PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Forensic Science B

_____

Grade Level: 10, 11, 12

Date of Board Approval: 2023

Marking Period Course Weighting: Forensic Science B

Major Assessments	**45%**
Skills Application	**30%**
Skills Practice	**20%**
Participation	**5%**
Total	**100%**

Curriculum Map

Overview:

This advanced science course will provide academic theories and extensive lab experiences about the application of science to criminal investigation and the role of science in the criminal justice system. Semester topics include but are not limited to Crime Scene Analysis and Reconstruction Overview, Criminal Psychology and Profiling, Serology and DNA analysis, Fingerprints and Other Personal Identification Patterns, Cyber Crimes, and final Crime Scene Processing and Analysis capstone project.

Students with diverse learning styles will have the opportunity to use a variety of learning methods to attain mastery of the skills and concepts necessary for success. These methodologies include direct instruction, laboratory activities and/or demonstrations, hands-on creative projects, interaction with various texts and media, collaboration with peers, guided inquiry, and written assignments.

This course is designed to build upon students' prior knowledge. Forensic Science A is not a prerequisite for this course; however, it is highly encouraged in that it allows the student a good framework of prior knowledge and skills to build upon to get the most out of this course.

Time/Credit for the Course: Half Year Course, meeting daily for 46 minutes / 0.5 Credits

Curriculum Writing Committee: Lindsay Duffy and Chelsea Sweeney

Curriculum Map

Goals:

1. **Marking Period One - Over a 45-day period of time, students will aim to understand:**

   UNIT 1: Review of Crime Scene Analysis and Reconstruction
   UNIT 2: Criminal Psychology and Profiling
   UNIT 3: Serology and DNA Analysis

   - Key Concepts of Forensic Science
   - Crime Scene Processing
   - Evidence Collection and Protocol
   - Crime Scene Analysis and Reconstruction
   - Medical Examiner's Report on Death Cases
   - Reconstruction vs. Reenactment
   - Examination and Interpretation of Patterns for Reconstruction
   - Reconstruction vs. Individualization Patterns
   - Experimentally Produced Patterns for Interpretation
   - Documentation of Reconstruction Patterns
   - Historical Development of Criminal Psychology
   - Criminal Profiling process
   - Role of Profiler in Criminal Investigation
   - Stages of the Profiling Process
   - Organized vs Disorganized Killers
   - Sociopaths' vs Psychopathy
   - MO vs. Signature
   - Victimology
   - Serial Killers vs Spree Killers
   - Role of Blood in the Body
   - Antibodies vs Antigens
   - Blood characteristics
   - Blood typing
   - Blood stain examination
   - Angle of Impact
   - Area of Intersection
   - DNA profile
   - Collection of Biological evidence
   - Presumptive Blood Tests: Kastle Meyer & Luminol Tests
   - Precipitin Test

- ABO Blood Typing system
- Platelets, RBCs, WBCs, Plasma
- Rh Factor
- Cast off, Back spatter, Parent drop, tail, satellite spatter, spines,
- Passive, Projected, Transfer, Artifactual Blood Stains
- High, Medium, Low Velocity Stains

2. **Marking Period Two - Over a 45-day period of time, students will aim to understand:**

UNIT 4: Fingerprints and Other Patterns of Identification
UNIT 5: Questioned Documents
UNIT 6: Cyber Crimes and Crime Scene Processing and Analysis

- History and Development of Fingerprint use
- Development and Nature of Fingerprints
- Bertillon Measurement System
- Anatomy of Fingerprints
- Sebaceous Glands
- Eccrine Gland and Apocrine Gland
- Embryonic development
- Classification of Prints
- Loops, Whorls, Arches
- Double Loop, Accidental
- Ridge Patterns (Bridge, delta, fork, ridge ending..etc)
- AFIS
- Collection and Preservation Fingerprints
- Fingerprint Comparison and Identification
- Other types of Prints (palm, sole, voice, lip,)
- Inking Fingerprints
- Latent prints, plastic prints
- Dusting for Latent prints
- Lifting latent prints
- Primary Classification of Fingerprints
- Calculation of Primary Classification number
- Questioned documents
- Review of individual and class characteristics of evidence
- Questioned documents
- Graphology
- Handwriting Analysis
- Handwriting characteristics
- Forged checks, insurance documents, wills, credit cards

- Analysis of printers, ink, paper, instruments
- Chromatography tests on ink, paper, and hardness of lead
- Counterfeit checks, currency, medicine, cosmetics, clothing
- Security Features on US Currency
- Ransom Notes
- Jon Benet Ramsey Case Analysis
- Types of Cyber Crimes
- Investigating and Prosecuting Cyber Crimes
- Future of Cyber Crime of
- Identity theft
- Dark Web
- Cat phishing
- Digital Forensics
- Social Media
- Digital Footprint
- Review of Crime Scene processing
- Sketching crime scene
- Photographing the crime scene
- Identification, collection, and preservation of evidence
- Collaborative crime scene team

Big Ideas:

Big Idea #1: Asking questions and defining problems is/are essential to developing a scientific habit of the mind.

