Texas CTE

Health Science (2010): Grade 10

Adopted 2010

Principles of Health Science

(1) The student applies mathematics, science, English language arts, and social studies in health science. The student is expected to:

(A) convert units between systems of measurement;

(B) apply data from tables, charts, and graphs to provide solutions to health-related problems;

(C) interpret technical material related to the health science industry;

(D) organize, compile, and write ideas into reports and summaries;

(E) plan and prepare effective oral presentations;

(F) formulate responses using precise language to communicate ideas;

(G) describe biological and chemical processes that maintain homeostasis;

(H) identify and analyze principles of body mechanics and movement such as forces and the effects of movement, torque, tension, and elasticity on the human body;

(I) identify human needs according to Maslow's Hierarchy of Human Needs;

(J) describe the stages of development related to the life span;

(K) identify the concepts of health and wellness throughout the life span;

(L) analyze and evaluate communication skills for maintaining healthy relationships throughout the life span;

(M) research the historical significance of health care;

(N) describe the impact of health services on the economy;

(O) analyze the impact of local, state, and national government on the health science industry;

(P) identify diverse and cultural influences that have impacted contemporary aspects of health care delivery; and

(Q) compare and contrast practices used by various cultures and societies to solve problems related to health.

(2) The student uses verbal and nonverbal communication skills. The student is expected to:

- (A) identify components of effective and non-effective communication;
- (B) demonstrate effective communication skills for responding to the needs of individuals in a diverse society;
- (C) evaluate the effectiveness of conflict resolution techniques in various situations; and
- (D) accurately interpret, transcribe, and communicate medical vocabulary using appropriate technology.

(3) The student implements the leadership skills necessary to function in a democratic society. The student is expected to:

- (A) identify traits of a leader;
- (B) demonstrate leadership skills, characteristics, and responsibilities of leaders such as goal setting and team building; and
- (C) demonstrate the ability to effectively conduct and participate in meetings.

(4) The student assesses career options and the preparation necessary for employment in the health science industry. The student is expected to:

- (A) locate, evaluate, and interpret career options and employment information; and
- (B) recognize the impact of career decisions, including cause and effect of changing employment situations.

(5) The student identifies professional characteristics, academic preparation, and skills necessary for employment as defined by the health science industry. The student is expected to:

- (A) identify employer expectations such as punctuality, attendance, time management, communication, organizational skills, and productive work habits; and
- (B) identify academic requirements for professional advancement such as certification, licensure, registration, continuing education, and advanced degrees.

(6) The student identifies the systems related to health science. The student is expected to:

- (A) compare health science careers within the diagnostic, therapeutic, health informatics, support services, and biotechnology research and development systems; and
- (B) identify the collaborative role of team members between systems to deliver quality health care.

(7) The student examines the role of the multidisciplinary team in providing health care. The student is expected to:

(A) explain the concept of teaming to provide quality health care; and

(B) examine the role of professional organizations in the preparation and governance of credentialing and certification.

(8) The student interprets ethical behavior standards and legal responsibilities. The student is expected to:

(A) compare published professional codes of ethics and scope of practice;

(B) explain principles of confidentiality and ethical behavior, including the consequences of breech of confidentiality;

(C) discuss ethical issues related to health care, including implications of technological advances;

(D) examine issues related to malpractice, negligence, and liability; and

(E) research laws governing the health science industry.

(9) The student recognizes the rights and choices of the individual. The student is expected to:

(A) recognize situations related to autonomy;

(B) identify wellness strategies for the prevention of disease;

(C) evaluate positive and negative effects of relationships on physical and emotional health such as peers, family, and friends and in promoting a healthy community;

(D) review documentation related to rights and choices; and

(E) recognize diversity and cultural practices influencing contemporary aspects of health care.

(10) The student recognizes the importance of maintaining a safe environment and eliminating hazardous situations. The student is expected to:

(A) identify governing regulatory agencies such as the World Health Organization, Centers for Disease Control, Occupational Safety and Health Administration, Food and Drug Administration, and National Institute for Occupational Safety and Health;

(B) relate industry safety standards such as standard precautions, fire prevention, safety practices, and appropriate actions to emergency situations; and

(C) identify safety practices in all aspects of the health science industry.

