**Syracuse City School District
Career and Technical Education Program
Course Syllabus**



HPP 200: Health Professions 200 - Human Body Systems

Program Overview

The Health Professions Program provides a preparatory pathway for students with a desire to enter a variety of health careers, including nursing, physical therapy, radiation therapy, respiratory therapy, physician's assistant, and many others. The learning environment is designed to prepare students for the rigors of the dynamic health care profession. Instruction will introduce students to infection control, medical terminology, human growth and development, anatomy and physiology, the structure and function of body systems, the study of diseases and the disease process, technology in healthcare, medical ethics and jurisprudence, standards of professional conduct, patient communication and the fundamentals of patient care.

Course Description

This is an inquiry-based course designed to complement students' mathematics and science courses. In the Human Body Systems course, students examine the interactions of body systems as they explore identity, communication, power, movement, protection, and homeostasis. Students design experiments, investigate the structures and functions of the human body, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration. Exploring science in action, students build organs and tissues on a skeletal manikin, work through interesting real-world cases, and play the role of biomedical professionals to solve medical mysteries. The laboratory methods used in the course build upon the previous course, HPP 100 and prepare students for the advanced experimental laboratory techniques used in HPP 300.

Pre-Requisites

HPP 100: Health Professions 100

Course Objectives

Upon completion of the course students will:

1. Have a strong understanding of scientific investigation.
2. Understand cell biology and cell genetics.
3. Understand the structure and function of human body systems.
4. Understand and apply intermediate lab experiment techniques.

Integrated Academics

N/A

Equipment and Supplies

TBD

Textbook

N/A

Grading

Each marking period counts as 25% of a student's final grade, with a comprehensive final exam at the end of the course, created and scored by Project Lead the Way. Grades for each marking period will be determined according to the following chart. Tests count twice as much as quizzes.

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10%	Participation
30%	Quizzes/Tests

Additional Course Policies

Attendance and Lateness

All rules regarding attendance and lateness will be followed according to the SCSD Code of Conduct. All absences will be counted as unexcused unless the school receives proper notification. Students must report to class on time or they will be marked late. If students have illegal absences or are late, they will receive a "0" for any assigned work, quizzes or tests missed during that period.

Make-up

It is the **student's** responsibility to make up any work missed due to an excused absence within 5 days of returning to school. This includes absences in which the student was not in school as well as missing a class due to participation in a sport, extracurricular activity and attending class trips or any other school event.

Time will be given in class to complete the activities and projects but any assignments not completed in class **must** be completed for homework. The items that are due for each assignment will be specified by the teacher during the lesson and posted on the board. It is the student's responsibility to complete and hand in assignments on time. Some activities and projects will be completed in groups and each person is responsible for taking notes and answering all conclusion questions. All assignments must be handed in when they are due. Failure to do so can result in a reduced grade or a zero for that assignment.

Quizzes and tests will be given throughout the course. The material covered on each test will be based on the essential questions, vocabulary and content covered in each activity.

Lab Activity

If a student misses a class lab activity that cannot be made up during class time, an alternate or modified assignment may be given. In some cases, students will have to use classroom equipment to complete makeup assignments which will require that they come in after regular school hours. It is important that the makeup work is completed as soon as possible to keep up with the class material.

PLEASE NOTE: Not all lab activities can be made up. Some labs require extensive and complicated teacher preparation and some solutions and materials cannot be recreated.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none"> • Identity <ul style="list-style-type: none"> ○ Human ○ Tissues ○ Molecules and Cells • Communication <ul style="list-style-type: none"> ○ The Brain ○ Electrical Communication
2	<ul style="list-style-type: none"> • Communication <ul style="list-style-type: none"> ○ Chemical Communication ○ Communication with the Outside World • Power <ul style="list-style-type: none"> ○ Intro to Power ○ Food ○ Oxygen ○ Water
3	<ul style="list-style-type: none"> • Movement <ul style="list-style-type: none"> ○ Joints and Motion ○ Muscles ○ Blood Flow ○ Energy and Motion - Exercise Physiology
4	<ul style="list-style-type: none"> • Protection <ul style="list-style-type: none"> ○ The Skin ○ Bones ○ Lymph and Blood Cells • Homeostasis: Health and Wellness

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
HPP 200: Health Professions Level 200 - Human Body Systems



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 1 Identity: Human	<ul style="list-style-type: none"> • In what ways do the parts of a human body system work together to carry out a specific function? • In what ways do different human body systems work together to complete specific functions? • What features of structure and function are common to all humans? • How can directional terms and regional terms help describe location in the body? 	<ul style="list-style-type: none"> • Identify the systems and structures involved in basic body processes. • Explain the functions of different human body systems, and list the major organs within each system. • Show the relationship between multiple human body systems. • Describe how multiple body systems are interconnected and how those interconnections and interactions are necessary for life. • Explain how directional terms and regional terms can be used to pinpoint location on the body. • Demonstrate the correct use of directional and regional terms. • Illustrate key directional term pairs on a model of the human body. 	<ul style="list-style-type: none"> • Laboratory Reports • Modeling with Manikin • Quiz • Career Journals 	Career Ready Practices CRP 2,4	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6
				Cluster Standards HL 1,4	Literacy RST 1,4,7 WHST 2,4,7
				Pathway Standards HL-BRD 2	Science HS-LS1-2
Weeks 2-3 Identity: Tissues	<ul style="list-style-type: none"> • What are the main types of tissue in the human body? • How does the structure of a type of human tissue relate to its function in the body? • What are the functions of the human skeletal system? • How does the distribution and structure of different types of tissue in the body contribute to personal identity? • What are the main bones of the human skeletal system? • What is forensic anthropology and how does this field relate to human body systems? • How can features of bone be used to determine information about a person's gender, ethnicity, age, or stature? 	<ul style="list-style-type: none"> • Identify characteristics of the four categories of human tissue. • Analyze the structure of various human tissue types to infer function. • Describe the functions of the human skeletal system. • Explain how differences in bone structure contribute to a person's unique identity. • Explain the relationship between the length of long bones and the overall height of an individual. • Identify and locate bones of the human skeletal system. • Interpret bone markings, bone landmarks, and bone measurements to determine a person's gender, age, stature, and ethnicity. • Derive and analyze a linear equation. 	<ul style="list-style-type: none"> • Laboratory Reports • Simulation • Practice Worksheet • Modeling with Manikin • Quiz 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6
				Cluster Standards HL 1,2	Literacy RST 1,4,7 WHST 2,4,7
				Pathway Standards HL-BRD 2,4	Science HS-LS1-2, HS-LS3-2

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 4-5 Identity: Molecules and Cells	<ul style="list-style-type: none"> • What is the structure and function of DNA? • How does DNA differ from person to person? • What role does DNA play in our identity? • How can tools of molecular biology be used to compare the DNA of two individuals? • What are restriction enzymes? • What are restriction fragment length polymorphisms? • What is gel electrophoresis and how can the results of this technique be interpreted? • How can the field of biometrics be used to verify and protect identity? 	<ul style="list-style-type: none"> • Explain the structure and function of DNA, and the role it plays in individual identity. • Explain how restriction enzymes cut DNA. • Describe how gel electrophoresis separates DNA fragments. • Explain how gel electrophoresis can be used to examine DNA differences between individuals. • Digest DNA samples using restriction enzymes. • Demonstrate the steps of gel electrophoresis and analyze the resulting restriction fragment length polymorphisms (RFLPs). • Outline current biometrics technology. 	<ul style="list-style-type: none"> • Formal Case Report • Case Studies and Discussion • Test 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10SL 1,4 9-10L 1,2,3,6
				Cluster Standards HL 1	Literacy RST 1,4,7 WHST 2,4,7
				Pathway Standards HL-BRD 2	Science HS-LS3-1
Weeks 6-7 Communication: The Brain	<ul style="list-style-type: none"> • What is communication? • What are ways that communication occurs in machines and in the human body? • How do the central nervous system and the peripheral nervous system work together to control the body? • What are consequences of miscommunication in the body? • What are the functions of the main regions of the brain? • How do scientists determine which areas of the brain are associated with specific actions, emotions, or functions? 	<ul style="list-style-type: none"> • Give examples of mechanical and biological communication. • Describe the structure and function of the central nervous system and the peripheral nervous system. • Interpret how a breakdown in communication in the central nervous system would impact the function of the human body. • Identify major regions of the human brain. • Match regions of the brain with their primary function in the human body. • Apply knowledge of brain structure and function to determine the parts of the brain related to specific human actions, emotions, and/or dysfunctions. 	<ul style="list-style-type: none"> • Laboratory Reports • Case Studies and Discussion • Modeling with Manikin • Quiz 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10SL 1,4 9-10L 1,2,3,6
				Cluster Standards HL 1,2	Literacy RST 1,4,7 WHST 2,4,7
				Pathway Standards HL-BRD 2	Science HS-LS1-2
Weeks 8-10 Communication: Electrical Communication	<ul style="list-style-type: none"> • How does communication happen within the body? • What is the basic structure and function of a neuron? • How do the different types of neurons work together to send and receive signals? • How are electrical impulses created in the human body? • How do neurons convey information using both electrical and chemical signals? 	<ul style="list-style-type: none"> • Explain how the nervous system relies on specialized cells called neurons to pass signals to and from the brain and spinal cord. • Describe how the movement of ions across the cell membrane of a neuron generates an action potential and propagates electrical signals. • Explain how neurons communicate at the synapse. • Outline what goes on in the human 	<ul style="list-style-type: none"> • Laboratory Reports • Modeling with Manikin • Career Journal • Quiz 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,7,8 9-10W 1,2,4,6 9-10L 1,2,3,6
				Cluster Standards HL 1,4	Literacy RST 1,4,7 WHST 2,4,7
				Pathway Standards HL-BRD 2	Science HS-LS1-2

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • What factors impact our ability to react to a stimulus? • How and why does reaction time differ in reflex and voluntary actions? • How do errors in communication impact homeostasis in the human body? • How can biomedical professionals help treat, cure, and improve the quality of life of those suffering from nervous system disorders? 	<ul style="list-style-type: none"> body from an initial stimulus to a response. • Describe how brain processing differs in reflex and voluntary responses. • Analyze experimental data to explore reaction time and reflexes in the human body. • Design an experiment to test factors that impact reaction time. • Analyze case studies to determine the effects of a communication breakdown in the nervous system on the human body. • Identify methods biomedical professionals can use to help treat, cure, or improve the quality of life for patients with nervous system disorders. 			
Week 11 Communication: Chemical Communication	<ul style="list-style-type: none"> • What is a hormone? • How do hormones interact with target cells? • What are examples of endocrine glands and exocrine glands in the human body? • How do feedback loops help regulate the action of hormones? • How can too little or too much of a hormone lead to disease? 	<ul style="list-style-type: none"> • Explain what hormones are and the way in which they interact with target cells. • Give examples of endocrine and exocrine glands in the human body. • Explain how the human body uses feedback mechanisms to maintain proper hormone levels. • Model a feedback loop that shows how the body maintains homeostasis. • Analyze physical symptoms of a patient and relate these symptoms to errors in chemical communication. 	<ul style="list-style-type: none"> • Case Study and Discussion • Graphic Organizer • Quiz 	Career Ready Practices CRP 1,2,4,8,9 Cluster Standards HL 1 Pathway Standards HL-BRD 2	ELA 9-10R 1,2,4,8 9-10W 1,2,4 9-10SL 1,4 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-3
Weeks 12-13 Communication: Communication with the Outside World	<ul style="list-style-type: none"> • How do humans communicate with the world around them? • How does the power of sight allow humans to communicate with the outside world? • How does what we see impact other human body systems? • How is light focused by the eye? • How do the eye and the brain work together to process what we see? • What is visual perception? • What does it mean to have 20/20 vision? 	<ul style="list-style-type: none"> • Explain how vision is used for communication and how it impacts other body systems. • Identify the key structures of the eye. • Diagram the path of light as it enters the eyes and travels to the brain for processing. • Demonstrate how light is processed in the eye in a person with normal vision, as well as a person with myopia or hyperopia. • Explain the tests and procedures in a typical eye exam. 	<ul style="list-style-type: none"> • Simulated Diagnostic Testing • Case Studies and Discussion • Laboratory Reports • Test 	Career Ready Practices CRP 1,2,4,8,9 Cluster Standards HL 1 Pathway Standards HL-DIA 5	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10SL 1,4 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-2

