# Scope & Sequence

|  |  |  |  |
| --- | --- | --- | --- |
| Course Name: Anatomy and Physiology **TSDS PEIMS Code:** 13020600 | | | **Course Credit:** 1.0  **Course Requirements:** This course is recommended for students in Grades 10-12.  **Prerequisites:** Biology and a second science credit.  **Recommended prerequisite:** A course from the Health Science Career Cluster. |
| **Course Description:** The Anatomy and Physiology course is designed for students to conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students in Anatomy and Physiology will study a variety of topics, including the structure and function of the human body and the interaction of body systems for maintaining homeostasis. | | | |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. | | | |
| **Total Number of Periods**  **Total Number of Minutes**  **Total Number of Hours** | 175 Periods  7,875 Minutes  131.25 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. | |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***  (assumes 45-minute periods)  Total minutes per unit | **TEKS Covered**  **130.224 (c)** **Knowledge and skills** | |
| **Unit 1: Meeting Employer Expectations in Health Science**  This unit is designed to inform future Health Science students about industry expectations for employability skills and professional standards. | 8 periods  360 minutes | 1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) demonstrate verbal and non-verbal communication in a clear, concise, and effective manner; and  (B) exhibit the ability to cooperate, contribute, and collaborate as a member of a team. | |
| **Unit 2: Laboratory and Field Investigation in Health Science**  In this unit students understand how to safely and effectively use laboratory equipment. Student will demonstrate ethical and environmentally appropriate practices during laboratory and field investigations. Students should be able analyze data with both physical equipment and with experimentation that extends beyond the classroom. | 10 periods  450 minutes | (2) The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:  (A) demonstrate safe practices during laboratory and field investigations; and  (B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. | |
| **Unit 3: The Use of Scientific Theory in Health Science**  The scientific theory is a foundation of health science. Student in this unit will distinguish between scientific hypotheses and scientific theories and also collect and organize qualitative and quantitative data and make measurements with accuracy and precision using a variety of scientific tools. Students will also demonstrate the ability to communicate valid conclusions supported by the data through a variety of methods. | 13 periods  585 minutes | (3) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:  (A) know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section;  (B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories;  (C) know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science are created and new technologies emerge;  (D) distinguish between scientific hypotheses and scientific theories;  (E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;  (F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;  (G) analyze, evaluate, make inferences, and predict trends from data; and  (H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. | |
| **Unit 4: Critical Thinking Skills in Health Science**  Students will learn to use the scientific method, critical thinking, and problem solving to make informed decisions in health science. Students will evaluate scientific models, research, and the impact of scientific research on society and the environment. Students will analyze, evaluate, and critique scientific explanations to encourage critical thinking. | 12 periods  540 minutes | (4) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:  (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking;  (B) communicate and apply scientific information extracted from various sources such as accredited scientific journals, institutions of higher learning, current events, news reports, published journal articles, and marketing materials;  (C) draw inferences based on data related to promotional materials for products and services;  (D) evaluate the impact of scientific research on society and the environment;  (E) evaluate models according to their limitations in representing biological objects or events; and  (F) research and describe the history of science and contributions of scientists. | |
| **Unit 5: Technological Advancements in Health Science**  Students will analyze developments in stem cell research, bioengineering, and transplant technologies. | 10 periods  450 minutes | (13) The student recognizes emerging technological advances in science. The student is expected to:  (A) recognize advances in stem cell research such as cord blood use; and  (B) recognize advances in bioengineering and transplant technology. | |
| **Unit 6: Human The Body’s Energy Needs**  Analyzing energy needs and the processes through which they are fulfilled id the emphasis of this unit. The digestive system will be evaluated as a way our bodies process and store energy. How energy excesses and energy deficiencies effect different body systems will be explored. | 10 periods  450 minutes | (5) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:  (A) analyze the chemical reactions that provide energy for the body;  (B) evaluate the modes, including the structure and function of the digestive system, by which energy is processed and stored within the body;  (C) analyze the effects of energy deficiencies in malabsorption disorders as they relate to body systems such as Crohn's disease and cystic fibrosis; and  (D) analyze the effects of energy excess in disorders as they relate to body systems such as cardiovascular, endocrine, muscular, skeletal, and pulmonary. | |
| **Unit 7: Handling Forces in the Human Body**  In this unit students discover how muscles, joints, and bones allow body movement. A variety of diagnostic and therapeutic technologies are discussed along with the physical effect forces have on the body. | 14 periods  630 minutes | (6) The student differentiates the responses of the human body to internal and external forces. The student is expected to:  (A) explain the coordination of muscles, bones, and joints that allows movement of the body;  (B) investigate and report the uses of various diagnostic and therapeutic technologies;  (C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage;  (D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body; and  (E) perform an investigation to determine causes and effects of force variance and communicate findings. | |
| **Unit 8: The Importance of Maintaining Homeostasis**  Students in this unit will become familiar with the consequences of failing to maintain homeostasis. Student will also investigate and describe the integration of the chemical and physical processes in maintaining homeostasis in the human body. | 10 periods  450 minutes | (7) The student examines the body processes that maintain homeostasis. The student is expected to:  (A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and  (B) determine the consequences of the failure to maintain homeostasis. | |
| **Unit 9: Electrical Impulse and it’s effect on Human Physiology**  In this unit students will illustrate the electrical conduction processes and electrical interactions in the human body. Therapeutic and more advanced diagnostic uses of electricity will be evaluated. | 10 periods  450 minutes | (8) The student examines the electrical conduction processes and interactions. The student is expected to:  (A) illustrate conduction systems such as nerve transmission or muscle stimulation;  (B) investigate the therapeutic uses and effects of external sources of electricity on the body system; and  (C) evaluate the application of advanced technologies such as electroencephalogram, electrocardiogram, bionics, transcutaneous electrical nerve stimulation, and cardioversion. | |
| **Unit 10: Human Body Transport Systems**  Physical, chemical, and biological properties of transport systems will be examined in this unit. Factors that alter normal transport and the interactions between transport systems will be analyzed. How the circulatory, respiratory, and excretory systems deal with transport will be explained. | 10 periods  450 minutes | (9) The student explores the body's transport systems. The student is expected to:  (A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;  (B) determine the factors that alter the normal functions of transport systems; and  (C) contrast the interactions among the transport systems. | |
| **Unit 11: Environmental Factors and the Human Body**  Students will learn about the affect of negative environmental factors on body systems. Measures to minimize these harmful environmental factors will be illustrated. | 8 periods  360 minutes | (10) The student investigates environmental factors that affect the human body. The student is expected to:  (A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and  (B) explore measures to minimize harmful environmental factors on body systems. | |
| **Unit 12: The Structure and Function of the Human Body**  In this unit students will explore the structure and function of 11 body systems. Students will examine the effect of disease, trauma, and congenital defects on body systems. Students will also analyze how technological advances along with limitations influence treatment of the various body systems. Human growth and development from embryo to old age will be explained. | 60 periods  2,700 minutes | (11) The student investigates the structure and function of the human body. The student is expected to:  (A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, muscular, cardiovascular, respiratory, digestive, urinary, immune, endocrine, and reproductive systems;  (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;  (C) research technological advances and limitations in the treatment of system disorders; and  (D) examine characteristics of the aging process on body systems.  (12) The student describes the process of reproduction and growth and development. The student is expected to:  (A) explain embryological development of cells, tissues, organs, and systems;  (B) identify the functions of the male and female reproductive systems; and  (C) summarize the human growth and development cycle. | |