



# **Forensic Science (Proc 24)**

PRE-TEST/POST-TEST TEKS BLUEPRINT

# Pre-Test/Post-Test Development Overview

## TEKS Addressed Selection Process

The Texas Essential Knowledge & Skills (TEKS) included in the course pre-test and post-test were selected for their direct relevance to the course content. This selection process was guided by the goal of assessing learners' understanding of specific topics and skills that are integral to the course. As a result, TEKS related to general employability skills or broader topics were often excluded. This focus ensures that the assessments accurately measure students' mastery of the subject matter, allowing educators to gain a clear insight into areas where students excel or may need additional support. By concentrating on content-specific TEKS, the tests provide a more precise evaluation of the students' knowledge and understanding of the core material.

## Test Question Development Process

The questions created for the pre-test and post-test were designed using psychometric principles to ensure they are of high quality and fairness. This approach helps to accurately assess student understanding. These principles guide the development of questions to be reliable, valid, and free from bias, ensuring that they effectively measure the knowledge and skills the students are expected to acquire in the course.

## Forensic Science (Proc 24) Pre-Test/Post-Test TEKS Blueprint

Knowledge & Skills Statement	Student Expectation	iCEV Lesson Title
(2) The Student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The Student is expected to	(B) apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems	Conducting Lab and Field Investigations: Forensic Science
(2) The Student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The Student is expected to	(D) use appropriate tools and equipment such as scientific calculators, computers, internet access, digital cameras, video recording devices, meter sticks, metric rulers, measuring tapes, digital range finders, protractors, calipers, light microscopes up to 100x magnification, hand lenses, stereoscopes, digital scales, dissection equipment, standard laboratory glassware, appropriate personal protective equipment (PPE), an adequate supply of consumable chemicals, biological specimens, prepared evidence slides and samples, evidence packaging and tamper evident tape, evidence tents, crime scene tape, L-rulers, American Board of Forensic Odontology (ABFO) scales, alternate light sources (ALS) and ALS protective goggles, blood specimens, blood presumptive tests, glass samples of various chemical composition, human and non-human bones, fingerprint brushes and powders, lifting tapes and cards, ten-print cards and ink pads, swabs with containers, disposable gloves, and relevant and necessary kits	Tools in Forensic Science
(2) The Student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The Student is expected to	(F) organize quantitative and qualitative data using appropriate methods of communication such as reports, graphs, tables, or charts	Conducting Lab and Field Investigations: Forensic Science
(2) The Student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The Student is expected to	(H) distinguish between scientific hypotheses, theories, and laws	Science Explained: Forensic Science
(3) The Student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The Student is expected to	(C) use mathematical calculations to assess quantitative relationships in data	Analyzing Data: Forensic Science
(4) The Student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The Student is expected to	(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories	Communicating Findings in Forensic Science
(5) The Student knows the contributions of scientists and engineers and recognizes the importance of scientific research and innovation on society. The Student is expected to	(B) relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists and engineers as related to the content	Impact of Science: Forensic Science
(6) The Student explores the history of forensic science. The Student is expected to	(B) explain significant historical and modern contributions to the development and advancement of forensic science made by contributors such as Edmond Locard, Mathieu Orfila, Francis Galton, Edwin Henry, and Alec Jeffreys.	History and Evolution of Forensic Science
(7) The Student analyzes legal aspects within forensic science. The Student is expected to	(B) identify and explain knowledge of terminology and procedures employed in the criminal justice system as they pertain to the chain of custody procedure for evidence	Evidence Collection: Laws and Regulation