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • How does the eye perceive depth, color, and optical illusions? • What are the tests and procedures in a routine eye exam? • How can corrective lenses be used to refocus light and resolve myopia and hyperopia? • How does an error in the structure or function of the eye relate to disease or dysfunction? • How is life impacted by a vision disorder? 	<ul style="list-style-type: none"> • Evaluate visual perception by testing depth perception, peripheral vision, color vision, and visual acuity. • Experiment with lenses to refocus light and correct problems with vision. • Analyze how diseases or dysfunction of the eye can impact a person's life. 			
Week 14 Power: Intro to Power	<ul style="list-style-type: none"> • What are the resources the human body needs to survive? • What role does food play in the human body? • What role does water play in the human body? • What role does oxygen play in the human body? • What human body systems work to create, process, or distribute the body's main power sources? • How do personal factors and environmental factors impact the body's ability to survive without air, food, or water? 	<ul style="list-style-type: none"> • List and describe the human body systems that create, process, and distribute food, water, and oxygen. • Explain how factors unique to the person, such as age, weight, and overall health affect the body's ability to utilize biological resources and maintain homeostasis. • Explain how factors in the environment, such as climate or temperature, affect the body's ability to utilize biological resources and maintain homeostasis. • Estimate how long the human body can last without food, without water, and without oxygen. 	<ul style="list-style-type: none"> • Laboratory Reports • Case Study • Quiz 	Career Ready Practices CRP 1,2,4,8,9 Cluster Standards HL 1 Pathway Standards HL-DIA 5	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-3
Weeks 15-16 Power: Food	<ul style="list-style-type: none"> • What are the functions of the digestive system? • How does the structure of each organ in the digestive system relate to its function? • How does the digestive system assist in maintaining the water balance in the body? • How do enzymes assist the process of digestion? • How do factors such as temperature, pH and concentration of enzyme or substrate affect the rate of enzyme-catalyzed reactions? • What are BMI and BMR? • How can BMI and BMR help assess healthy diet and weight? 	<ul style="list-style-type: none"> • Describe the structure and function of the organs in the digestive system. • Outline what happens to a bite of food as it travels down the digestive tract. • Explain how enzymes are designed to be highly specific, and the structure of the enzyme's active site determines the substrate it acts upon. (Optional) • Explain how factors such as temperature, pH, and enzyme and substrate concentration affect the rate of an enzyme-catalyzed reaction. • List specific enzymes that digest carbohydrates, fats, and proteins at 	<ul style="list-style-type: none"> • Student Created Model • Laboratory Reports • Practice Worksheets • Case Study • Career Journals • Quiz 	Career Ready Practices CRP 1,2,4,7,8,9 Cluster Standards HL 1 Pathway Standards HL-BRD 1,2,3	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-6

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • What are the health risks associated with being overweight or underweight? • What body systems are affected when a person is overweight or underweight? • What is ATP? • How is energy released from ATP and used to do work in the body? • How do the air you breathe and the food you eat relate directly to the production of energy in the form of ATP? 	<ul style="list-style-type: none"> • sites along the digestive tract. • Model the interaction between enzymes and their corresponding substrates. (Optional) • Design a laboratory experiment investigating the impact that environmental changes can have on enzyme function and analyze the results. • Define BMI (Body Mass Index) and BMR (Basic Metabolic Rate) and how they can be used to assess healthy diet and weight. • Analyze the risks associated with overweight and underweight and how they affect other body systems. • Explain how energy is stored in ATP. • Analyze energy inputs and outputs in the body to assess overall health. 			
Weeks 17-18 Power: Oxygen	<ul style="list-style-type: none"> • Why do we need oxygen? • How do we breathe? • How does the oxygen we inhale get to all of our cells? • How do muscles assist in the movement of air in and out of the respiratory system? • Why is it valuable to measure lung capacity? • Why might some people be more efficient at capturing oxygen than others? • What changes in the respiratory system contribute to asthma? • What are examples of diseases or medical conditions that would affect breathing or lung capacity? • How does a doctor decide which drug to prescribe a patient? • How does a respiratory therapist assist patients with ventilation and utilization of oxygen? 	<ul style="list-style-type: none"> • Describe the structure of the respiratory system, especially the lungs, and the basic mechanics of breathing. • Explain how the structure of the lungs facilitates the exchange of oxygen and carbon dioxide between air and the body. • Use sensors to measure lung capacity. • Analyze data collected using a spirometer to determine tidal volume, vital capacity, and minute volume. • Describe the action of specific medications on the body and investigate how this action helps treat and control disease. 	<ul style="list-style-type: none"> • Laboratory Reports • Case Study • Career Journals • Quiz 	Career Ready Practices CRP 1,2,4,8,9,11 Cluster Standards HL 1 Pathway Standards HL-BRD 2,4	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-2
Weeks 19-21 Power: Water	<ul style="list-style-type: none"> • What are the functions of the urinary system? • What are the major organs of the urinary system? • What is the general structure of 	<ul style="list-style-type: none"> • Describe the structure and function of the human urinary system. • Describe how the structure of the kidney relates to its function in the body. 	<ul style="list-style-type: none"> • Detailed Scientific Drawings • Laboratory Reports • Modeling with Manikin • Test 	Career Ready Practices CRP 1,2,4,8,9,11 Cluster Standards HL 1	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>the kidney and how does this structure relate to kidney function?</p> <ul style="list-style-type: none"> • How does the kidney form urine? • What is the function of the nephron? • What is the relationship between blood and urine? • How do filtration, secretion and reabsorption in the nephron help maintain a fluid and electrolyte balance in the body? • How do the hormones ADH and aldosterone affect the nephron and the body's overall water balance? • What is urinalysis? • How can the composition of urine provide clues about problems in other human body systems? 	<ul style="list-style-type: none"> • Explain that the nephron is the structural and functional unit of the kidney. • Illustrate the path of urine formation through the kidney. • Describe the connections between urine and blood and the exchange of ions and fluids that occurs across the nephron. • Estimate the filtration rate of the glomerulus and relate mathematical estimates to the function of the human kidney. • Analyze urinalysis results to diagnose disease and dysfunction in human body systems. 		<p>Pathway Standards HL-BRD 2 HL-THR 1</p>	<p>WHST 2,4,7</p> <p>Science HS-LS1-2</p>
Week 22	<p>Movement: Joints and Motion</p> <ul style="list-style-type: none"> • What role do joints play in the human body? • How do bones, muscles and joints work together to enable movement and locomotion for the human body? • How are joints classified by both structure and function? • What are the different types of synovial joints? • What role do cartilage, tendons, and ligaments play at a joint? • What terms describe the path of movement at a joint? • What is range of motion? • How do you measure the range of motion of a particular joint movement? 	<ul style="list-style-type: none"> • Explain that a joint is the location at which two or more bones connect, allowing movement and providing support to the human skeleton. • Describe the motion at joints, such as flexion and extension. • Demonstrate the types of movement possible at a joint and match range of motion photographs to specific actions. • Measure range of motion of human joints using a goniometer. 	<ul style="list-style-type: none"> • Laboratory Reports • Simulated Diagnostic Testing • Quiz 	<p>Career Ready Practices CRP 1,2,4,8,9,11</p>	<p>ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6</p>
				<p>Cluster Standards HL 1</p>	<p>Literacy RST 1,4,7 WHST 2,4,7</p>
				<p>Pathway Standards HL-BRD 4 HL-DIA 5</p>	<p>Science HS-LS1-2</p>
Weeks 23-25	<p>Movement: Muscles</p> <ul style="list-style-type: none"> • How do muscles assist with movement of the body and of substances around the body? • How do the structure and function of the three types of muscle tissue compare? • How are muscles named? • How do nerves interact with muscles? 	<ul style="list-style-type: none"> • Describe how the three types of muscle tissue differ in structure and function. • Explain the sliding filament mechanism of muscle contraction. • Explain the connection between nerves and muscle. • Analyze muscle tissue structure using a microscope. 	<ul style="list-style-type: none"> • Modeling with Manikin • Case Studies • Laboratory Reports • Practice Worksheets 	<p>Career Ready Practices CRP 1,2,4,8,9,11</p>	<p>ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6</p>
				<p>Cluster Standards HL 1</p>	<p>Literacy RST 1,4,7 WHST 2,4,7</p>
				<p>Pathway Standards HL-DIA 1,2</p>	<p>Science HS-LS1-2</p>

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • How are muscle fibers and membranes organized to form a whole skeletal muscle? • What do skeletal muscle structure and attachment to bones convey about function? • What are the requirements for muscle contraction? • What role do calcium and ATP play in muscle contraction? • What is a sarcomere? • How does a sarcomere contract and lengthen to cause muscle contraction? • How is the condition rigor mortis related to muscle contraction? • How can we assess muscle function? 	<ul style="list-style-type: none"> • Interpret muscle function by examining its structure and its attachment to bones. • Test the effect of varying solutions of ATP on the contraction of muscle tissue. • Demonstrate the process of muscle contraction as well as the phenomenon of rigor mortis. 			
Weeks 26-28 Movement: Blood Flow	<ul style="list-style-type: none"> • What is the relationship between the heart and the lungs? • What is the pathway of blood in and out of the heart in pulmonary and systemic circulation? • What are the major arteries and veins in the body and which regions do they serve? • What types of muscle help move blood around the body? • How do the structure of arteries, veins and capillaries relate to their function in the body? • What unique features of veins help move blood back to the heart? • What are varicose veins? • Why don't we ever hear about varicose arteries? • What is cardiac output? • How does cardiac output help assess overall heart health? • How does an increased or decreased cardiac output impact the body? • What is blood pressure? • How can the measurement of blood pressure in the legs be used to assess circulation? • What is peripheral artery 	<ul style="list-style-type: none"> • Explain the relationship between the heart and the lungs. • Trace blood flow in pulmonary and systemic circulation. • Identify the body's major arteries and veins and name the body region supplied by each. • Explain how, unlike arteries, veins contain valves that prevent the backflow of blood. • Describe pulse and blood pressure as they relate to cardiovascular health. • Calculate and interpret cardiac output values and relate the amount of blood pumped by the heart to the health of other body systems and organs. • Measure peripheral pulses using Doppler ultrasound and calculate an ankle brachial index (ABI). • Interpret the ankle brachial index (ABI) to determine possible blockages in blood vessels. • Explain how lifestyle choices, such as poor diet and smoking, can lead to the development of blood flow disorders. 	<ul style="list-style-type: none"> • Modeling with Manikin • Detailed Scientific Drawing • Case Studies • Quiz 	Career Ready Practices CRP 1,2,4,8,9,11 Cluster Standards HL 1 Pathway Standards HL-DIA 1,2,5	ELA 9-10R 1,2,4,8 9-10W 2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-2, HS-LS1-3

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	disease? • Why can smoking lead to peripheral artery disease?				
Weeks 29-30 Movement: Energy and Motion - Exercise Physiology	<ul style="list-style-type: none"> • How does the body maintain a supply of ATP during exercise? • What is muscle fatigue? • How are we able to overcome muscle fatigue? • What is the connection between power and movement in the body? • What body systems are involved with powering an athlete through a running race? • What are areas to consider when designing a training plan for an athlete? • What are performance-enhancing drugs? • How do specific performance-enhancing drugs affect the human body? • Why should certain performance-enhancing drugs be banned from athletic competition? 	<ul style="list-style-type: none"> • Explain how the body uses high energy molecules such as creatine phosphate, glycogen, and glucose to supply ATP to working muscle. • Illustrate the body's response to the stages of exercise. • Explain how muscle fatigue occurs with prolonged or repetitive use of a muscle group. • Interpret EMG and grip strength data to assess muscle fatigue. • Describe ways in which an athlete can prepare his or her body for the stress of an athletic event. • Design an experiment to test the effect of feedback, coaching, or competition on muscle fatigue. • Apply knowledge of power and movement in the body to design a comprehensive training plan for an athlete. • Analyze arguments against the use of performance-enhancing drugs in athletic competition. 	<ul style="list-style-type: none"> • Laboratory Reports • Simulated Diagnostic Testing • Quiz • Career Journal 	Career Ready Practices CRP 1,2,4,8,9,11 Cluster Standards HL 1,4 Pathways Standards HL-BRD 4 HL-DIA 5	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-3
Week 31 Protection: The Skin	<ul style="list-style-type: none"> • What are the functions of skin? • What types of tissue make up the layers of the skin? • What role do accessory organs such as sweat glands and sebaceous glands play in the skin? • What happens to skin as it is exposed to sunlight and as a person ages? • Which layers of the skin are damaged in different types of burns? • How does burn damage in the skin affect other functions in the body? • How do medical professionals in different fields assist with burn care and rehabilitation? • What role does pain play in the human body? 	<ul style="list-style-type: none"> • Describe the structure and function of the two main layers and the accessory organs of the skin. • Explain how different degrees of burns damage layers of the skin. • Interpret how burn damage to the skin will affect the function of the organ and overall homeostasis in the body. • Explain how the human body senses and processes signals of pain. • Outline what happens inside the body when a person feels pain. 	<ul style="list-style-type: none"> • Laboratory Reports • Simulated Diagnostic Testing and Treatment • Quiz 	Career Ready Practices CRP 1,2,4,8,9,11 Cluster Standards HL 1 Pathways Standards HL-DIA 5 HL-THR 1	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6 Literacy RST 1,4,7 WHST 2,4,7 Science HS-LS1-2, HS-LS1-3

