Month	Standards	Student Learning Objective	Key Vocabulary	Instructional Resources
August	STEELS SEP 3.1.9-12.B 3.2.9-12.B TES 3.5.9-12.A 3.5.9-12.CC	**Intro, History, & Careers in Forensic Science** ● Define the key concepts and terms related to forensic science. ● Explain the historical evolution of forensic science and its impact on the legal system. ● Evaluate the different career paths available in the field of forensic science. ● Analyze case studies to understand the application of forensic science in real-life scenarios.	Locard's Exchange Principle Expert Witness Daubert Standards Serology Pathology Odontology Ballistics Toxicology	Presentation/notes Practice Worksheets How CSI Works activity How Police Interrogation Works activity
September	STEELS SEP 3.1.9-12.E 3.2.9-12.B TES 3.5.9-12.A 3.5.9-12.N 3.5.9-12.AA	**Processing the Crime Scene** ● Describe the proper steps for processing a crime scene, including search techniques and documentation ● Explain the importance of proper collection and packaging of evidence to avoid contamination ● Evaluate the necessity of Chain of Custody	Trace evidence Contamination Impression evidence Control sample Druggist fold Primary crime scene Secondary crime scene Chain of Custody	Presentation/notes Mock Crime Scene Search Techniques activity "Barbie Murder Mystery" activity Crime Scene Basics
September	STEELS SEP 3.1.9-12.C 3.2.9-12.C TES 3.5.9-12.J	**Trace Evidence** ● Identify examples of trace evidence ● Explain the difference between class evidence and individual evidence. ● Describe the proper collection techniques for certain types of trace evidence. ● Apply Locard's Exchange Principle to the presence of trace evidence ● Evaluate the reliability and limitations of trace evidence in forensic investigations. ● Analyze real-life case studies to understand the impact of trace evidence on court cases. ● Construct arguments to support or challenge the inclusion of trace evidence in legal proceedings.	Trace evidence Class evidence Individual evidence Refractive index Comparison microscope Phase-contrast microscope Scanning Electron microscope Infrared spectrophotometry Gas chromatograph Probability Theory Cuticle Medulla Cortex Follicle	Presentation/notes Hair Diagrams Wayne Williams Case Study Practice Worksheets Hair Analysis - microscopes Fiber Analysis - microscopes OJ Simpson Trial Analysis "The People vs OJ Simpson" movie

Upper Dauphin Area School District **Course: Forensic Science and the Human Experience - Science**

Month	Standards	Student Learning Objective	Key Vocabulary	Instructional Resources
October	STEELS SEP 3.2.9-12.H 3.2.9-12.R TES 3.5.9-12.H	**Arson** ● Identify the possible motives for Arson ● Describe the different aspects of an Arson investigation (point of origin, accelerants, etc). ● Analyze real-life case studies to understand the impact of arson evidence on court cases. ● Explain the different types of fires, according to their cause. ● Describe the important role of K-9 Units in forensic investigations.	Motive Accelerant Ignitor Arson plant Point of origin Incendiary device Spontaneous combustion Asphyxiation Carbon monoxide	Presentation/notes Practice worksheets How Police Dogs Work “Death By Fire” Case Study
October - November	STEELS SEP 3.2.9-12.U TES 3.5.9-12.A	**Document Analysis** ● Identify examples of questioned documents. ● Describe the clues that indicate a document has been modified or forged. ● Explain how paper chromatography can be used for document analysis. ● Analyze case studies to understand the application of forensic science in real-life scenarios.	Questioned document Forgery Embezzlement Counterfeiting Ransom notes Standards of reference Exemplar Non-requested standards Alterations 5th amendment 4th amendment Paper chromatography	Presentation/notes Document Analysis research activity Handwriting Analysis group exercise How Counterfeiting Works Paper Chromatography Lab Lindbergh Kidnapping Case Study Jon Benet Ramsey Case Study “Catch Me If You Can” movie (Frank Abagnale Case Study)
November - December	STEELS SEP 3.1.9-12.B 3.2.9-12.B 3.2.9-12.X TES 3.5.9-12.A	**Fingerprinting** ● Describe the history of Fingerprinting, and how it has changed. ● Identify the various parts of a fingerprint, including loops, whorls, and arches. ● Classify fingerprints according to Henry's System of Classification. ● Differentiate between latent, visible, and plastic fingerprints. ● Describe the proper technique for collecting fingerprints from a person, as well as a crime scene. ● Understand the limitations and capabilities of fingerprint databases in forensic investigations. ● Analyze ethical considerations surrounding the collection, analysis, and presentation of fingerprint evidence.	Henry System Epidermis Dermis Papillae Sebaceous gland Friction ridges Loop Arch Whorl Delta Core Visible print Plastic print Latent print Ninhydrin Cyanoacrylate AFIS ATF	Presentation/notes History of Fingerprinting Calculating Henry Scores Fingerprint Lab Classification of Prints SERIAL KILLER Mid-Term Project