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Knowledge & Skills Statement	Student Expectation	ICEV Lesson Title
(7) The Student analyzes legal aspects within forensic science. The Student is expected to	(D) research and discuss the effect of biases such as confirmation bias and framing cognitive bias on evidence collection, forensic analysis, and expert testimony	Ethics in Forensic Science
(7) The Student analyzes legal aspects within forensic science. The Student is expected to	(E) compare the admissibility of expert witness testimony in terms of the Frye Standard and the Daubert Standard under federal rules of evidence.	Ethics in Forensic Science
(9) The Student recognizes the procedures of crime scene investigation while maintaining scene integrity. The Student is expected to	(A) explain the roles and tasks needed to complete a crime scene examination, which may require collaboration with outside experts and agencies, and demonstrate the ability to work as a member of a crime scene team	Evidence Collections: Laws and Regulation
(9) The Student recognizes the procedures of crime scene investigation while maintaining scene integrity. The Student is expected to	(C) discuss the elements of criminal law that guide search and seizure of persons, property, and evidence	Evidence Collection: Laws and Regulation
(9) The Student recognizes the procedures of crime scene investigation while maintaining scene integrity. The Student is expected to	(D) conduct a primary and secondary systematic search of a simulated crime scene for physical evidence utilizing search patterns such as spiral, line, grid, and zone	Evidence Collection: Procedures - Systematic Searches
(9) The Student recognizes the procedures of crime scene investigation while maintaining scene integrity. The Student is expected to	(F) generate a physical or digital crime scene sketch, including coordinates or measurements from fixed points, compass directions, scale of proportion, legend-key, heading, and title block	Crime Scene Sketching
(9) The Student recognizes the procedures of crime scene investigation while maintaining scene integrity. The Student is expected to	(G) demonstrate proper techniques for collecting, packaging, and preserving physical evidence found at a crime scene while maintaining documentation, including chain of custody	Evidence Collection: Procedures
(10) The Student analyzes fingerprint evidence in forensic science. The Student is expected to	(A) compare the three major fingerprint patterns of arches, loops, and whorls	Fingerprint and Impression Analysis
(10) The Student analyzes fingerprint evidence in forensic science. The Student is expected to	(C) distinguish between patent, plastic, and latent impressions	Fingerprint and Impression Analysis
(10) The Student analyzes fingerprint evidence in forensic science. The Student is expected to	(E) perform procedures for developing latent prints using chemical processes on porous and adhesive surfaces with chemicals such as ninhydrin and crystal violet and documenting the results via photography	Fingerprint and Impression Analysis
(10) The Student analyzes fingerprint evidence in forensic science. The Student is expected to	(F) explain the Integrated Automated Fingerprint Identification System (IAFIS) and describe the implications of Next Generation Identification (NGI) systems.	Fingerprint and Impression Analysis
(11) The Student collects and analyzes impression evidence in forensic science. The Student is expected to	(B) analyze the class and individual characteristics of footwear impressions and the recovery and documentation of surface characteristics such as soil or organic plant material	Tool Mark Analysis
(11) The Student collects and analyzes impression evidence in forensic science. The Student is expected to	(C) analyze the class and individual characteristics of tire tread impressions and the recovery documentation of surface characteristics such as soil or organic plant material	Tool Mark Analysis
(11) The Student collects and analyzes impression evidence in forensic science. The Student is expected to	(D) compare impression evidence collected at a simulated crime scene with the known impression.	Tool Mark Analysis
(12) The Student recognizes the methods to process and analyze hair and fibers found in a crime scene. The Student is expected to	(A) demonstrate how to collect hair and fiber evidence at a simulated crime scene	Evidence Collection: Procedures
(12) The Student recognizes the methods to process and analyze hair and fibers found in a crime scene. The Student is expected to	(B) perform the analysis of hair and fiber evidence using forensic science methods such as microscopy and flame testing	Trace Evidence: Hair and Fiber
(12) The Student recognizes the methods to process and analyze hair and fibers found in a crime scene. The Student is expected to	(C) compare the microscopic characteristics of human hair and non-human hair, including medulla, pigment distribution, and scales	Trace Evidence: Hair and Fiber
(13) The Student recognizes the methods to process and analyze glass evidence. The Student is expected to	(A) demonstrate how to collect and preserve glass evidence	Evidence Collection: Procedures
(13) The Student recognizes the methods to process and analyze glass evidence. The Student is expected to	(B) compare the composition of various types of glass such as soda lime, borosilicate, leaded, and tempered	Trace Evidence: Glass and Paint