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> • How does the body interpret and process pain? • Why would the inability to feel pain actually put the human body in danger? 				
Weeks 32-33 Protection: Bones	<ul style="list-style-type: none"> • How does the skeletal system assist with protection in the body? • How does the structure of compact bone differ from the structure of spongy bone? • How does the overall structure of bone provide great strength and flexibility, but keep bone from being too bulky and heavy? • What lifestyle choices relate to the overall strength and protective properties of bone? • What is an X-ray? • What are the different types of bone fractures and how are they identified on X-rays? • How can damage to a bone affect other human body systems? • What is bone remodeling? • How do osteoblasts and osteoclasts assist with bone remodeling and overall bone homeostasis? • What are the four main stages of healing that occur after a bone fracture? • What is the relationship between bone remodeling and blood calcium levels? • How do hormones assist in the maintenance of healthy bone and the release of calcium to be used in other body processes? 	<ul style="list-style-type: none"> • Recall the four main types of bone. • Explain that bone is a living connective tissue composed of cells and protein fibers wrapped in hard mineral salts that can adapt and change to fit the needs of the person. • Describe the structure and function of compact and spongy bone. • Analyze bone structure using a microscope. • Describe the types of bone fractures. • Interpret X-rays to determine specific types of bone fractures. • Diagram the stages of bone healing after injury. • Apply knowledge of hormones and of bone remodeling to explain calcium balance in the body. 	<ul style="list-style-type: none"> • Laboratory Reports • Case Studies • Career Journal • Quiz 	Career Ready Practices CRP 1,2,4,8,9	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6
				Cluster Standards HL 4	Literacy RST 1,4,7 WHST 2,4,7
				Pathways Standards HL-DIA 2	Science HS-LS1-2
Weeks 34-35 Protection: Lymph and Blood Cells	<ul style="list-style-type: none"> • What body systems function to protect the human body? • How does the structure of the lymphatic system relate to its function? • What is an antigen? • What is an antibody? • How do circulating antibodies 	<ul style="list-style-type: none"> • Describe the structure and function of the lymphatic and immune systems. • Explain how a type of white blood cell called B lymphocyte is responsible for the production of antibodies and has the ability to remember invaders once they have 	<ul style="list-style-type: none"> • Practice Worksheet • Simulated Diagnostic Testing • Case Studies • Test 	Career Ready Practices CRP 1,2,4,8,9,11	ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10L 1,2,3,6
				Cluster Standards HL 1	Literacy RST 1,4,7 WHST 2,4,7
				Pathways Standards	Science

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>protect a person from receiving incompatible blood during a transfusion?</p> <ul style="list-style-type: none"> • What is specific immunity? • What role do lymphocytes play in specific immunity? • How does a body react the second time it is exposed to a particular antigen? 	<p>entered the body.</p> <ul style="list-style-type: none"> • Explain how blood type is determined by the antigens present on red blood cells. • Describe the genetics of blood type. • Describe the interaction between antigens and antibodies. • Analyze simulated blood samples to determine blood type. • Produce and analyze a family pedigree for blood type and determine potential donors for a transfusion. • Graph and interpret antibody data collected after an infection and relate this data to the response of body cells. • Diagram an immune response to a common cold. • Apply knowledge of specific immunity to deduce how vaccines function. 		<p>HL-BRD 2 HL-DIA 5</p>	<p>HS-LS1-2, HS-LS1,</p>
<p>Weeks 36-40</p> <p>Homeostasis: Health and Wellness</p>	<ul style="list-style-type: none"> • How do the human body systems respond to changes in the external environment? • How can a person prepare his or her body for an adventure to an extreme environment? • What happens to the body if the systems are unable to maintain homeostasis? • How do the systems of the body work together to defend against disease and injury and to maintain health and wellness? • How do medical interventions help doctors and patients prevent, diagnose, and treat disease? 	<ul style="list-style-type: none"> • Describe how the body systems respond to extreme external environments. • Explain how the systems work together to maintain homeostasis in the body and to complete basic functions such as movement and communication. • Illustrate disease in the human body, from its initial symptoms to eventual diagnosis and treatment. • Interpret knowledge of homeostasis in the body to design an innovative medical intervention or invention. • Trace disease in human systems by generating a fictional case study and compiling a patient case file. 	<ul style="list-style-type: none"> • Presentation • Graphic Organizer • Portfolio • Case Study 	<p>Career Ready Practices CRP 1,2,4,7,8,9</p> <hr/> <p>Cluster Standards HL 1</p> <hr/> <p>Pathways Standards HL-DIA 5 HL-THR 1</p>	<p>ELA 9-10R 1,2,4,8 9-10W 1,2,4,6 9-10SL 1,2,4,5 9-10L 1,2,3,6</p> <hr/> <p>Literacy RST 1,4,7 WHST 2,4,7</p> <hr/> <p>Science HS-LS1-3</p>

**Syracuse City School District
Career and Technical Education Program
Course Syllabus**



HPP 300: Health Professions 300 - Medical Interventions

Program Overview

The Health Professions Program provides a preparatory pathway for students with a desire to enter a variety of health careers, including nursing, physical therapy, radiation therapy, respiratory therapy, physician's assistant, and many others. The learning environment is designed to prepare students for the rigors of the dynamic health care profession. Instruction will introduce students to infection control, medical terminology, human growth and development, anatomy and physiology, the structure and function of body systems, the study of diseases and the disease process, technology in healthcare, medical ethics and jurisprudence, standards of professional conduct, patient communication and the fundamentals of patient care.

Course Description

This is an inquiry-based course designed to complement students' mathematics and science courses. In the Medical Interventions course, students investigate how to prevent, diagnose, and treat disease as they follow the life of a fictitious family. Students will explore how to detect and fight infection; screen and evaluate the genetic code in human DNA; evaluate options for cancer treatment; and problem-solve when the organs of the body begin to fail. Through real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and medical diagnostics.

Pre-Requisites

HPP 100: Health Professions 100
HPP 200: Health Professions 200 – Human Body Systems

Course Objectives

Upon completion of the course students will:

1. Have a strong understanding of infectious disease, including prevention, diagnosis, and treatment.
2. Understand human genetics and how genetic information impacts the individual and society.
3. Understand how cancer is diagnosed and treated, including innovations to advance cancer treatment
4. Understand kidney disease and related treatments, including organ transplant.
5. Understand and apply advanced lab experiment techniques.

Integrated Academics

1 CTE Integrated Science Credit

Equipment and Supplies

TBD

Textbook

N/A

Grading

Each marking period counts as 25% of a student's final grade, with a comprehensive final exam at the end of the course, created and scored by Project Lead the Way. Grades for each marking period will be determined according to the following chart. Tests count twice as much as quizzes.

50%	Quizzes/Tests
30%	In-Class Activities
20%	Laboratory Experiments

Additional Course Policies

Attendance and Lateness

All rules regarding attendance and lateness will be followed according to the SCSD Code of Conduct. All absences will be counted as unexcused unless the school receives proper notification. Students must report to class on time or they will be marked late. If students have illegal absences or are late, they will receive a "0" for any assigned work, quizzes or tests missed during that period.

Make-up

It is the **student's** responsibility to make up any work missed due to an excused absence within 5 days of returning to school. This includes absences in which the student was not in school as well as missing a class due to participation in a sport, extracurricular activity and attending class trips or any other school event.

Time will be given in class to complete the activities and projects but any assignments not completed in class **must** be completed for homework. The items that are due for each assignment will be specified by the teacher during the lesson and posted on the board. It is the student's responsibility to complete and hand in assignments on time. Some activities and projects will be completed in groups and each person is responsible for taking notes and answering all conclusion questions. All assignments must be handed in when they are due. Failure to do so can result in a reduced grade or a zero for that assignment.

Quizzes and tests will be given throughout the course. The material covered on each test will be based on the essential questions, vocabulary and content covered in each activity.

Lab Activity

If a student misses a class lab activity that cannot be made up during class time, an alternate or modified assignment may be given. In some cases, students will have to use classroom equipment to complete makeup assignments which will require that they come in after regular school hours. It is important that the makeup work is completed as soon as possible to keep up with the class material.

PLEASE NOTE: Not all lab activities can be made up. Some labs require extensive and complicated teacher preparation and some solutions and materials cannot be recreated.

Course Calendar

Quarter	Units of Study
1	How to Fight Infection <ul style="list-style-type: none"> • The Mystery Infection • Antibiotic Treatment • The Aftermath - Hearing Loss • Vaccination
2	How to Screen What is in Your Genes <ul style="list-style-type: none"> • Genetic Testing and Screening • Our Genetic Future • Detecting Cancer • Reducing Your Risk
3	How to Conquer Cancer <ul style="list-style-type: none"> • Treating Cancer • Building a Better Cancer Treatment • Manufacturing Human Proteins
4	How to Prevail When Organs Fail <ul style="list-style-type: none"> • Organ Failure • Transplant • Building a Better Body • Review and Final Examination

**Syracuse City School District
Career and Technical Education Program
Scope and Sequence
HPP300: Health Professions 300 – Medical Interventions**