Big Idea #2: Scientists construct mental and conceptual models of phenomena to represent ways of knowing that are represented and communicated by words, diagrams, charts, graphs, images, and symbols.

Big Idea #3: Observed patterns of forms and events guide organization and classification and prompt questions about relationships and the factors that influence them.

Big Idea #4: Cause and Effect: Casual relationships and their mechanisms can be tested and used to predict and explain events.

Big Idea #5: Hereditary information in genes is inherited and expressed

Big Idea #6: DNA segments contain information for production of proteins necessary for growth and reproduction of cells

Big Idea #7: Data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others.

Big Idea #8: Patterns: observed patterns of forms and events guide organization and classification and prompt questions about relationships and the factors that influence them.

Big Idea #9: Systems and system models: Scientists develop and use system models to represent current understandings, aid in developing questions and experiments, and communicate ideas to others.

Textbook and Supplementary Resources

Name of Textbook: Forensic Science: Fundamentals and Investigations 3rd ed.

Textbook ISBN#: 9780357543627

Textbook Publisher & Year of Publication: Cengage, 2021

Curriculum Plan

Unit 1: Review of Crime Scene Analysis and Reconstruction
Time range in days: Approximately 15 days

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology, and Science as Inquiry

Standards Addressed:

PA Academic Standards: 3.1.12.A5.; 3.1.12.A8.; 3.1.12.A9.; 3.4.12.A2; 3.4.12.A3; 3.4.12.B1

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.B.; CC.3.5.11-12.E.; CC.3.6.11-12.C.; CC.3.6.11-12.D.; CC.3.6.11-12.E.; CC.3.6.11-12.G.

Anchor(s): S11.A.1; S11.B.1; S11.A.1.2; S11.A.1.3; S11.A.2.1; S11.A.3.1; S11.A.3.2; S11.A.3.3; S11.B.3.2

Eligible Content:

- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to)

1. Recognize and define basic definitions and terminology and concepts of forensic science (DOK 1)

2. Recall what disciplines play a pivotal role in forensic investigations (DOK 1)
3. Observe and evaluate scenarios using inductive and deductive reasoning skills (DOK 2)
4. Draw conclusions about the use of forensic science in the judicial system. (DOK 3)
5. Asses the relationship between science and society (DOK 3)
6. Interpret and analyze one or more scientific investigations (DOK 2 and DOK 4)
7. Formulate a hypothesis to determine the events of a crime as well as to locate evidence (cause/effect) (DOK 3)
8. Draw conclusions as to how the evidence was left at the scene and how it may be associated with a suspect, victim, or location. (DOK 3)
9. Apply concepts of basic procedures to a crime scene in order to maintain chain of custody and recording the scene (DOK 4)
10. Apply concepts of previous material presented in Forensic Science A to a crime scene scenario (DOK 4)
11. Create a police report document summarizing the findings of the case (DOK 4)

Core Activities and Corresponding Instructional Methods: *****Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.***

1. Recall and review the various forensic science disciplines and responsibilities of an investigative team.

- Take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented.
- Provide a written response to daily at the bell prompted discussion questions. For example: “Why does a crime scene investigation rely on science to help lead to conclusions? How can the scientific method be beneficial with respect to an investigation?” or “How does crime scene reconstruction impact forensic investigations?**”**
- Complete an introductory group logic problem solving activity to promote the development of communication and critical thinking skills needed throughout the course.
- Complete note sheets, worksheets, vocabulary evaluations, and content evaluations to demonstrate understanding of the concepts within the unit.

2. Practice and apply investigative skills.

- Design a mock style crime scene. This activity continues to serve as structured practice for students to use observational, communication, and reasoning skills.

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning
- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets
- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals
- Structured class discussion
- Activities and Review Games

Summative:

- Crime Scene analysis and reconstruction project
- Review of Concepts of forensic science Unit quiz

Unit 2 : Criminal Psychology and Profiling **Time Range in Days:** Approximately 15 days

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology

Standards Addressed:

PA Academic Standards: 3.1.12.A1.; 3.1.12.A5.; 3.1.12.A8.; 3.1.12.C2.; 3.4.12.A2.; 3.4.12.B1.; 3.4.12.C3.

