

Forensic Science

At-A-Glance - Lamar CISD

Professional Standards/Employability Skills/Technical Skills			
Ongoing Skills Imbedded All Year	<p>Professional Standards/Employability Skills FS 1(A) The student will demonstrate professional standards/employability skills as required by business and industry. The student is expected to achieve business and industry employability skills standards such as attendance, punctuality, meeting deadlines, working toward personal/team goals every day, and ethical use of technology.</p> <p>Safety FS 2(A) The student will demonstrate safe practices during laboratory and field investigations. FS 2(B) The student will demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>Scientific Method FS 3(A) The student will know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section. FS 3(B) The student will know that scientific 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. FS 3(C) The student will 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. FS 3(D) The student will distinguish between scientific hypotheses and scientific theories. FS 3(E) The student will plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology. FS 3(F) The student will 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, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures. FS 3(G) The student will analyze, evaluate, make inferences, and predict trends from data. FS 3(H) The student will communicate valid conclusions supported by the data through methods such as investigative reports, lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p> <p>Critical Thinking FS 4(A) The student will 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, to encourage critical thinking. FS 4(B) The student will communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials. FS 4(C) The student will draw inferences based on data related to criminal investigation. FS 4(D) The student will evaluate the impact of scientific research on criminal investigation, society, and the environment. FS 4(E) The student will evaluate models according to their limitations in representing biological objects or events. FS 4(F) The student will research and describe the history of science and contributions of scientists within the criminal justice system.</p> <p>History FS 5(E) The student will explore and demonstrate an understanding of the terminology and the procedures employed in the criminal justice system. FS 5(F) The student will illustrate the history of forensic science and recognize the major contributors in the development of forensic science. FS 6(D) The student will apply knowledge of the elements of criminal law that guide search and seizure of persons, property, and evidence.</p>		
	Grading Period	Unit Name	Estimated Time Frame
Grading Period 1 28 Days	Professional Standards/Employability Skills	1 Day	1A
	FS 1(A) The student will demonstrate professional standards/employability skills as required by business and industry. The student is expected to achieve business and industry employability skills standards such as attendance, punctuality, meeting deadlines, working toward personal/team goals every day, and ethical use of technology.		
	Safety	2 Days	2A, 2B
FS 2(A) The student will demonstrate safe practices during laboratory and field investigations. FS 2(B) The student will demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.			

Scientific Method	2 Days	3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H
<p>FS 3(A) The student will know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section.</p> <p>FS 3(B) The student will know that scientific 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.</p> <p>FS 3(C) The student will 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.</p> <p>FS 3(D) The student will distinguish between scientific hypotheses and scientific theories.</p> <p>FS 3(E) The student will plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology.</p> <p>FS 3(F) The student will 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, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures.</p> <p>FS 3(G) The student will analyze, evaluate, make inferences, and predict trends from data.</p> <p>FS 3(H) The student will communicate valid conclusions supported by the data through methods such as investigative reports, lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>		
Critical Thinking	1 Day	4A, 4B, 4C, 4D, 4E, 4F
<p>FS 4(A) The student will 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, to encourage critical thinking.</p> <p>FS 4(B) The student will communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials.</p> <p>FS 4(C) The student will draw inferences based on data related to criminal investigation.</p> <p>FS 4(D) The student will evaluate the impact of scientific research on criminal investigation, society, and the environment.</p> <p>FS 4(E) The student will evaluate models according to their limitations in representing biological objects or events.</p> <p>FS 4(F) The student will research and describe the history of science and contributions of scientists within the criminal justice system.</p>		
History	5 Days	5E, 5F, 6D
<p>FS 5(E) The student will explore and demonstrate an understanding of the terminology and the procedures employed in the criminal justice system.</p> <p>FS 5(F) The student will illustrate the history of forensic science and recognize the major contributors in the development of forensic science.</p> <p>FS 6(D) The student will apply knowledge of the elements of criminal law that guide search and seizure of persons, property, and evidence.</p>		
Roles	5 Days	5A, 5B, 6A, 6B, 5D
<p>FS 5(A) The student will distinguish between criminalistics and criminology.</p> <p>FS 5(B) The student will identify and illustrate roles, functions, and responsibilities of different forensic science disciplines such as serology-DNA, controlled substances, toxicology, trace evidence, firearms, fingerprints, and questioned documents.</p> <p>FS 6(A) The student will compare and contrast the roles of forensic scientists and crime scene investigators.</p> <p>FS 6(B) The student will demonstrate the ability to work as a member of a team.</p> <p>FS 5(D) The student will identify and illustrate roles, functions, and responsibilities of professionals in the criminal justice system, including crime scene investigators, criminalists, attorneys, and medical examiners.</p>		
Ethics	2 Days	5C
<p>FS 5(C) The student will summarize the ethical standards required of a forensic science professional.</p>		
Physical Evidence	10 Days	6C, 6E, 6F, 6G, 6H
<p>FS 6(C) The student will conduct a systematic search of a simulated crime scene for physical evidence following crime scene search patterns such as spiral, line, grid, and strip.</p> <p>FS 6(E) The student will describe the elements of a crime scene sketch such as measurements, compass directions, scale of proportion, legend-key, and title.</p> <p>FS 6(F) The student will develop a crime scene sketch using coordinates/measurements from fixed points.</p> <p>FS 6(G) The student will outline the chain of custody procedure for evidence discovered in a crime scene.</p> <p>FS 6(H) The student will demonstrate proper techniques for collecting, packaging, and preserving physical evidence found at a crime scene.</p>		