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 How to Fight Infection: The Mystery Infection	<ul style="list-style-type: none"> • What is a medical intervention? • What are the main categories of interventions that function to maintain human health? • How do scientists gather evidence during the potential outbreak of an infectious disease? • What is bioinformatics? • What is an antibody? • How do antibodies identify and inactivate antigens? • How can DNA sequences be used to identify disease pathogens? • How can the ELISA assay be used to detect disease? • Why is it important for doctors to know the concentration of disease antigen present in a patient's system? • What steps do scientists take to diagnose, treat, and prevent future spread of a disease outbreak? 	<ul style="list-style-type: none"> • Explain that medical interventions are measures to improve health or alter the course of an illness and can be used to prevent, diagnose, and treat disease. • Describe how bioinformatics, the collection, classification, storage, and analysis of biochemical and biological information using computers, can be used to identify disease pathogens. • Describe the applications of bioinformatics in health and wellness. • Explain how diagnostic tests for infectious diseases can provide qualitative results, indicating the presence or absence of disease, as well as quantitative results, indicating the concentration of the infectious agent or of an antibody produced in response to the disease agent. • Use publicly available molecular databases to search for DNA sequences and identify pathogens. • Explain the principles of the Enzyme-linked Immunosorbent Assay (ELISA) test and describe how antibodies can be used to detect disease. • Perform ELISA testing to determine the concentration of infectious bacteria in simulated body fluids and identify infected patients. • Compute serial dilutions and calculate resultant concentrations. • Analyze connections between individuals in a disease outbreak. 	<ul style="list-style-type: none"> • Laboratory Reports • Quiz • Patient Scenarios 	Career Ready Practices CRP 1,2,4,7,8,11,12	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6
				Cluster Standards HL 1,2	Literacy RST 1,2,4,7 WHST 2,4,7
				Pathway Standards HL-DIA 2,5	Science HS-LS1-2 HS-LS1-3
Weeks 3-4 How to Fight Infection: Antibiotic Treatment	<ul style="list-style-type: none"> • How do antibiotics work to fight bacterial infections? • What methods do bacteria use to share antibiotic resistant genes? • What actions are humans 	<ul style="list-style-type: none"> • Label the structures of a bacterial cell. • Explain the method of action for different classes of antibiotics. • Simulate the effects of antibiotics on a bacterial population during an infection. • Describe the pathways through which 	<ul style="list-style-type: none"> • Laboratory Reports • Practice Worksheet • Simulation • Quiz 	Career Ready Practices CRP 1,2,4,5,7,8,11,12	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6
				Cluster Standards HL 1,2	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>taking that are contributing to bacteria becoming resistant to commonly used antibiotics?</p>	<p>bacterial cells transfer genes.</p> <ul style="list-style-type: none"> Use proper laboratory techniques to “mate” a streptomycin resistant strain of E. coli with an ampicillin resistant strain of E. coli. Explain the importance of taking antibiotics as prescribed. Simulate the effect of a missed dose of antibiotics on a bacterial population during an infection. 		<p>Pathway Standards HL-BRD 4 HL-DIA 4,5</p>	<p>Science HS-LS1-1 HS-LS1-3</p>
<p>Weeks 5-6</p> <p>How to Fight Infection: The Aftermath - Hearing Loss</p>	<ul style="list-style-type: none"> How do frequency and amplitude affect how humans interpret sound? What causes different types of hearing loss? How is hearing loss diagnosed? What interventions are available for patients with hearing loss? What are the bioethical concerns related to the use of cochlear implant technology? 	<ul style="list-style-type: none"> Identify the structures of the ear and describe their function in hearing. Describe the pathway of sound vibrations from the time a sound is generated to the time the brain registers the sound. Demonstrate sensorineural versus conductive hearing loss on a model of the ear. Perform several simple tests, such as Rinne Test and the Pure Tone Test, to evaluate hearing. Interpret audiograms to identify different types of hearing loss. Recommend the most appropriate type of intervention for a patient with hearing loss, given the patient’s audiogram. Explain the bioethical concerns and considerations related to the use of cochlear implant technology. 	<ul style="list-style-type: none"> Practice Worksheet Simulated Diagnostic Testing Case Studies & Discussion Test 	<p>Career Ready Practices CRP 1,2,4,5,7,8,11,12</p> <p>Cluster Standards HL 3,4,5</p> <p>Pathway Standards HL-BRD 5,6</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12SL 1,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7 WHST 2,4,7</p> <p>Science HS-LS1-2</p>
<p>Weeks 7-8</p> <p>How to Fight Infection: Vaccination</p>	<ul style="list-style-type: none"> What is vaccination? How does a vaccine activate the body’s immune system? How has vaccination impacted disease trends in our country? What methods are used to produce vaccines in the laboratory? What is recombinant DNA technology? What are the molecular tools used to assemble recombinant DNA? How can recombinant DNA and bacterial cells be used to produce vaccines? 	<ul style="list-style-type: none"> Describe how vaccines interact with the human immune system. Explain how many diseases have been eradicated by large-scale vaccination campaigns. Describe the various laboratory methods that are used to manufacture vaccines. Explain how molecular tools such as ligase and restriction enzymes are used to cut and paste DNA from different sources. Describe how recombinant DNA technology can be used to produce vaccines. Explain how plasmids can be employed as an important tool in genetic engineering and can serve as vectors, 	<ul style="list-style-type: none"> Laboratory Reports Case Studies & Discussion Unit 1 Exam 	<p>Career Ready Practices CRP 1,2,4,5,7,8,11,12</p> <p>Cluster Standards HL 1,2,5</p> <p>Pathway Standards HL-BRD 5 HL-DIA 2</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12SL 1,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7 WHST 2,4,7</p> <p>Science HS-LS1-1</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> How can engineered plasmids be inserted into bacterial cells? What is epidemiology? How can epidemiologists assist with the detection, prevention, and treatment of both chronic and infectious disease? 	<ul style="list-style-type: none"> vehicles for the movement of genetic information. Assume the role of an epidemiologist to analyze disease data, design an epidemiologic study, and evaluate prevention and therapy for chronic and infectious diseases. Identify the appropriate steps in an outbreak investigation. 			
Weeks 9-11 How to Screen What is in Your Genes: Genetic Testing and Screening	<ul style="list-style-type: none"> What is genetic testing? What is the goal of PCR? What are the steps of the PCR process? What are SNPs? What is the relationship between phenotype and genotype? How can restriction enzymes and electrophoresis be used to identify SNPs and determine genotype? What medical interventions and lifestyle modifications can help a pregnant woman have a healthy pregnancy? What can amniocentesis and chorionic villus sampling tell a couple about their developing fetus? What are the duties of a genetic counselor? 	<ul style="list-style-type: none"> Explain how the polymerase chain reaction (PCR) is a laboratory procedure that produces multiple copies of a specific DNA sequence. Explain how single base pair changes called single nucleotide polymorphisms (SNPs) can be identified through genetic testing and often correlate to specific diseases or traits. Analyze genetic testing results to predict phenotype. Analyze a karyotype. Use laboratory techniques such as DNA extraction, PCR, and restriction analysis to identify single base pair differences in DNA. Describe proper prenatal care and the medical interventions that function to monitor a pregnancy. Compare the process of amniocentesis and chorionic villus sampling. Analyze a genetic counseling case file and provide feedback regarding potential genetic outcomes. 	<ul style="list-style-type: none"> Laboratory Reports Patient Scenarios Quiz 	Career Ready Practices CRP 1,2,4,5,7,8,11,12 Cluster Standards HL 4 Pathway Standards HL-DIA 2,4	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science HS-LS3-1 HS-LS3-2
Weeks 12-13 How to Screen What is in Your Genes: Our Genetic Future	<ul style="list-style-type: none"> How can genetic diseases be cured if scientists could replace faulty genes? What vectors can be used to transfer DNA to human cells? How might gene therapy open the door to genetic enhancement? What medical interventions are available for couples who would like to choose the gender of their child? Should parents be able to 	<ul style="list-style-type: none"> Explain how traditional gene therapy and genome editing can treat and prevent genetic disorders, cancer, and infectious diseases. Explain how various vectors, including viruses, can be used to transfer DNA into human cells. Debate the safety and overall effectiveness of traditional gene therapy and genome editing. Defend an argument governing future traditional gene therapy and genome editing research. Describe current or future technologies 	<ul style="list-style-type: none"> Case Study & Discussion Socratic Debate Graphic Organizer Unit 2 Test 	Career Ready Practices CRP 1,2,4,5,6,7,8,11,12 Cluster Standards HL 2,5 Pathway Standards HL BRD 6 HL DIA 4	ELA 11-12R 1,4,7 11-12W 1,2,4,5,6,7 11-12SL 1,3,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 1,2,4,7 Science HS-LS3-2 HS-LS3-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	design their children? <ul style="list-style-type: none"> What is the difference between reproductive cloning and therapeutic cloning? What are some of the ethical dilemmas surrounding current and future reproductive technology? 	that provide parents reproductive options. <ul style="list-style-type: none"> Outline the process of reproductive cloning. 			
Weeks 14-16 How to Screen What is in Your Genes: Detecting Cancer	<ul style="list-style-type: none"> What fundamental characteristics do all cancers have in common? In what ways are diagnostic imaging technologies used to diagnose and treat disorders? What do DNA microarrays measure? How is DNA microarray technology used to determine the differences in gene expression between different tissue samples? How are the similarities of gene expression patterns between different individuals calculated? 	<ul style="list-style-type: none"> Describe the many different types of cancer, each with specific risk factors, manifestations in the body, and treatment options. Describe the differences in the appearance of normal cells and cancer cells. Use a microscope to compare normal cells and cancer cells. Describe the different uses for X-rays, CT scans, and MRIs as well as how each technology works. Explain how DNA microarrays measure the amount of mRNA for genes that is present in a cell sample. Perform a simulated DNA microarray to analyze gene expression patterns. Calculate the correlation coefficient for gene expression patterns between different individuals. 	<ul style="list-style-type: none"> Patient Scenarios Simulated Diagnostic Testing Laboratory Reports Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1,2 Pathway Standards HL DIA 1,5	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science HS-LS3-1 HS-LS3-2
Weeks 17-19 How to Screen What is in Your Genes: Reducing Your Risk	<ul style="list-style-type: none"> In what ways do different risk factors increase the chance that a person will develop cancer? How can lifestyle changes reduce the risk for developing cancer? How can molecular tests be used to detect inherited genetic mutations associated with certain cancers? How can viruses lead to cancer? What is the importance of routine cancer screenings? 	<ul style="list-style-type: none"> Describe the potential risk factors for different types of cancer as well as the way to reduce the risk. Explain how viruses can insert their DNA or RNA into a host cell, causing the host cell's genes to mutate which can sometimes cause the cell to become cancerous. List and describe the routine cancer screenings a person should have performed throughout his or her life. Explain why that all external variables in an experiment need to be controlled. Design a controlled experiment. Graph and analyze experimental data. Perform marker analysis to determine the presence of a genetic mutation associated with breast cancer. 	<ul style="list-style-type: none"> Laboratory Reports Case Study Quiz 	Career Ready Practices CRP 1,2,4,5,7,8,11,12 Cluster Standards HL 3 Pathway Standards HL DIA 4,5	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science HS-LS3-1 HS-LS3-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 20-22 How to Conquer Cancer: Treating Cancer	<ul style="list-style-type: none"> What can a cancer patient receiving chemotherapy and/or radiation therapy expect during treatment? How is biofeedback therapy used to help patients improve their health or manage pain? In what ways do artificial limbs allow patients who have suffered from the loss of a limb regain lost function? How do advances in technology allow for the development of artificial limbs that look and move like actual human limbs? How do physical and occupational therapists help patients with disabilities or patients recovering from surgery or injury? 	<ul style="list-style-type: none"> Describe how different cancer treatments interact with and destroy cancer cells. Explain how chemotherapy and radiation therapy are cancer treatments that work to destroy cancer cells by stopping or slowing their growth and the negative side effects they can cause to the patient. Explain how biofeedback therapy is a technique in which patients are trained to improve their health or manage pain by learning to control certain internal bodily processes that normally occur involuntarily, such as heart rate, respiration rate, and skin temperature. Design a controlled experiment to test the effect of relaxation techniques on their heart rate, respiration rate, and skin temperature. Analyze experimental data. Explain how artificial limbs are built to allow patients who have suffered from the loss of a limb to regain lost function. Describe how myoelectric prosthetic limbs work. Design and create a simple functioning model of an arm. Explain how physical and occupational therapists work to help patients with disabilities or patients recovering from surgery or injury to restore function, improve mobility, relieve pain, and improve the ability to perform the tasks necessary to lead an independent and productive life. Design and present a comprehensive rehabilitation plan, given a specific case. 	<ul style="list-style-type: none"> Patient Scenarios Practice Worksheets Model Arm Project Quiz 	Career Ready Practices CRP 1,2,4,5,7,8,11,12 Cluster Standards HL 1,2 Pathway Standards HL DIA 1,4	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science MS-LS1-3
Weeks 23-26 How to Conquer Cancer: Building a Better Cancer Treatment	<ul style="list-style-type: none"> Why do some drugs affect individuals in different ways? How can information in our genes affect how our bodies interact with certain medications? How are clinical trials set up to ensure all data 	<ul style="list-style-type: none"> Explain how all drugs do not act the same way for all individuals. Explain how single nucleotide polymorphism (SNP) profiles may factor in to the decision to prescribe a specific medication. Use patients' SNP profiles to predict how they will respond to particular medicines. 	<ul style="list-style-type: none"> Laboratory Reports Case Study Career Journals Unit Test 	Career Ready Practices CRP 1,2,4,5,6,7,8,11,12 Cluster Standards HL 4,5 Pathway Standards HL BRD 5,6	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science HS-LS1-1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>collected is valid and that all human subjects are treated ethically?</p> <ul style="list-style-type: none"> How might nanomedicine change the future of medicine? 	<ul style="list-style-type: none"> Complete an alignment to arrange DNA sequences side-by-side to locate any base pair differences between different individuals. Explain how clinical trials are regulated by strict guidelines that ensure data collected is valid and human subjects are treated ethically. Explain why controlled, randomized, double-blind studies are considered the gold standard for clinical trials. Describe the size of the nanoscale. Explain that nanomedicine shows great promise, particularly for cancer research, in the hope that medical interventions can be developed at the cellular and molecular scale to diagnose and treat disease. Develop and present a clinical trial proposal for an immunotherapy or nanotechnology-based cancer treatment. 			
<p>Weeks 27-31</p> <p>How to Conquer Cancer: Manufacturing Human Proteins</p>	<ul style="list-style-type: none"> What role does insulin play in diabetes? How has the diagnosis and treatment for diabetes changed in the last 200 years? What is bacterial transformation? How can bacterial plasmids be used to produce proteins such as insulin? How can you gauge the success of a transformation experiment? How does amino acid structure relate to the overall shape of a protein? What is chromatography? How can chromatography be used to separate proteins? How can electrophoresis be used to check the purity of a protein sample? 	<ul style="list-style-type: none"> Describe the evolution of the methods used to diagnose and treat diabetes from the 1800s through today. Outline the process of bacterial transformation. Explain how plasmids, rings of DNA containing genes of interest, can be inserted into bacteria cells via the process of bacterial transformation. Explain that chromatography is a technique used to separate components of a mixture and can be used to separate proteins based on the properties of their side chains. Explain how electrophoresis can be used to separate proteins in a mixture and determine the purity of a sample. Outline the steps required to produce a protein in the laboratory and describe the role of biomedical professionals along this processing path. Insert plasmid DNA into bacterial cells in the laboratory and observe how this genetic information relates to new traits of the bacteria. Calculate transformation efficiency to 	<ul style="list-style-type: none"> Detailed Scientific Drawings Laboratory Reports Modeling with Manikin 	<p>Career Ready Practices CRP 1,2,4,7,8,11,12</p> <p>Cluster Standards HL 1,4</p> <p>Pathway Standards HL BRD 4</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7 WHST 2,4,7</p> <p>Science HS-LS1-1 HS-LS3-2</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<ul style="list-style-type: none"> How does protein electrophoresis differ from DNA electrophoresis? What is SDS-PAGE? What biomedical professionals are involved in all stages of producing and manufacturing a protein product? 	<ul style="list-style-type: none"> determine the success of a laboratory experiment. Demonstrate how amino acids interact using a protein model. Isolate a protein based on its chemical properties using column chromatography. Analyze results of a bacterial transformation and a protein purification laboratory. Set up and run protein gel electrophoresis to test the purity of a protein sample. Graph electrophoresis results to determine the molecular weight of an unknown protein. 			
Week 32 How to Prevail When Organs Fail: Organ Failure	<ul style="list-style-type: none"> What is End Stage Renal Disease (ESRD)? How is ESRD diagnosed? What are the treatment options or medical interventions for patients with ESRD? How does dialysis work? 	<ul style="list-style-type: none"> Explain how ESRD is diagnosed when a patient loses 85 to 90 percent of his/her normal kidney function. Analyze patient symptoms and laboratory results to diagnose a patient and make treatment recommendations. Explain how dialysis machines work to remove wastes from the blood and adjust fluid and electrolyte imbalances. Analyze the pros and cons of hemodialysis, peritoneal dialysis, and kidney transplant for a patient with ESRD. 	<ul style="list-style-type: none"> Simulated Diagnosis and Treatment scenarios Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1,2 Pathway Standards HL DIA 1,4	ELA 11-12R 1,4,7 11-12W 2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 2,4,7 Science HS-LS1-2
Weeks 33-36 How to Prevail when Organs Fail: Transplant	<ul style="list-style-type: none"> What (or who) decides who should receive a donated organ? How are organ donors and recipient matched? What general surgical techniques are necessary for a live donor kidney transplant? What are the roles of the various members of the surgical transplant team? How does a heart transplant compare to a kidney transplant? 	<ul style="list-style-type: none"> Use federal policy guidelines to defend who should receive a donated organ in a given situation. Use blood typing and HLA typing results to determine to match an organ donor with a compatible recipient. Explain the surgical techniques involved in a live donor kidney transplant. Explain the similarities and differences between a heart transplant and a kidney transplant. Perform simulated laparoscopic and general surgical techniques. 	<ul style="list-style-type: none"> Career Exploration Scenario Simulation Quiz 	Career Ready Practices CRP 1,2,4,5,7,8,11,12 Cluster Standards HL 4,5 Pathway Standards HL DIA 2,4	ELA 11-12R 1,4,7 11-12W 1,2,4,6 11-12L 1,2,3,6 Literacy RST 1,2,4,7 WHST 1,2,4,7 Science HS-LS1-2
Weeks 37-38 How to Prevail	<ul style="list-style-type: none"> What parts of the human body can be replaced? 	<ul style="list-style-type: none"> Identify which tissues and organs can be transplanted from one person to 	<ul style="list-style-type: none"> Socratic Debate Case Studies 	Career Ready Practices CRP 1,2,4,5,6,7,8,9,11,12	ELA 11-12R 1,4,7 11-12W 1,2,4,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
when Organs Fail: Building a Better Body	<ul style="list-style-type: none"> • What role do medical interventions play in the prevention, diagnosis, and treatment of disease? • What are the benefits and risks of using xenotransplantation and tissue engineering for replacement organs? • What are the ethical considerations for xenotransplantation and tissue engineering? • How can the human body be remodeled or enhanced to create a “super” human? 	<p>another.</p> <ul style="list-style-type: none"> • Describe how xenotransplantation and tissue engineering work, their potential risks, benefits, challenges, and ethical or moral concerns. • Defend an argument as to whether or not further research for xenotransplantation and tissue engineering should be banned. • Evaluate the effectiveness of different body parts and functions and design enhancements and/or replacements to make the human body more efficient. 	<ul style="list-style-type: none"> • Unit Test 	<p></p> <p>Cluster Standards HL 1,5</p> <p>Pathway Standards HL BRD 5,6</p>	<p>11-12SL 1,3,4,6 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7 WHST 1,2,4,7</p> <p>Science HS-LS1-2 HS-LS1-3</p>
Weeks 39-40 Review and Final Examination	<ul style="list-style-type: none"> • What are the main learning goals for this past year in this course? 	<ul style="list-style-type: none"> • Complete the final examination demonstrating a thorough knowledge of the course content. 	<ul style="list-style-type: none"> • Review Roundtables • Final Examination 	<p>Career Ready Practices CRP 1,2,4,6,7,8,11</p> <p>Cluster Standards HL 1,2,3,4,5</p> <p>Pathway Standards HL BRD 4,5,6 HL-DIA 1,2,4,5</p>	<p>ELA 11-12R 1,2,4,7 11-12W 1,2,4,6,7 11-12SL 1,3,4,6 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7 WHST 2,4,7</p> <p>Science HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS3-1 HS-LS3-2 HS-LS3-3</p>