Month	Standards	Student Learning Objective	Key Vocabulary	Instructional Resources
January	STEELS SEP 3.1.9-12.C 3.2.9-12.C TES 3.5.9-12.A	**Toxicology** ● Identify common drugs and toxins encountered in forensic toxicology, including their chemical structures, pharmacological effects, and routes of administration. ● Explore the legal and ethical considerations in forensic toxicology, including chain of custody procedures, expert testimony, and the interpretation of toxicology results in legal proceedings. ● Contrast a poison with an intoxicant. ● Define Cause of Death and Manner of Death ● Analyze case studies and real-life examples to apply principles of forensic toxicology in the investigation of drug-related deaths, poisoning incidents, and impairment cases. ● Explain the current DUI Laws in Pennsylvania ● Explore the changing Marijuana laws in Pennsylvania and the US, and their implications on society ● Compare the different Drug Schedules according to the DEA	Toxicology Intoxicant Poison Vitreous humor Acute poisoning Chronic poisoning Schedule I - V DEA FDA BAC Breathalyzer Field Sobriety Test Cause of Death Manner of Death Confirmatory Test Presumptive Test Controlled Substance Act Intravenous	Presentation/Notes “Pick Your Poison” research activity Tylenol Tampering Case Study Checking Out Familiar Poisons DUI and Marijuana Laws Analysis of Drugs and Poisons LAB
February	STEELS SEP 3.1.9-12.A 3.1.9-12.B TES 3.5.9-12.A	**Serology** ● Perform and interpret results from common blood typing techniques such as ABO and Rh typing ● Describe presumptive tests for the presence of blood at crime scenes, such as the Kastle-Meyer test and luminol ● Analyze and interpret serological evidence found at crime scenes, including bloodstains, semen, saliva, and other bodily fluids. ● Explain the importance of maintaining a proper chain of custody for serological evidence. ● Analyze real-life case studies involving serological evidence, considering factors such as sample collection, preservation, analysis, and interpretation. ● Interpret blood stain patterns to decipher the events of a crime	Serology Platelets Antigens Blood type Hemoglobin Phenolphthalein Kastle-Meyer Luminol Presumptive Confirmatory Antibodies Rh factor Agglutination Probability Passive bloodstain Transfer bloodstain Projected blood Arterial spurt/gush Impact spatter Cast-Off spatter Low/medium/high velocity spatter Point of convergence	Presentation/notes Blood Typing and Transfusion packet Blood Typing Lab Blood Typing Game online Revisit OJ Simpson Case to discuss blood evidence Blood Spatter video Blood Spatter Lab CSI episode “Coming of Rage”