(11) The student identifies the technology used in the diagnostic, therapeutic, health informatics, support services, and biotechnology research and development systems. The student is expected to:

(A) identify technological equipment used in each of the five systems and relate findings to identified societal risk factors; and

(B) recognize and relate the process for reporting equipment or technology malfunctions.

Medical Terminology

(1) The student recognizes the terminology related to the health science industry. The student is expected to:

(A) identify abbreviations, acronyms, and symbols;

(B) identify the basic structure of medical words;

(C) practice word-building skills;

(D) research the origins of eponyms;

(E) recall directional terms and anatomical planes related to body structure; and

(F) define and accurately spell occupationally specific terms such as those relating to the body systems, surgical and diagnostic procedures, diseases, and treatments.

(2) The student demonstrates communication skills using the terminology applicable to the health science industry. The student is expected to:

(A) demonstrate appropriate verbal and written strategies such as correct pronunciation of medical terms and spelling in a variety of health science scenarios;

(B) employ increasingly precise language to communicate; and

(C) translate technical material related to the health science industry.

(3) The student examines available resources. The student is expected to:

(A) examine medical and dental dictionaries and multimedia resources;

(B) integrate resources to interpret technical materials; and

(C) investigate electronic media such as the Internet with appropriate supervision.

(4) The student interprets medical abbreviations. The student is expected to:

(A) distinguish medical abbreviations used throughout the health science industry; and

(B) translate medical abbreviations in simulated technical material such as physician progress notes, radiological reports, and laboratory reports.

(5) The student appropriately translates health science industry terms. The student is expected to:

- (A) interpret, transcribe, and communicate vocabulary related to the health science industry;
- (B) translate medical terms to conversational language to facilitate communication;
- (C) distinguish medical terminology associated with medical specialists such as geneticists, pathologists, and oncologists;
- (D) summarize observations using medical terminology; and
- (E) correctly interpret contents of medical scenarios.

Health Science

(1) The student applies mathematics, science, English language arts, and social studies in health science. The student is expected to:

- (A) solve mathematical calculations appropriate to situations in a health-related environment;
- (B) communicate using medical terminology;
- (C) express ideas in writing and develop skills in documentation;
- (D) interpret complex technical material related to the health science industry;
- (E) summarize biological and chemical processes that maintain homeostasis;
- (F) explain the changes in structure and function due to trauma and disease; and
- (G) research the global impact of disease prevention and cost containment.

(2) The student displays verbal and non-verbal communication skills. The student is expected to:

- (A) demonstrate therapeutic communication appropriate to the situation;
- (B) execute verbal and nonverbal skills when communicating with persons with sensory loss and language barriers; and
- (C) apply electronic communication with appropriate supervision.

(3) The student analyzes and evaluates communication skills for maintaining healthy relationships throughout the life span. The student is expected to:

- (A) evaluate how a healthy relationship influences career goals;
- (B) demonstrate communication skills in building and maintaining healthy relationships;
- (C) demonstrate strategies for communicating needs, wants, and emotions; and
- (D) evaluate the effectiveness of conflict resolution techniques in various situations.

(4) The student relates appropriate information to the proper authority. The student is expected to:

(A) identify and retrieve reportable information; and

(B) report information according to facility policy.

(5) The student identifies documents integrated into the permanent record of the health informatics system. The student is expected to:

(A) describe document formats; and

(B) compile and record data according to regulatory agency policy.

(6) The student describes academic requirements necessary for employment in the health science industry. The student is expected to:

(A) research specific health science careers; and

(B) review employment procedures for a specific health science career.

(7) The student identifies problems and participates in the decision-making process. The student is expected to:

(A) analyze systematic procedures for problem solving;

(B) evaluate the impact of decisions; and

(C) suggest modifications based on decision outcomes.

(8) The student implements the knowledge and skills of a health science professional in the clinical setting. The student is expected to:

(A) comply with specific industry standards related to safety and substance abuse;

(B) model industry expectations of professional conduct such as attendance, punctuality, personal appearance, hygiene, and time management;

(C) articulate comprehension of assignment;

(D) employ medical vocabulary specific to the health-care setting;

(E) perform admission, discharge, and transfer functions in a simulated setting;

(F) demonstrate skills related to activities of daily living in rehabilitative care such as range of motion, positioning, and ambulation according to the health science industry standards, regulatory agency standards, and professional guidelines;

(G) role play techniques used in stressful situations such as trauma, chronic, and terminal illness;

(H) demonstrate first aid, vital signs, cardiopulmonary resuscitation, and automated external defibrillator skills in a laboratory setting; and

(I) perform skills specific to a health science professional such as medical assistant, dental assistant, emergency medical technician-basic, phlebotomy technician, and pharmacy technician.