Syracuse City School District Course Syllabus

Career and Technical Education Program

Course Syllabus

HPP 400: Health Professions 400 - Anatomy and Physiology



Program Overview

The Health Professions Program provides a preparatory pathway for students with a desire to enter a variety of health careers, including nursing, physical therapy, radiation therapy, respiratory therapy, physician's assistant, and many others. The learning environment is designed to prepare students for the rigors of the dynamic health care profession. Instruction will introduce students to infection control, medical terminology, human growth and development, anatomy and physiology, the structure and function of body systems, the study of diseases and the disease process, technology in healthcare, medical ethics and jurisprudence, standards of professional conduct, patient communication and the fundamentals of patient care.

Course Description

HPP 400 is a capstone course that integrates skills and knowledge learned in previous health professions and science courses. This is a laboratory-based course that investigates the structure and function of the human body. Topics covered will include the basic organization of the body, biochemical composition, and major body systems along with the impact of diseases on certain systems. Students will engage in many topics to truly understand the structure and function of the human body. Working from the topics of basic anatomical terminology and the biochemical composition of the human body, to detailed investigation of each of the major systems of the body, students will learn through reading materials, study guides, unit worksheets, group work, projects, and labs. Students will also expand on their professional skills through field trips, internships, research, and professional certifications. Upon completion of this course, students will be prepared to either continue upper level courses in science and/or enter the workforce with professional certifications.

Pre-Requisites

HPP 100: Health Professions 100
HPP 200: Health Professions 200 – Human Body Systems
HPP 300: Health Professions 300 – Medical Interventions

Course Objectives

Upon completion of the course students will:

1. Explain the concept of homeostasis, how it interrelates basic human body functions and life processes, and demonstrate a knowledge of the organization of the human body.
2. Describe the major anatomical components of each human body system studied, describe their anatomical locations and structures, and explain their physiological functions at both the organ and cellular levels.
3. Apply the concepts learned in the lecture to understand and analyze laboratory activities and observations.
4. Obtain healthcare provider CPR, First Aid, and Phlebotomy Certification.
5. Complete job shadows and internship experiences.

Integrated Academics

1 CTE Integrated English Credit

Equipment and Supplies

TBD

Textbooks

- Martini, Nath, Bartholomew. 2015. Fundamentals of Anatomy and Physiology, 10th edition.
- Marieb & Smith. 2016. Human Anatomy and Physiology Laboratory Manual (cat version), 12th edition.

NOTE: Older and/or used editions are acceptable. Keep in mind that page numbers may be different.

Grading

Each marking period counts as 25% of a student's final grade, with a comprehensive final exam at the end of the course, created and scored by Project Lead the Way. Grades for each marking period will be determined according to the following chart. Tests count twice as much as quizzes.

50%	Quizzes/Tests
30%	In-Class Activities
20%	Laboratory Experiments

Additional Course Policies

Attendance and Lateness

All rules regarding attendance and lateness will be followed according to the SCSD Code of Conduct. All absences will be counted as unexcused unless the school receives proper notification. Students must report to class on time or they will be marked late. If students have illegal absences or are late, they will receive a "0" for any assigned work, quizzes or tests missed during that period.

Make-up

It is the **student's** responsibility to make up any work missed due to an excused absence within 5 days of returning to school. This includes absences in which the student was not in school as well as missing a class due to participation in a sport, extracurricular activity and attending class trips or any other school event.

Time will be given in class to complete the activities and projects but any assignments not completed in class **must** be completed for homework. The items that are due for each assignment will be specified by the teacher during the lesson and posted on the board. It is the student's responsibility to complete and hand in assignments on time. Some activities and projects will be completed in groups and each person is responsible for taking notes and answering all conclusion questions. All assignments must be handed in when they are due. Failure to do so can result in a reduced grade or a zero for that assignment.

Quizzes and tests will be given throughout the course. The material covered on each test will be based on the essential questions, vocabulary and content covered in each activity.

Lab Activity

If a student misses a class lab activity that cannot be made up during class time, an alternate or modified assignment may be given. In some cases, students will have to use classroom equipment to complete makeup assignments which will require that they come in after regular school hours. It is important that the makeup work is completed as soon as possible to keep up with the class material.

PLEASE NOTE: Not all lab activities can be made up. Some labs require extensive and complicated teacher preparation and some solutions and materials cannot be recreated.

Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none">• Homeostasis<ul style="list-style-type: none">○ Basic Chemistry○ Biochemistry• Cell Physiology<ul style="list-style-type: none">○ Cell Structure, Function, and Reproduction○ Cellular Transport and Protein Synthesis○ Cellular Energetics• Tissues<ul style="list-style-type: none">○ Integumentary System○ Bone○ Muscles
2	<ul style="list-style-type: none">• Respiratory System• Urinary System• Professional Skills
3	<ul style="list-style-type: none">• Central Nervous System<ul style="list-style-type: none">○ Electrophysiology and Neurons○ Spinal Cord and Reflexes○ The Brain• Peripheral Nervous System<ul style="list-style-type: none">○ Sensory Pathways – Somatic Nervous System○ Autonomic Nervous System• Endocrine System• Cardiovascular System<ul style="list-style-type: none">○ Blood○ The Heart
4	<ul style="list-style-type: none">• Cardiovascular System: Blood Vessels and Regulation• Immune System• Digestive System• Reproductive System• Professional Certifications