Month	Standards	Student Learning Objective	Key Vocabulary	Instructional Resources
March	STEELS SEP 3.1.9-12.A 3.1.9-12.P 3.1.9-12.Q TES 3.5.9-12.A 3.5.9-12.DD	**DNA Evidence** ● Describe structure of DNA, and the functions of its different components. ● Explain the role of DNA in inheritance and genetic traits. ● Explain the principles of DNA extraction from various sample types (e.g., blood, saliva, hair). ● Describe the process of DNA quantification and amplification using PCR (Polymerase Chain Reaction). ● Understand the fundamentals of DNA profiling techniques such as Short Tandem Repeat (STR) analysis. ● Identify potential sources of contamination in DNA samples and the laboratory environment. ● Describe the importance of maintaining chain of custody protocols in forensic DNA analysis. ● Interpret DNA profiles generated from forensic samples. ● Analyze complex DNA mixtures and differentiate between contributors. ● Apply statistical methods to assess the significance of DNA matches or associations. ● Understand the purpose and functionality of forensic DNA databases. ● Explain the purpose, functionality, and process of DNA database searching and matching. ● Discuss legal and ethical considerations related to the use of DNA databases in forensic investigations. ● Explain how genealogy can be used in forensic investigations. ● Analyze the role and methods of the Innocence Project in overturning wrongful convictions.	Deoxyribonucleic acid Nucleotides Nitrogen bases Adenine Thymine Guanine Cytosine Base-pairing rules Gene Chromosome Genome Short tandem repeats (STR) VNTR RFLP Polymerase Chain Reaction (PCR) Restriction enzyme Gel electrophoresis Fragment length Loci Autorad Paternity CODIS Cold case Genealogy Innocence Project Wrongful conviction	Presentation/notes DNA Fingerprinting packet Gel Electrophoresis online simulation Gel Electrophoresis lab Marilyn Sheppard Case Study Green River Killer Case Study Christy Mirack Case Study Golden State Killer Case Study Innocence Project

Month	Standards	Student Learning Objective	Key Vocabulary	Instructional Resources
April - May	STEELS SEP 3.1.9-12.B 3.1.9-12.C	**Anthropology & Pathology** ● Identify and analyze human skeletal remains, including methods for determining age, sex, ancestry, and stature. ● Explain the processes involved in the decomposition of human remains and the factors that affect it. ● Evaluate the significance of skeletal trauma in forensic investigations, including blunt force, sharp force, and projectile injuries. ● Describe methods for determining post-mortem interval estimation. ● Analyze the limitations and challenges faced by forensic anthropologists in the field, including issues related to incomplete or degraded remains. ● Define the scope and principles of forensic pathology, including its role in the investigation of suspicious deaths and legal proceedings. ● Describe the various manners of death encountered in forensic pathology, such as natural, accidental, homicidal, suicidal, and undetermined. ● Understand the physiological and pathological changes that occur during the process of death and post-mortem interval estimation. ● Recognize the features of common traumatic injuries and pathological conditions encountered in forensic pathology, including blunt force trauma, sharp force injuries, gunshot wounds, asphyxia, and poisoning. ● Explain the techniques and procedures involved in the forensic autopsy, including external examination, internal examination, toxicological analysis, and histological examination. ● Analyze the role of forensic pathology in the determination of cause and manner of death, including the interpretation of autopsy findings and the integration of investigative information. ● Discuss the ethical and legal considerations in forensic pathology practice, including issues related to consent, confidentiality, and the use of autopsy findings in court proceedings. ● Evaluate the limitations and challenges faced by forensic pathologists, including issues related to decomposition	Anthropology Humerus Ossification Post-mortem interval Antemortem Perimortem Coroner Medical Examiner Rigor mortis Livor mortis /lividity Algor mortis Cadaveric spasm Decomposition Putrefaction Butyric fermentation Cecum Cadaver Ventral surface Entomology Autopsy	Anatomy web activity Bodies N Bones activity How Autopsies Work web activity Pathology research The Body Farm video “Charles Manson and the Family” video CRIME SCENE IN A BOX Final Project (group) Field Trip: Dimon Funeral Home, Tower City