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(14) The Student explores principles of questioned document analysis in the physical and digital form. The Student is expected to	(A) research and explain different types of examinations performed on digital and physical evidence in a forensic laboratory such as digital data recovery, counterfeiting, ink, and paper analysis	Digital Forensics
(14) The Student explores principles of questioned document analysis in the physical and digital form. The Student is expected to	(B) investigate and describe the security features incorporated in U.S. and foreign currency to prevent counterfeiting	Document Analysis: Forgery and Counterfeiting
(14) The Student explores principles of questioned document analysis in the physical and digital form. The Student is expected to	(C) perform handwriting comparisons of an unknown sample with exemplars by analyzing characteristics such as letter, line, and formatting.	Document Analysis: Handwriting
(15) The Student evaluates firearms and ballistics evidence. The Student is expected to	(B) identify the components and characteristics of bullet and cartridge cases	Ballistics
(15) The Student evaluates firearms and ballistics evidence. The Student is expected to	(C) describe the composition of and method of analysis for gunshot residue and primer residue	Ballistics
(15) The Student evaluates firearms and ballistics evidence. The Student is expected to	(D) conduct and calculate trajectory analysis of bullet strikes within a simulated crime scene	Ballistics
(15) The Student evaluates firearms and ballistics evidence. The Student is expected to	(E) identify and recognize the type of information available through the National Integrated Ballistics Information Network.	Ballistics
(16) The Student identifies controlled and illicit substances. The Student is expected to	(B) classify controlled substances using the schedules under the Controlled Substances Act	Toxicology and Controlled Substances
(16) The Student identifies controlled and illicit substances. The Student is expected to	(C) identify unknown substances using presumptive and confirmatory procedures such as microchemical/color indicating reagent field tests, microscopy, chromatography, and spectrophotometry.	Toxicology and Controlled Substances
(17) The Student explores toxicology in forensic science. The Student is expected to	(C) interpret results from presumptive and confirmatory laboratory procedures, including GC/MS and their implications	Toxicology and Controlled Substances
(17) The Student explores toxicology in forensic science. The Student is expected to	(D) explain the precautions necessary in the forensic laboratory for proper preservation of biological samples.	Evidence Collection: Procedures
(18) The Student analyzes blood spatter at a simulated crime scene. The Student is expected to	(A) analyze blood stain patterns based on surface type and appearance such as size, shape, distribution and location in order to determine the mechanism by which the patterns are created	Blood Spatter
(18) The Student analyzes blood spatter at a simulated crime scene. The Student is expected to	(B) explain the methods of chemically enhancing latent blood patterns using reagents such as Blue Star or Amido Black	Blood Spatter
(18) The Student analyzes blood spatter at a simulated crime scene. The Student is expected to	(C) conduct and interpret blood presumptive tests for various biologicals such as phenolphthalein and tetramethylbenzidine (TMB).	Serology, Blood and Body Fluids
(19) The Student analyzes the foundations and methodologies surrounding the processing of biological evidence for the purpose of identification. The Student is expected to	(B) identify the red blood cell antigens and antibodies as they relate to human blood types	Serology, Blood and Body Fluids
(19) The Student analyzes the foundations and methodologies surrounding the processing of biological evidence for the purpose of identification. The Student is expected to	(D) explain the analytical procedure for generating a DNA profile, including extraction, quantification, amplification, and capillary electrophoresis	DNA Analysis - Extracting DNA
(19) The Student analyzes the foundations and methodologies surrounding the processing of biological evidence for the purpose of identification. The Student is expected to	(E) explain the different methodologies surrounding the different types of DNA analysis such as short tandem repeats (STRs), Y-STRs, mitochondrial DNA, and single nucleotide polymorphisms (SNPs)	DNA Analysis - Restriction Fragment Length
(19) The Student analyzes the foundations and methodologies surrounding the processing of biological evidence for the purpose of identification. The Student is expected to	(G) explore the databasing systems associated with DNA such as Combined DNA Index System (CODIS) and ancestry based databasing systems.	DNA Analysis - Introduction to DNA Analysis
(20) The Student explores the principles surrounding medicolegal death investigations. The Student is expected to	(A) explain the principles of rigor, algor, and livor mortis and how they apply to deceased persons	Decomposition Analysis
(20) The Student explores the principles surrounding medicolegal death investigations. The Student is expected to	(D) determine the approximate time of death using entomology.	Decomposition Analysis

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Knowledge & Skills Statement	Student Expectation	iCEV Lesson Title
(21) The Student explores principles of anthropology and odontology relevant to forensic science. The Student is expected to	(D) explain the characteristics of the human skeletal system indicative of specific biological sex and approximate range of age and height; and	Forensic Anthropology and Odontology
(21) The Student explores principles of anthropology and odontology relevant to forensic science. The Student is expected to	(E) explain how human remains are identified through dental records such as dentures, x-rays, and implants.	Forensic Anthropology and Odontology