**Syracuse City School District
Career and Technical Education Program
Scope and Sequence**

HPP 400 – Health Professions Level 400 – Anatomy and Physiology



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 Homeostasis: Basic Chemistry	<ul style="list-style-type: none"> • What is matter and how is it organized to form different structures? • How does the structure of an atom make each element unique? • Why is homeostasis important and what are the results of a homeostatic imbalance? • How can directional terms and regional terms help describe location in the body? 	<ul style="list-style-type: none"> • Identify the sub-atomic particles, their charges, and their role in atomic structure. • Differentiate between elements, molecules, and compounds. • Identify common elements and ions within the human body. • Identify a molecule as either polar or nonpolar. • Compare and contrast ionic, covalent and hydrogen bonds. • State how the structure of water relates to its function. • Explain the concept of homeostasis and discuss the importance of homeostatic regulation. • Demonstrate the correct use of directional and regional terms. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Graphic Organizer • Case Study Analysis • Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12	ELA 11-12R 1,4 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-BRD 2 HL-DIA 1	Science HS-LS1-3
Week 3 Homeostasis: Biochemistry	<ul style="list-style-type: none"> • How do molecules bond together to form larger molecules? • What is an organic molecule and how does it differ from an inorganic molecule? • Which monomers are used to build the major macromolecules used in the body? • How are the major macromolecules used in the body? • What is the function of DNA and RNA? • What is ATP used for in living things? • How does protein structure affect its function? • What role do enzymes play in chemical reactions? • How does structure of an enzyme determine its 	<ul style="list-style-type: none"> • Describe the general structure of a macromolecule, including the reactions used to synthesize and break down. • Describe the structure and functions of the following classes of carbohydrates: monosaccharides, disaccharides, and polysaccharides. • Describe the structure and functions of the following classes of lipids: fatty acids, glycerides, eicosanoids, steroids, phospholipids, and glycolipids. • Describe the structure and functions of the following classes of nucleic acids: DNA and RNA. • Describe the structure and function of ATP. • Describe protein structure, including the four levels of structural complexity and how protein structure can be disrupted by denaturation. • List the primary functions of proteins in the body. • Explain the function and importance of enzymes. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Case Study Analysis • Unit Test 	Career Ready Practices CRP 1,2,4,7,8,11,12	ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6
				Cluster Standards HL 1	Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7
				Pathway Standards HL-BRD 2 HL-DIA 1	Science HS-LS1-6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	function?				
Week 4 Cell Physiology: Cell Structure, Function, and Reproduction	<ul style="list-style-type: none"> • What is a cell? • What is an organelle and how does each organelle contribute to cell function? • How would cell function change if organelles did not work together? • How do cells reproduce? • What is the purpose of asexual reproduction? • What are the steps of mitosis? • What are the end products of mitosis? 	<ul style="list-style-type: none"> • Identify and explain the function of eukaryotic cell organelles. • Explain the stages of cell cycle, including interphase, mitosis, and cytokinesis. • Identify mitosis as a form of asexual reproduction. • Explain the role of mitosis in the human body. • List and explain the steps of mitosis. • Describe how mitosis forms two genetically identical, diploid daughter cells. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Student-Created Diagrams • Models • Case Study Analysis • Research Summaries • Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4,5,6,7 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-2
Week 5 Cell Physiology: Cellular Transport and Protein Synthesis	<ul style="list-style-type: none"> • How does the structure of the cell membrane determine what can enter/exit the cell? • What are the different mechanisms used to transport molecules across a cell membrane? • What effect do different types of solutions have on the movement of solutes? • How do cells move large molecules across the cell membrane? • What is the function of DNA? • How is a genetic trait determined? • What molecules make up the structure of DNA? • What are the bases that make up DNA and RNA and why are they important? • What are proteins and how are they used in the human body? • What are the steps required to produce a protein in a cell? • What happens to a protein after it is built? • How does protein structure 	<ul style="list-style-type: none"> • Describe the structure and function of the plasma membrane. • List and describe the various types of passive cell transport. • Describe active cell transport. • Describe the various types of vesicular transport. • Describe the functions of the major cellular locations and components involved in gene expression including the nucleus, nuclear membrane, cytosol, ribosomes, rough endoplasmic reticulum. • List and describe the key enzymes, steps, and cellular components involved in the process of transcribing sequences of DNA into the three types of RNA. • Describe the specific processes involved in producing mRNA transcripts including initiation, elongation, and termination steps along with additional processing steps required to produce mature mRNA transcripts ready to be translated in the cytosol. • Describe the specific enzymes, cellular components, and processes involved in translation of mRNA including initiation, elongation, and termination steps along with additional processing steps required to produce functional proteins in either the cytosol or rough endoplasmic reticulum. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Simulations • Research Summary • Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4,5,6,7 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	affect its function?				
Week 6 Cell Physiology: Cellular Energetics	<ul style="list-style-type: none"> • What is ATP used for in living things? • How does the structure ATP relate to its function? • What molecules are required to produce ATP? • What role does the presence of oxygen play in the production of ATP? • What are the steps involved in aerobic and anaerobic respiration? • How are hydrolysis and dehydrations synthesis used to recycle ATP? 	<ul style="list-style-type: none"> • Describe the structure of ATP and explain how energy is stored in ATP. • Explain the pathways used in ATP production under both aerobic and anaerobic conditions. • Describe the pathways involved in cellular ATP production including glycolysis, Krebs' cycle and the electron transport chain. • Explain how energy is recycled using the processes of dehydration synthesis and hydrolysis of ATP/ADP. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Simulations • Research summaries • Unit Test 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4 11-12W 1,2,4,5,6,7 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-1
Week 7 Tissues: Integumentary System	<ul style="list-style-type: none"> • What are the categories used to define levels of cellular organization in the human body? • What are the main types of tissues in the body? • How does the structure of tissue in the human body relate to its function? • What are the functions of skin? • How is the skin organized? • What types of tissue makes up the layers of the skin? • What role do accessory organs such as sweat glands and sebaceous glands play in the skin? • How does cellular structure of skin cells relate to their function? • What happens to skin as it is exposed to sunlight and as a person ages? • Which layers of the skin are damaged in different types of burns? • How does burn damage in the skin affect other functions in the body? • What events occur 	<ul style="list-style-type: none"> • Explain the levels of organizational units used within the human body (organelles, cells, tissues, organs, organ systems). • Identify characteristics of the four categories of human tissue. • Identify the components and the general functions of the integumentary system. • List and describe the accessory structures of the integumentary system and their functions. • Explain why the histology of the epidermis is well suited for its function • Describe the distinctive features of each of the five layers of thick skin including the various cells present and the function of each. • Describe the characteristics of the hypodermis (subcutaneous layer) and explain how the components within the hypodermis contribute to its function. • Describe the life cycle of a keratinocyte and explain what happens to the keratinocytes, including the process of keratinization, as they move from the deepest layer to the most superficial. • Describe the general structure and characteristics of the dermis, including the papillary and reticular layers, and its association with the epidermis. • Explain what cleavage lines are and how they are useful to surgeons. • Explain the basis of fingerprints. • Describe the pigments responsible for 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Simulations • Case Study Summary • Detailed Scientific Drawings • Quiz 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-6 HS-LS1-7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>following superficial or deep skin damage?</p>	<p>producing various skin colors and identify where in the skin these pigments would be found.</p> <ul style="list-style-type: none"> • Explain the danger and benefit of sun exposure and describe how melanocytes protect us from damaging UV radiation. • Differentiate among the three different types of skin cancer and identify the specific epidermal origin of each. • Briefly explain how the degree of a burn relates to the severity of the burn and the ability of the skin to heal. • Describe the events involved in epidermal wound healing and deep wound healing. 			
<p>Weeks 8-9 Tissues: Bone</p>	<ul style="list-style-type: none"> • How does the skeletal system assist with protection in the body? • How does the structure of compact bone differ from the structure of spongy bone? • How does the overall structure of bone provide great strength and flexibility, but keep bone from being too bulky and heavy? • How can damage to a bone affect other human body systems? • What is bone remodeling? • How do osteoblasts and osteoclasts assist with bone remodeling and overall bone homeostasis? • What is the relationship between bone remodeling and blood calcium levels? • How do hormones assist in the maintenance of healthy bone and the release of calcium to be used in other body processes? • What are the four main stages of healing that occur after a bone fracture? • What role do joints play in 	<ul style="list-style-type: none"> • Describe the functions of the skeletal system. • Describe the differences and similarities among cellular and extracellular components of osseous tissue. • Distinguish between compact and spongy bone. • Differentiate among the different types of bone cells in terms of their origin and development, characteristic features, function, general location and contribution to the growth and maintenance of the bone. • Describe the general features of a long bone, focusing more specifically on the area of longitudinal growth. • Compare and contrast endochondral and intramembranous ossification. • Describe how bones grow in length and in width. • Explain the process of bone remodeling and fracture repair. • Describe how nutrition, hormones and weight-bearing exercise affect bone growth and remodeling. • Describe how calcium balance is maintained and why calcium homeostasis is physiologically important to the skeleton. • Differentiate among the major categories of joints based on degree of movement and/or structure and explain how structure correlates with function. • Select a clinically important synovial joint and describe the organization, accessory structures, and function of that joint. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Detailed Scientific Drawings • Models • Simulations • Case Study Summary • Quiz 	<p>Career Ready Practices CRP 1,2,4,7,8,11,12</p> <hr/> <p>Cluster Standards HL 1</p> <hr/> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6</p> <hr/> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <hr/> <p>Science HS-LS1-2</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	the human body? <ul style="list-style-type: none"> • How are joints classified by both structure and function? • What are the different types of synovial joints? 				
Weeks 10-11 Tissues: Muscles	<ul style="list-style-type: none"> • How do muscles assist with movement of the body and of substances around the body? • How are muscle fibers and membranes organized to form a whole skeletal muscle? • What do skeletal muscle structure and attachment to bones convey about function? • What are the requirements for muscle contraction? • How is the condition rigor mortis related to muscle contraction? • What role do calcium and ATP play in muscle contraction? • What is a sarcomere? • How does a sarcomere contract and lengthen to cause muscle contraction? • How do nerves interact with muscles? • How can we assess muscle function? • How does the body maintain a supply of ATP during exercise? • What is muscle fatigue? • How do the structure and function of the three types of muscle tissue compare? • How are muscles named? 	<ul style="list-style-type: none"> • Identify and describe the key components of the connective tissue framework of muscle and tendons. • Identify all the major anatomical features of muscle cells/fibers and describe how each of these components function uniquely in driving excitation-contraction coupling. • Identify the key band, zone, and protein components of the sarcomere and explain how each function and change as part of the contraction cycle. • Describe all key components and steps in excitation-contraction coupling of muscle cells starting from a motor neuron and proceeding through the contraction cycle of actin and myosin. • Describe mechanisms in muscle fibers that regulate the duration and tension of the contraction and how relaxation and rigor mortis of muscles and muscle fibers occurs. • Explain how muscle cells and muscles as a whole regulate tension produced. • List the major energy sources for muscle fibers and how each source functions to provide ATP for contraction during various levels of activity. • Explain the key aspects of muscle metabolism including anaerobic metabolism and the implications of lactic acid production, as well as the metabolic processes that occur to drive aerobic muscle metabolism and muscle fiber recovery. • Describe the effects of fast twitch and slow twitch muscle fiber type, as well as training on muscle performance, including tension/force and endurance aspects. • Compare and contrast the key anatomical and functional differences between cardiac, smooth, and skeletal muscle and list major organs comprised on these various muscle types. • Identify the names and associated actions of 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Student Drawings • Simulations • Case Study Analysis • Research Report • Unit Test 	Career Ready Practices CRP 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4,5,6,7 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<p>muscles in both human and cat specimens, including the origins and insertions of these muscles.</p>			
<p>Weeks 1213</p> <p>Respiratory System</p>	<ul style="list-style-type: none"> • Why do we need oxygen? • What is the purpose of breathing and how does it occur? • How do muscles assist in the movement of air in and out of the respiratory system? • How does the oxygen we inhale move to cells? • How does diffusion facilitate gas exchange? • What changes in the respiratory system contribute to asthma? • Why is it valuable to measure lung capacity? • Why might some people be more efficient at capturing oxygen than others? • How does the respiratory system help regulate blood pH and CO₂ levels? • How is respiration rate regulated and what influences this rate? 	<ul style="list-style-type: none"> • Describe the major functions of the respiratory system and protective features against pathogens, particles, and other hazards. • Differentiate between external and internal respiration. • Describe the basic organization of the respiratory system, identify the organs and structures including tissue composition from the nasal cavity to the alveoli and their associated functions. • Identify the structure of the larynx and describe its role in breathing and sound production. • Identify the gross structure of the lungs and pleurae and describe the importance of this structure in pulmonary ventilation. • Explain how gas exchange occurs at the respiratory membrane and how its structure relates to function. • Summarize the mechanisms governing movement of air into and out of the lungs and how Boyle's law relates to the sequence of events. • Identify the muscles responsible for respiratory movements and how these muscles contribute to inspiration or expiration. • Describe the various lung volumes and how they relate to lung capacities. • Describe Dalton's and Henry's Laws and how these laws are related to respiratory gas exchange. • Identify mechanisms of gas exchange in the lungs and the tissues including O₂ and CO₂ concentration gradients and net gas exchange. • Describe the structure and function of hemoglobin, and the transport of oxygen and carbon dioxide in the blood. • Describe how oxygen is transported in the blood, and explain how factors such as temperature, pH, BPG and pCO₂ affect oxygen loading and unloading. • Describe carbon dioxide transport in the 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Simulations • Case Study of Respiratory Disorder • Quiz 	<p>Career Ready Practices CRP 1,2,4,7,8,11,12</p> <p>Cluster Standards HL 1</p> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-2 HS-LS1-3</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<p>blood including the three forms of delivery and the influence of CO₂ on blood pH.</p> <ul style="list-style-type: none"> • Explain the factors that influence rate and depth of breathing; locate the respiratory centers involved in the regulation of respiration and describe their roles in breathing control. 			
<p>Weeks 14-15 Urinary System</p>	<ul style="list-style-type: none"> • What are the functions of the urinary system? • What are the major organs of the urinary system? • What is the general structure of the kidney and how does this structure relate to kidney function? • How does the kidney form urine? • What is the function of the nephron? • What is the relationship between blood and urine? • How do filtration, secretion and reabsorption in the nephron help maintain a fluid and electrolyte balance in the body? • How do the hormones ADH and aldosterone affect the nephron and the body's overall water balance? • What components are found in normal urine? • How do reflexes and voluntary muscle control work together to regulate release of urine from the body? 	<ul style="list-style-type: none"> • Describe the general functions of the urinary system. • Identify anatomical structures of the urinary system and their histological characteristics, including: internal and external structures of the kidney, vasculature of the kidney, ureters, urinary bladder, and urethra. • Identify regions of the nephron and the surrounding capillaries. • Define filtration, reabsorption, and secretion with reference to urine production. • Describe the process of glomerular filtration, including how filtration pressure is calculated. • Explain the regulation of glomerular filtration rate by local, neural, and hormonal mechanisms. • Identify substances that are reabsorbed and/or secreted in the nephron, including the mechanism and location, such as: Na⁺, K⁺, Cl⁻, glucose, H⁺, and H₂O. • Describe the hormonal regulation of the reabsorption of Na⁺ and water in the nephron. • Differentiate between obligatory and facultative water reabsorption. • Explain the role of the kidneys in the maintenance of acid/base balance. • Describe the normal composition of urine. • Describe the events that occur during the micturition reflex. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Simulations • Case Study Analysis • Unit Test 	<p>Career Ready Practices CRP 1,2,4,7,8,11,12</p> <p>Cluster Standards HL 1</p> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-2 HS-LS1-7</p>
<p>Weeks 16-20 Professional Skills</p>	<ul style="list-style-type: none"> • What is the purpose of a professional portfolio? • How can keeping a professional portfolio benefit you in your future studies and career? • What careers interest you the most and why? • What experiences can help you best prepare for college admissions and 	<ul style="list-style-type: none"> • Write a professional resume appropriate for college admissions and job applications. • Create a professional portfolio that demonstrates mastery of program content, creativity, professionalism, and experience within their chosen field. • Complete an independent research project that investigates a medical topic of their choice and encompasses multiple investigative skills and content from the program. 	<ul style="list-style-type: none"> • Portfolio • Peer Assessment • Supervisor Formal Evaluations • Practical Exam • Lab Report • Discussions • Student Reflections 	<p>Career Ready Practices CRP 1,2,4,7,8,9,10,11,12</p> <p>Cluster Standards HL 1</p> <p>Pathway Standards HL-BRD 1 HL-DIA 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12SL 1,2,3,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	employment opportunities?	<ul style="list-style-type: none"> • Complete an internship, mentorship, or shadowing experience with at least one professional in the field of their choice. • Identify and investigate potential career options through college visits and field trips to local businesses. • Participate in mock interviews to prepare for college admissions and job interviews. 			