(9) The student evaluates ethical behavioral standards and legal responsibilities. The student is expected to:

(A) research and describe the role of professional associations and regulatory agencies;

(B) examine legal and ethical behavior standards such as Patient Bill of Rights, Advanced Directives, and the Health Insurance Portability and Accountability Act;

(C) investigate the legal and ethical ramifications of unacceptable behavior; and

(D) perform within the designated scope of practice.

(10) The student exhibits the leadership skills necessary to function in a democratic society. The student is expected to:

(A) identify leadership skills of health science professionals;

(B) participate in group dynamics; and

(C) integrate consensus-building techniques.

(11) The student maintains a safe environment. The student is expected to:

(A) conform to governmental regulations and guidelines from entities such as the World Health Organization, Centers for Disease Control, Occupational Safety and Health Administration, Food and Drug Administration, and National Institute for Occupational Safety and Health;

(B) explain protocol related to hazardous materials and situations such as material safety data sheets;

(C) observe and report unsafe conditions; and

(D) practice recycling and waste management for cost containment and environmental protection.

(12) The student assesses wellness strategies for the prevention of disease. The student is expected to:

(A) research wellness strategies for the prevention of disease;

(B) evaluate positive and negative effects of relationships on physical and emotional health such as peers, family, and friends;

(C) explain the benefits of positive relationships among community health professionals in promoting a healthy community;

(D) examine access to quality health care; and

(E) research alternative health practices and therapies.

Anatomy and Physiology

(1) The student conducts investigations, for at least 40% of instructional time, 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.

(2) 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)(2) 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 which have been tested over a wide variety of conditions are incorporated into theories;

(C) know 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 and new technologies are developed;

(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, 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.

(3) 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 by the student;

(B) communicate and apply scientific information extracted from various sources such as 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.

(4) 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 means, 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 such as diabetes, hypothyroidism, and Crohn's disease; and

(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.

(5) 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.

(6) 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.

(7) 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.

(8) 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.

(9) 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.

(10) The student investigates 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, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;

(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.

(11) The student describes the process of reproduction and growth and development. The student is expected to:

(A) explain embryological development of tissues, organs, and systems;

(B) identify the functions of the male and female reproductive systems; and

(C) summarize the human growth and development cycle.

(12) The student recognizes emerging technological advances in science. The student is expected to:

(A) recognize advances in stem cell research such as cord blood utilization; and

(B) recognize advances in bioengineering and transplant technology.

Medical Microbiology

(1) The student conducts investigations, for at least 40% of instructional time, 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.

(2) 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)(2) 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 which have been tested over a wide variety of conditions are incorporated into theories;

(C) know 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 and new technologies are developed;

(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, 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.

(3) 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 by the student;

(B) communicate and apply scientific information extracted from various sources such as 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.

(4) The student describes the relationships between microorganisms and health and wellness in the human body. The student is expected to:

(A) research and describe the historical development of microbiology as it relates to health care of an individual;

(B) identify chemical processes of microorganisms;

(C) recognize the factors required for microbial reproduction and growth;

(D) explain pathogenic and non-pathogenic microbes in the human body;

(E) describe the morphology and characteristics of microorganisms using a variety of microbiological techniques;

(F) discuss the results of laboratory procedures that are used to identify microorganisms;

(G) explain how pathogens affect the human body systems; and

(H) research roles, functions, and responsibilities of agencies governing infectious disease control.

(5) The student examines the role of pathogens in infectious diseases. The student is expected to:

(A) outline the infectious process;

(B) classify microorganisms using a dichotomous key;

(C) categorize diseases caused by bacteria, fungi, viruses, protozoa, rickettsias, arthropods, and helminths;

(D) explain the body's immune response and defenses against infection;

(E) evaluate the effects of anti-microbial agents;

(F) examine reemergence of diseases such as malaria, tuberculosis, and polio;

(G) investigate drug-resistant microorganisms, including methicillin-resistant Staphylococcus aureus, vancomycin-resistant enterococci, and superbugs; and

(H) outline the role of the governing agencies in monitoring and establishing guidelines based on the spread of infectious diseases.