Grading Period 2 25 Days	Trace Evidence at Crime Scene	6 Days	7A, 7E, 7I
	FS 7(A) The student will demonstrate how to process trace evidence such as glass, paint, fibers, hair, soil, grass, and blood collected in a simulated crime scene. FS 7(E) The student will describe the instrumental analysis of trace evidence such as microscopy and spectrometry. FS 7(I) The student will describe various examinations performed in forensic paint analysis, including microscopic morphology, binder, and pigment characterization.		
	Hair	6 Days	7F, 7G
	FS 7(F) The student will compare and contrast the microscopic characteristics of human hair and animal hair, including medulla, pigment distribution, and scales. FS 7(G) The student will describe and illustrate the different microscopic characteristics used to determine the racial and somatic origin of a human hair sample.		
	Fibers	7 Days	7H
	FS 7(H) The student will differentiate between natural and synthetic fibers.		
	Glass Direction	6 Days	7B, 7C, 7D
FS 7(B) The student will compare and contrast the composition of various types of glass such as soda lime, borosilicate, leaded, and tempered. FS 7(C) The student will determine the direction of a projectile by examining glass fractures. FS 7(D) The student will define refractive index and explain how it is used in forensic glass analysis.			
Grading Period 3 25 Days	Blood Stain, Types, Punnett Squares, and Serology – Lab Procedures	10 Days	11A, 11B, 11C, 11D
	FS 11(A) The student will explain forensic laboratory procedures to determine if a stain detected in a crime scene is blood. Blood Types FS 11(B) The student will identify the red blood cell antigens and antibodies as they relate to human blood types. Punnett Squares FS 11(C) The student will determine genotypes and phenotypes in the human red blood cell system using Punnett Squares. Body Fluids FS 11(D) The student will research methodologies used to collect and analyze other body fluids.		
	Blood Stain Patterns	9 Days	9A, 9B
	FS 9(A) The student will analyze blood stain patterns based on source, direction, and angle of trajectory. Invisible Blood Stains FS 9(B) The student will explain the method of chemically isolating an invisible blood stain using reagents such as luminol.		
	DNA Analysis	6 Days	12A, 12B
FS 12(A) The student will describe the structure of a DNA molecule and its function. FS 12(B) The student will describe the steps used in extraction of DNA.			
Grading Period 4 33 Days	DNA Analysis continues	10 Days	12A, 12B, 12C, 12D
	DNA Analysis continues FS 12(A) The student will describe the structure of a DNA molecule and its function. FS 12(B) The student will describe the steps used in extraction of DNA Polymerase Chain Reaction FS 12(C) The student will explain the analytical procedure for forensic DNA typing, including electrophoresis, polymerase chain reaction, and short tandem repeat. FS 12(D) The student will interpret the components of an electropherogram		
	Fingerprint Patterns and Characteristics	6 Days	8A, 8B, 8C
FS 8(A) The student will compare the three major fingerprint patterns of arches, loops, and whorls and their respective subclasses. FS 8(B) The student will identify characteristics of fingerprints, including bifurcations, ending ridges, dots, short ridges, and enclosures. FS 8(C) The student will distinguish among patent, plastic, and latent impressions.			