Week 21 Central Nervous System: Electrophysiology and Neurons	<ul style="list-style-type: none"> • What are the major structures and functions of the nervous system? • How does the structure of a neuron relate to its function? • How do different types of neurons work together to coordinate bodily functions? • What role do passive and active transport play in the function of a neuron? • What are the steps of an action potential? • What is a synapse and how are chemicals used to transmit messages at the synapse? • What can occur as a result of neuronal malfunctions? 	<ul style="list-style-type: none"> • Describe the structural and functional subdivisions of the nervous system including sensory/afferent, motor/efferent, interneurons, somatic, visceral/autonomic, central, and peripheral nervous systems. • Identify the key structural features of the neuron and describe their specific functions. • Describe the differences in anatomy, location, and function of unipolar, multipolar, and bipolar neurons. • Describe the anatomy of synapses including the structure and roles of the pre- and post-synaptic cells. • Describe the structure, function, and location of neuroglial cells of both central and peripheral nervous systems. • Review the key roles of transmembrane channel and carrier proteins in determining and maintaining transmembrane potential, as well as rapid changes in the resting membrane potential (action potentials). • Compare and contrast graded versus action potentials and where and how these changes in transmembrane potentials occur on neurons. • Describe the various phases of the action potential (including the relative and absolute refractory periods) and associated key structural components of the neuron that contribute to the changes in membrane potential for each phase. • Define and differentiate between depolarization and hyperpolarization, as related to membrane potential and the types of ions channels and ion diffusions that contribute to these potential changes. • Describe the structural and functional differences between continuous and salutatory propagation of action potentials. • Distinguish between Type A, B, and C 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Graphic Organizer • Simulations • Case Study Analysis • Quiz 	Career Ready Practices 1,2,4,7,8,11 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-2 HS-LS1-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<p>neuron fibers both structurally and functionally based on the type of sensory or motor information transmitted by each.</p> <ul style="list-style-type: none"> • Describe the key roles of neurotransmitters at the synapse and be able to provide examples of excitatory and inhibitory neurotransmitters. • Describe the key components and events involved in transmission of action potentials across a cholinergic synapse. • Explain the difference between excitatory and inhibitory post-synaptic potentials (EPSPs and IPSPs) and how temporal and spatial summation, relate to these concepts and information processing. • Identify various disorders caused by neuronal malfunctions. • Describe the causes, symptoms and treatments of specific neuronal disorders as presented through case studies. 			
<p>Week 22</p> <p>Central Nervous System: Spinal Cord and Reflexes</p>	<ul style="list-style-type: none"> • How does the structure of the spinal cord affect its function? • How are different types of neurons used to bring messages to and from the spinal cord? • What is a reflex and how do they work? • How are different types of neural circuit pathways used to facilitate electrical communication in the body? 	<ul style="list-style-type: none"> • Identify and describe the key structural and functional attributes of the spinal cord including cross sectional anatomy, spinal nerves and nerve plexuses, spinal nerve roots, and the spinal meninges. • Describe the general organization of the gray and white matter of the spinal cord including sensory and motor nuclei, ascending and descending columns and tracts, and commissures. • Describe the key anatomy and function of sensory and motor pathways to and from the spinal cord using spinal nerves including both somatic and visceral modalities. • Compare and contrast the structural and functional differences between somatic, visceral, motor, and sensory neurons. • Explain the physiology and clinical relevance of sensory dermatomes. • Discuss and differentiate between the following types of reflexes: innate and acquired, monosynaptic and polysynaptic, somatic, and visceral, spinal, and cranial. • Describe the components and events involved in the reflex arc including stretch, withdrawal, and crossed-extensor reflexes. • Describe the following neural circuit pathways: divergence, convergence, reverberation, serial and parallel processing. 	<ul style="list-style-type: none"> • Lab Reports • 3-D Models • Practice Worksheets • Graphic Organizer • Simulations • Case Study Analysis • Quiz 	<p>Career Ready Practices 1,2,4,7,8,11</p> <hr/> <p>Cluster Standards HL 1</p> <hr/> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12L 1,2,3,6</p> <hr/> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <hr/> <p>Science HS-LS1-3</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<ul style="list-style-type: none"> Identify the possible causes and effects of ineffective reflexes as presented through case studies. 			
Week 23: Central Nervous System: The Brain	<ul style="list-style-type: none"> What are the locations and functions of the major regions of the brain? What is CSF and how does it contribute to the function of the nervous system? What is the blood-brain barrier and why is it important? How does the limbic system help regulate emotions and learning? How are basal nuclei used to relay information to and from other parts of the brain? What are consequences of miscommunication in the body? How do scientists determine which areas of the brain are associated with specific actions, emotions, or functions? How are cranial nerves used to control specific regions in the body? 	<ul style="list-style-type: none"> Identify and describe the key structural and functional features of medulla oblongata, pons, thalamus and hypothalamus, mesencephalon, cerebellum, and cerebrum. Identify and describe the locations of the cranial meninges and their functions for the brain and CNS. Identify and describe the development and function of all the ventricles of the brain and the associated structures that play a role in the formation, circulation, and reabsorption of cerebrospinal fluid (CSF). Describe the key functions of cerebrospinal fluid and how the Blood – CSF barrier is maintained. Describe the key structural components of the Blood Brain Barrier and the associated physiological implications of these specialized capillaries in the brain. Explain the roles of the limbic system and describe key portions of the brain involved in this system along with their specific functions in emotions and learning. Describe the components and key functions of the basal nuclei in the cerebrum. Describe the key structural and functional features of the cerebral cortex including the concepts of hemispheric lateralization and disconnection syndrome. Identify and describe the functions of the various nerve fiber tracts in the cerebral white matter. Identify and describe functions and locations of the primary motor and sensory cortices, cortical association, and integrative areas (including Wernicke’s and Broca’s areas and the premotor cortex). Describe the anatomical and physiological concepts of the cortical homunculus in terms of both sensory and motor functions. Describe how electroencephalograms are generated and the various types of brain waves observed. Describe the physiology of seizures and explain the concept and implications of 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Models Case Study Analysis Unit Test 	Career Ready Practices 1,2,4,7,8,11 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		epilepsy. <ul style="list-style-type: none"> Identify the cranial nerves on pictures or models of the brain and be able to describe key sensory and/or motor functions of these nerves. Describe the causes, symptoms, and treatments of at least two brain disorders as presented through case studies. 			
Weeks 24-25 Peripheral Nervous System: Sensory Pathways - Somatic Nervous System	<ul style="list-style-type: none"> What role does the thalamus serve in processing neuronal information? How are different types of receptors used for sensory input? What is the difference between somatic and visceral sensory information? How does the nervous system control skeletal muscle movement? What structures are used to maintain balance and motor control? 	<ul style="list-style-type: none"> Describe the role of the thalamus in transmission and sorting of sensory information along with the related concepts of 1st, 2nd, and 3rd order neurons in the processing of somatic sensory information. Explain the concepts of sensory receptor specificity, receptive fields, and transduction of sensory information in the form of graded and action potentials along neurons. Compare and contrast nociceptors, thermoreceptors, chemoreceptors, and mechanoreceptors. Distinguish between somatic and visceral sensory information. Identify and describe sensory information carried by the posterior column and spinothalamic pathways, along with the concepts of 2nd order neurons and decussation of the information to the cortex. Identify and describe how motor information to skeletal muscle is initiated and directed through upper and lower motor neurons through the motor cortex, pyramids, and corticospinal tracts. Describe the roles of the basal nuclei, cerebellum, and vestibulospinal tracts in sensory perception and associated motor control. Analyze a research paper investigating the somatic nervous system and state its hypothesis, summarize the data, and discuss the researcher's conclusion. Recommend modifications or further follow up studies to a currently published research article. 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Student Created Diagrams Models Research Article Summary/Analysis Quiz 	Career Ready Practices 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-BRD 2 HL-DIA 1	ELA 11-12R 1,4 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-3
Week 26 Peripheral Nervous System: Autonomic	<ul style="list-style-type: none"> How are ganglionic neurons used to facilitate electrical communication in the sympathetic and 	<ul style="list-style-type: none"> Identify and describe the location and function of pre- and post-ganglionic neurons in the sympathetic and parasympathetic nervous systems. 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Models 	Career Ready Practices 1,2,4,7,8,11	ELA 11-12R 1,4,7 11-12W 1,2,4,5 11-12SL 1,4 11-12L 1,2,3,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Nervous System	<ul style="list-style-type: none"> parasympathetic nervous systems? What are visceral motor nuclei and how are they used in the nervous system? How do the structure and function differ between the sympathetic and parasympathetic nervous systems? How is the nervous system used to maintain regulatory cycles within the human body? 	<ul style="list-style-type: none"> Explain the concepts of visceral motor nuclei in both divisions of the autonomic nervous system and compare/contrast their anatomical locations. Describe the key structural components and functions of the sympathetic nervous system. Identify and describe the functions of the three types of ganglia in the sympathetic nervous system including sympathetic chain, collateral, and suprarenal medullae. List and describe functions for the alpha and beta receptors of the sympathetic nervous system. Describe the key structural components and functions of the parasympathetic nervous system. Identify and describe the functions of the terminal and intramural ganglia in the parasympathetic nervous system. Describe the concepts and associated components involved in autonomic tone, sleeping, and memory. Analyze a research paper investigating the somatic nervous system and state its hypothesis, summarize the data, and discuss the researcher's conclusion. Recommend modifications or further follow up studies to a currently published research article. 	<ul style="list-style-type: none"> Simulations Research Paper Summary/Analysis Quiz 	<p>Cluster Standards HL 1</p> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-3</p>
Week 27 Endocrine System	<ul style="list-style-type: none"> What is a hormone? How do hormones interact with target cells? What are examples of endocrine glands and exocrine glands in the human body? How do feedback loops help regulate the action of hormones? How can too little or too much of a hormone lead to disease? 	<ul style="list-style-type: none"> Identify the major endocrine organs on models and/or diagrams. Describe the primary means of intercellular communication in the body. Describe the various locations and functions of hormone receptors in target organs and tissues. Differentiate between lipid-soluble and water-soluble hormones in terms of transport, receptor location and mechanism of action. Describe typical endocrine reflexes and feedback loops. Explain the regulatory role of the hypothalamus in the endocrine system, including the hormones it produces and their effects. For each of the following endocrine organs, 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Simulations Case Study Summary Unit Test 	<p>Career Ready Practices 7</p> <p>Cluster Standards HL 1</p> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-2 HS-LS1-3</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<p>list the primary hormones produced: pituitary gland, pineal gland, thyroid gland, parathyroid glands, adrenal glands, pancreas.</p> <ul style="list-style-type: none"> Identify organs that have secondary endocrine functions and list the hormones they produce. Describe the structure of key hormones, the means of transport, the mechanism of action at target organs/tissues, and the reason for its release/production. Describe the stages of the general adaptation syndrome (stress response). Diagnose an endocrine system disorder and explain the cause of this disorder. Recommend a treatment plan for a specific endocrine system disorder using current medical research. 			
<p>Week 28</p> <p>Cardiovascular System: Blood</p>	<ul style="list-style-type: none"> How does the structure of blood affect its function? Why is the shape of a RBC critical for proper function? What can occur if a RBC does not have the correct shape? How is blood type determined? What is a platelet and why are they important? How does the body prevent blood loss after an injury? What types of cells are found in blood and what are the functions of each? 	<ul style="list-style-type: none"> Describe the composition of blood and differentiate between formed elements and plasma. Identify the key functions and physical characteristics of blood and the components of blood. Describe the structure of RBCs and explain why RBC structure is optimal for its function. Describe the basic process of erythropoiesis, the significance of the reticulocyte, and the effect of erythropoietin in the regulation of erythropoiesis. Discuss the structure and function of hemoglobin. Describe how specific RBC components are recycled. Explain the basis for ABO blood types and the Rh factor system and discuss the importance of blood typing in blood transfusions. Distinguish among the different types of white blood cell types in terms of structure, function, and origin. Describe the structure, function, and production of platelets. Describe the specific events that take place in each phase of hemostasis. Describe the events involved in the formation of a fibrin clot and differentiate between the 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Models Simulations Case Study Analysis Quiz 	<p>Career Ready Practices 1,2,4,7,8,11,12</p> <hr/> <p>Cluster Standards HL 1</p> <hr/> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6</p> <hr/> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <hr/> <p>Science HS-LS1-2</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<p>extrinsic, intrinsic, and common pathway.</p> <ul style="list-style-type: none"> • Explain how positive feedback loops promote coagulation. • Describe the process of fibrinolysis and explain why it is necessary. • Identify blood disorders in a given case study. • Diagnose sickle cell anemia and describe its causes and appropriate treatment using current medical research. 			
<p>Week 29</p> <p>Cardiovascular System: The Heart</p>	<ul style="list-style-type: none"> • How does the structure of the heart contribute to its function? • What role do coronary arteries serve in terms of heart function? • What role do valves serve in the heart? • How do the structure and functions of the different chambers of the heart differ? • How do medical professionals analyze heart function? • How do the nervous system, muscular system and circulatory system work together to ensure blood moves continuously through the body? 	<ul style="list-style-type: none"> • Identify the unique structural features of cardiac muscle cells/tissue and describe the associated functions of these features (intercalated discs, myoglobin, etc.) • Identify key gross anatomical features of the superficial heart including the great vessels, various sulci, and the major vessels of the coronary circulation. • Identify the names and associated functions of the three layers of the heart wall. • Identify other major anatomical components of the heart wall and explain their functional significance, including the layers of the pericardium, trabeculae carnae, chordae tendineae, and papillary muscles. • Identify landmark anatomical features of all four chambers of the heart and explain why each of the chambers look and function uniquely. • Trace the flow of blood through the pulmonary and systemic circuits of the body while listing the key vessels, chambers, and valves encountered through both circuits. • Describe the valve names and compare/contrast the anatomical and physiological differences in the operation of the atrioventricular versus the semilunar valves. • Describe the key components of the cardiac conduction system and how each functions to initiate and regulate excitation and contraction of the various chambers of the heart. • Explain how the electrocardiogram (EKG) illustrates electrical activity of the cardiac conduction system and be able to attribute each part of the EKG tracing to conduction system components. 	<ul style="list-style-type: none"> • Lab Reports • 3-D Models • Practice Worksheets • Graphic Organizer • Simulations • Case Study Summary • Unit Test 	<p>Career Ready Practices 1,2,4,7,8,11,12</p> <hr/> <p>Cluster Standards HL 1</p> <hr/> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12L 1,2,3,6</p> <hr/> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <hr/> <p>Science HS-LS1-2</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		<ul style="list-style-type: none"> • Explain the key pressure and volume changes associated with the cardiac cycle and attribute these changes to flow of blood and opening/closing of valves. • Explain various ways in which stroke volume and heart rate are regulated to adjust cardiac output to match level of activity. • Diagnose a heart attack using EKG images. • Recommend treatment plans for heart attack victims based on current medical research. 			
Weeks 30-31 Cardiovascular System: Blood Vessels and Regulation	<ul style="list-style-type: none"> • What is the difference between pulmonary and systemic circulation? • What is the difference in structure and function between veins and arteries? • What role do veins, arteries, and capillaries serve in the circulatory system? • How is blood pressure maintained in the human body? 	<ul style="list-style-type: none"> • Identify and list the structural differences between arteries, arterioles, capillaries, venules, and veins and describe how these differences explain their unique functional or physiological attributes. • Explain how blood flow, volume, and pressure are adjusted in the blood vessels, including how vasoconstriction and venoconstriction are controlled and their effects on these key variables. • Trace the flow of blood from the heart through major blood vessels and back to the heart and describe mechanisms that assist venous return of this blood as pressures decrease through the circuit. • Explain the pressures that drive capillary filtration and reabsorption, along with the function of lymphatic vessels in maintaining blood volume and preventing edema. • Explain the key cardiovascular reflexes operated neurally by the baroreceptors and chemoreceptors and hormonally by several important hormones. • Identify and describe the key anatomical features of the blood supply to various organs including the heart, lungs, liver, and brain, as well as the unique vessels and features of the fetal circulation. • Identify the major arteries and veins in both human and cat specimens. • Diagnose a patient with hypertension and explain the causes, and appropriate treatment using current medical research. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Detailed Scientific Drawings • Models • Simulations • Case Study Summary • Unit Test 	Career Ready Practices 1,2,4,7,8,11,12 Cluster Standards HL 1 Pathway Standards HL-DIA 1	ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6 Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7 Science HS-LS1-3
Week 32 Immune System	<ul style="list-style-type: none"> • What body systems function to protect the human body? • How does the structure of 	<ul style="list-style-type: none"> • Describe both the components and major functions of the lymphatic system. • Describe the distribution and structure of lymphatic vessels and explain how lymph is 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models 	Career Ready Practices 1,2,4,7,8,11,12	ELA 11-12R 1,4 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>the lymphatic system relate to its function?</p> <ul style="list-style-type: none"> • What is an antigen? • What is an antibody? • How do circulating antibodies protect a person from receiving incompatible blood during a transfusion? • What is specific immunity? • What role do lymphocytes play in specific immunity? • How does the body react the second time it is exposed to a particular antigen? 	<p>transported.</p> <ul style="list-style-type: none"> • Explain the basic structure, cellular populations, and function of lymphoid tissue (Lymph nodes). • Describe the structure and function of key lymphoid organs including the spleen and thymus. • Explain the importance of Mucosa-Associated Lymphoid Tissue including the tonsils and Peyer's patches. • Compare and contrast the key elements between the innate and adaptive immune defenses. • Describe the basic components and functions of the innate immune system including surface barriers, cells, and chemical defenses. • Describe the basic components and functions of the adaptive immune system including cell-mediated immunity and antibody-mediated immunity. • Explain what an antigen is and how it affects the adaptive response. • Identify the basic structure of an antibody monomer and name and describe the functions of the five classes of antibodies. • Explain T and B cell development and activation. • Explain humoral immunity including clonal selection of B cells. • List the various types of T cells, how they become activated and how they contribute to the cellular immune response. • Explain the basis of immunological memory and how it relates to vaccination. • Diagnose and describe appropriate treatment plans for patients with autoimmune disorders through the use of case studies. 	<ul style="list-style-type: none"> • Student Drawings • Simulations • Case Study Analysis • Quiz 	<p>Cluster Standards HL 1</p> <hr/> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <hr/> <p>Science HS-LS1-2</p>
<p>Week 33-34</p> <p>Digestive System</p>	<ul style="list-style-type: none"> • What are the functions of the digestive system? • How does the structure of each organ in the digestive system relate to its function? • How does the digestive 	<ul style="list-style-type: none"> • Describe the classes of nutrients required by the body. • Define the two types of digestive processes: mechanical and chemical. • Explain what is meant by absorption. • Identify the organs of the digestive system and describe their major functions. 	<ul style="list-style-type: none"> • Lab Reports • Practice Worksheets • Discussions • Models • Simulations • Case Study Analysis • Quiz 	<p>Career Ready Practices 1,2,4,7,8,11,12</p> <hr/> <p>Cluster Standards HL 1</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6</p> <hr/> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p>

