Texas CTE

Medical Microbiology

The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: TXMM 1	**(A)** demonstrate verbal and non-verbal communication in a clear, concise, and effective manner; and TXMM 1.A
	(B) exhibit the ability to cooperate, contribute, and collaborate as a member of a team. TXMM 1.B
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: TXMM 2	**(A)** demonstrate safe practices during laboratory and field investigations; and TXMM 2.A
	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. TXMM 2.B
The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to: TX MM 3	**(A)** know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section; TXMM 3.A
	(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; TXMM 3.B
	know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike

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	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; TXMM 3.C
	(D) distinguish between scientific hypothesis and scientific theories; TXMM 3.D
	(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology; TXMM 3.E
	(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; TXMM 3.F
	(G) analyze, evaluate, make inferences, and predict trends from data; TXMM 3.G
	(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; TXMM 3.H
	(I) dispose of all biological material in the proper biohazard containers; and TXMM 3.I
	(J) employ standard precautions, including proper protective equipment during all laboratory exercises. TXMM 3.J
The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: TXMM 4	(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; TXMM 4.A
	(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; TXMM 4.B
	(C) draw inferences based on data related to promotional materials for products and services; TXMM 4.C
	(D) evaluate the impact of scientific research on society and the environment; TXMM 4.D
	evaluate models according to their limitations in representing biological objects or events; and TXMM 4.E

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	(F) research and describe the history of science and contributions of scientists. TXMM 4.F
The student describes the relationships between microorganisms and health and wellness in the human body. The student is expected to: TXMM 5	**(A)** research and describe the historical development of microbiology as it relates to health care of an individual; and TXMM 5.A
	(B) research roles, functions, and responsibilities of agencies governing infectious disease control. TXMM 5.B
The student is expected to perform and analyze results in the microbiology laboratory. The student is expected to: TXMM 6	**(A)** classify microorganisms using a dichotomous key; TXMM 6.A
	(B) explain the difference between Gram positive and Gram negative bacteria regarding the bacterial cell wall; TXMM 6.B
	(C) identify chemical processes of microorganisms; TXMM 6.C
	(D) recognize the factors required for microbial reproduction and growth; TXMM 6.D
	(E) identify the normal flora microorganisms of the human body; TXMM 6.E
	(F) distinguish between pathogens, opportunistic pathogens, hospital-acquired infections, and colonizing microorganisms; TXMM 6.F
	(G) describe the colony morphology of microorganisms; TXMM 6.G
	(H) interpret Gram stain results; TXMM 6.H
	(I) discuss the results of laboratory procedures such as biochemical reactions that are used to identify microorganisms; and TXMM 6.I
	(J) explain the role of the sensitivity report provided to the clinician by the microbiology department. TXMM 6.J
The student examines the role of microorganisms in infectious diseases. The student is expected to: TXMM 7	**(A)** outline the infectious process, including how pathogenic microorganisms affect human body systems; TXMM 7.A
	(B) categorize diseases caused by bacteria, fungi, viruses, protozoa, rickettsias, arthropods, and helminths; TXMM 7.B
	(C) explain the body's immune response and defenses against infection; TXMM 7.C
	(D) evaluate the effects of anti-microbial agents such as narrow and broad spectrum antibiotics; TXMM 7.D
	(E) examine reemergence of diseases such as malaria, tuberculosis, and polio; TXMM 7.E

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(F) identify common bacterial infections from hospital-acquired infection and community-acquired infections such as Clostridium difficile and Staphylococcus aureus; TXMM 7.F

(G) investigate drug-resistant microorganisms such as carbapenem-resistant Enterobacteriaceae, methicillin-resistant Staphylococcus aureus, vancomycin-intermediate/resistant Staphylococci aureus, vancomycin-resistant enterococci, and emergent antibiotic-resistant superbugs; and TXMM 7.G

(H) outline the role of the governing agencies in monitoring and establishing guidelines based on the spread of infectious diseases. TXMM 7.H