	Lifting Prints and Comparing	9 Days	8D, 8E, 8F, 8G
	<p>FS 8(D) The student will perform laboratory procedures for lifting latent prints on porous and nonporous objects using chemicals such as iodine, ninhydrin, silver nitrate, and cyanoacrylate resin.</p> <p>FS 8(E) The student will perform laboratory procedures for lifting latent prints on nonporous objects using fingerprint powders such as black powder and florescent powders.</p> <p>FS 8(F) The student will explain the Automatic Fingerprint Identification System (AFIS) and describe the characteristics examined in the AFIS.</p> <p>Comparing Fingerprints</p> <p>FS 8(G) The student will compare impressions evidence collected at a simulated crime scene with the known impression.</p>		
	Alcohol – Human Body, BAC, Impairment, Preservation	8 Days	10A, 10B, 10C, 10D
	<p>FS 10(A) The student will explain the absorption, distribution, and elimination of alcohol through the human body.</p> <p>Blood Alcohol</p> <p>FS 10(B) The student will describe the blood alcohol laboratory procedures as they relate to blood alcohol concentration.</p> <p>Alcohol Impairment</p> <p>FS 10(C) The student will explain the levels of tolerance and impairment due alcohol consumption.</p> <p>Blood Samples Preservation</p> <p>FS 10(D) The student will explain the precautions necessary in the forensic laboratory for proper preservation of blood samples.</p>		
Grading Period 5 34 Days	FDA and Controlled Substance	10 Days	13A, 13B
	<p>FS 13(A) The student will classify controlled substances using the schedules under the Controlled Substances Act.</p> <p>FS 13(B) The student will identify controlled substances using laboratory procedures such as microchemical tests, microscopy, chromatography, and spectrophotometry.</p>		
	Tool Marks	2 Days	14A
	<p>FS 14(A) The student will explain the individual characteristics of tool marks.</p>		
	Dental Records ID	2 Days	16E
	<p>FS 16(E) The student will explain the role of dental records in identification of human remains.</p>		
	Ballistics	10 Days	14B, 14C, 14D, 14E
<p>Ballistics</p> <p>FS 14(B) The student will describe the mechanism of modern firearms.</p> <p>FS 14(C) The student will recognize characteristics of bullet and cartridge cases.</p>			
<p>Weapon Fired</p> <p>FS 14(D) The student will describe the composition and method of analysis for gunshot residue and primer residue.</p>			
<p>NIBIN - Information</p> <p>FS 14(E) The student will recognize the type of information available through the National Integrated Ballistics Information Network.</p>			
Document Analysis	10 Days	15A, 15B, 15C, 15D	
<p>FS 15(A) The student will describe different types of examinations performed by a questioned document examiner in a forensic laboratory, including counterfeiting, handwriting, ink, and paper analysis.</p> <p>FS 15(B) The student will describe the security features incorporated in the U.S. currency to prevent counterfeiting.</p> <p>FS 15(C) The student will perform handwriting comparisons of an unknown sample with exemplars by analyzing characteristics such as letter, line, and formatting.</p> <p>FS 15(D) The student will describe the process of ink analysis using chromatography.</p>			
Grading Period 6 28 Days	Forensic Anthropology	13 Days	16B, 16A, 16C, 16D, 16E
	<p>FS 16(B) The student will compare composition and structure of human bones with other animals.</p> <p>Major Bones</p> <p>FS 16(A) The student will identify the major bones of the human skeletal system.</p> <p>Excavate Bones</p> <p>FS 16(C) The student will describe the techniques used to excavate bones from a crime scene.</p> <p>Gender/Age</p> <p>FS 16(D) The student will explain the characteristics of the human skeletal system indicative of specific gender, racial origin, and approximate range of age and height.</p> <p>FS 16(E) The student will explain the role of dental records in identification of human remains.</p>		

	Death and Decomposition	13 Days	17A, 17B, 17D, 17C
	Rigor Timeline – TOD FS 17(A) The student will explain the process and timeline of rigor mortis and its role in calculating time of death. Postmortem Lividity. FS 17(B) The student will explain postmortem lividity and its importance when processing a crime scene. Cause of Death FS 17(D) The student will determine time and cause of death through case studies. TOD Entomology FS 17(C) The student will determine time of death using entomology.		
	Semester Review & Test	2 Days	All above TEKS