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	<p>system assist in maintaining the water balance in the body?</p> <ul style="list-style-type: none"> How do enzymes assist the process of digestion? 	<ul style="list-style-type: none"> Describe the histology of the digestive tract. Describe the mechanisms that regulate digestion. Explain muscular movements in the intestinal tract: peristalsis; segmentation Describe the anatomy of the oral cavity and pharynx and explain their digestive functions. List the salivary glands and their secretions. Name the permanent teeth and explain the human dental formula. Describe the anatomy and function of the esophagus. Describe the anatomy and histology of the stomach. Discuss digestive and absorptive processes in the stomach. Explain the nervous and hormonal control mechanisms of gastric activity. Describe the anatomy and histological organization of the small intestine. Explain the functions of intestinal secretions and their regulation. Describe the anatomy and functions of the accessory organs. Explain nervous and hormonal controls acting on the small intestine. Describe the absorptive processes of nutrients in the small intestine. Describe the anatomy and histology of the large intestine. Discuss the digestive and absorptive processes of the large intestine. Explain the importance of the gut microbiome in digestion. Describe the events of the defecation reflex. Explain the current understanding of the “gut microbiome” and its importance to the digestive processes and influence on the physiology of other organ systems. Diagnose and provide treatment plans for digestive system disorders through the use of case studies. 		<p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>Science HS-LS1-2</p>
<p>Week 35 Reproductive System</p>	<ul style="list-style-type: none"> What are the functions of the male reproductive system? What role does testosterone play in 	<ul style="list-style-type: none"> Identify and describe the major organs, glands, and tissues of the male reproductive system. Describe the major components of semen, including their functions and the glands 	<ul style="list-style-type: none"> Lab Reports Practice Worksheets Discussions Simulations Case Study Summary 	<p>Career Ready Practices 1,2,4,7,8,11,12</p> <hr/> <p>Cluster Standards</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,4 11-12L 1,2,3,6</p> <hr/> <p>Literacy</p>

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	<p>development and sexual reproduction?</p> <ul style="list-style-type: none"> • What is the function of sperm? • How is sperm transferred to the female body during sexual reproduction? • What are the structures in the female reproductive system? • How does the structure of the female reproductive system allow for fertilization and development of a baby? • What role do hormones play in the female menstrual cycle? • How does the female menstrual cycle prepare the female body for pregnancy? • What role do feedback cycles play in menstrual cycle? 	<p>producing them.</p> <ul style="list-style-type: none"> • Identify the key components of a spermatozoan and describe their functions. • Explain the processes of spermatogenesis, including meiosis and spermiogenesis, along with the cells (including nurse, interstitial, spermatogonia, and spermatocytes) and associated hormones and locations. • Describe the major targets and effects of the reproductive hormones including GnRH, FSH, LH, and testosterone. • Identify and describe the major organs, glands, and tissues of the female reproductive system. • Explain the processes of oogenesis, including meiosis and follicle development, along with the cells (including follicular, oogonia, and oocytes) and associated hormones and locations. • Describe the key events, cells, organs, and hormones involved in the ovarian cycle, including the follicular phase, ovulation, and luteal phases. • Describe the key events, cells, organs, and hormones involved in the uterine cycle, including the menses, proliferative, and secretory phases. • Identify the anatomy and histology of the uterine wall including perimetrium, myometrium, and endometrium. • Explain the significance of the hormonal coordination of the uterine and ovarian cycles and its role in the success of oocyte fertilization and implantation. • Explain menopause and its implications. • Describe the role of reproductive therapy through the use of case studies. • Defend an opinion on the use of reproductive therapy techniques using specific evidence to support the claim. 	<ul style="list-style-type: none"> • Student Debates • Unit Test 	<p>HL 1</p> <p>Pathway Standards HL-BRD 2 HL-DIA 1</p>	<p>RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p> <p>Science HS-LS1-2</p>
<p>Weeks 36-40</p> <p>Professional Certifications</p>	<ul style="list-style-type: none"> • What is the difference between a lay responder and a professional rescuer? • What is the Good Samaritan law and how does it provide legal 	<ul style="list-style-type: none"> • Describe the Good Samaritan laws and the level of protection they provide to a lay rescuer • Define the “duty to act” and give examples of scenarios where this duty applies • Describe the process of obtaining consent to treat and explain when implied consent 	<ul style="list-style-type: none"> • Portfolio • Peer Assessment • Supervisor Formal Evaluations • Practical Exams • Simulations • Students 	<p>Career Ready Practices 1,2,4,5,7,8,10,11,12</p> <p>Cluster Standards HL 2,5</p>	<p>ELA 11-12R 1,4,7 11-12W 1,2,4 11-12SL 1,2,3,4 11-12L 1,2,3,6</p> <p>Literacy RST 1,2,4,7,8,9 WHST 2,4,5,6,7</p>

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	<p>protection to lay responders?</p> <ul style="list-style-type: none"> • What is a professional rescuer and why do they have a duty to act? • What are the legal concerns of treating a patient during a medical emergency? • What is the proper way to obtain consent to treat a victim? • What types of interventions can be done in specific medical emergencies? • What is the correct procedure to treat someone who is choking, not breathing or has no signs of life? • What is a phlebotomist? • What are the legal issues related to phlebotomy? • What are standard precautions and why should they always be used? • What are the different types of blood draws performed by phlebotomists? Why would each one be used? • What documentation is required during blood draws and specimen collection? 	<p>applies to a victim</p> <ul style="list-style-type: none"> • Discuss the legal issues related to treating a victim both as a lay responder and a professional rescuer. • Demonstrate the ability to assess a victim and provide appropriate interventions • Give examples of when to use rescue breathing or CPR • Perform rescue breathing to infant, child, and adult victims • Perform correct CPR techniques at the professional rescuer level on an infant, child, and adult victim. • Demonstrate how to aid both a consciously choking and unconsciously choking victim. • List the duties of a phlebotomist. • Define legal issues related to phlebotomy. • Describe the universal precautions as outlined by the CDC. • Describe the venous anatomy and veins and skin surfaces on which phlebotomy can be performed. • Differentiate between serum and plasma. • Identify factors to be considered in venipuncture or skin puncture site selection. • List the equipment and supplies needed to collect blood by venipuncture and skin puncture. • Describe 6 patient factors which influence the ability to perform venipuncture successfully. • Discuss 6 complications associated with blood collection. • Describe the steps in accurate specimen collection and documentation procedures. • Demonstrate a successful venipuncture on manikin arm. 	<p>Demonstrations</p> <ul style="list-style-type: none"> • Discussions • Student Reflections • Peer Review 	<p>Pathway Standards HL-BRD 3</p>	<p>Science</p>