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.A.; CC.3.5.11-12.B.; CC.3.5.11-12.C.; CC.3.5.11-12.D.; CC.3.5.11-12.F.; CC.3.5.11-12.H.; CC.3.5.11-12.I.; CC.3.6.11-12.A.; CC.3.6.11-12.C.; CC.3.6.11-12.G.

Anchor(s): S11.A.1; S11.B.1

Eligible Content:

- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to)

1. Differentiate between criminal psychology and criminal profiling (DOK 3)

2. Identify historical events in criminal psychology (DOK 1)
3. List key contributors to and their work in the field of criminal profiling (DOK 1)
4. Apply concepts of the stages of the criminal profiling process to a crime scene (DOK 4)
5. Assess the importance of victimology in the criminal profiling process (DOK 3)
6. Differentiate between the roles of the investigator and the profiler (DOK 3)
7. Explain the value of developing a victim's timeline (DOK 2)
8. Compare and contrast psychopaths and sociopaths (DOK 3)
9. Make observations in order to decide on the 'type' of person who may have committed a crime (DOK 2)
10. Analyze and evaluate the types of individuals who may have committed a particular crime in a particular manner (DOK 4)
11. List the key characteristics of the McDonald Triad of Serial Killers (DOK 1)
12. Distinguish between serial killers and spree killers (DOK 1)
13. Assess a crime scene to determine if it is an organized or disorganized offender (DOK 3)
14. State the different characteristics of male and female serial killers (DOK 1)
15. Organize killers into a psychological category based upon their victimology and M.O. (DOK 2)
16. Distinguish between M.O. and Signature of killers (DOK 2)
17. Analyze a crime scene scenario to construct a profile of the offender (DOK 4)

Core Activities and Corresponding Instructional Methods: ***Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.*

1. Introduce and understand the process of criminal profiling and how it is used throughout the investigation.

- Students will take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented.
- Students will provide a written response to daily at the bell prompted discussion questions. For example: "How can Criminal Profiling lead to an arrest and possible conviction? "How can criminal profiling impact the outcome of an investigation?"
- Students will participate in and complete an introductory activity investigating the differences between M.O. and signatures while also assessing the risk levels of victims. This activity is used to continue the development of communication and critical thinking skills needed throughout the course.

- Students will work at designated lab stations in partners to complete a deductive and inductive reasoning analysis lab on profiling the victims using everyday objects found at the crime scene or victims home. Example activities include: “Another Man’s Trash” and “Who live here?” This will serve as structured practice for students to use observational, communication, and reasoning skills.
- Students will review the responsibilities of an investigative team and their respective roles during the stages of developing a criminal profile through direct instruction of teacher generated PowerPoint or Smart Notebook software.

2. Study the role of psychology within the crime scene and investigation process.

- Students will analyze a mock crime scene or several crime scene scenarios using skills to evaluate the psychological and behavior characteristics of the crime to determine the psychological category of the offender.
- Students will conduct an independent investigation using computer-based skills on a selected serial killer and will present the information through media, text, or other resources regarding careers available in that related field and current or previous cases highlighting that specific discipline and prepare a multimedia presentation to share knowledge of discipline studied.
- Students will complete note sheets, worksheets, vocabulary evaluations, and content evaluations to demonstrate understanding of the concepts within the unit.
- Students will read case studies to answer content questions, write summary paragraphs, or create materials for debate, discussion, or presentation.

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning
- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets

- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals
- Structured class discussion
- Activities and Review Games

Summative:

- Serial Killer Quiz
- Criminal Psychology and Profiling Unit Exam
- Serial Killer Investigation Project

<u>Unit 3:</u> Serology and DNA Analysis
<u>Time Range in Days:</u> 10-15

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology, Science as Inquiry

Standards Addressed:

PA Academic Standards: 3.1.12.A1.; 3.1.12.A2.; 3.1.12.A6.; 3.1.12.A8.; 3.1.12.B1.; 3.1.12.B2.; 3.1.12.B3.; 3.1.12.B4.; 3.2.12.A1.; 3.4.12.A3.; 3.4.12.B1.; 3.4.12.C3.

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.C.; CC.3.5.11-12.D.; CC.3.5.11-12.F.CC.3.5.11-12.G.; CC.3.5.11-12.H.; CC.3.5.11-12.I.; CC.3.6.11-12.A.; CC.3.6.11-12.E.

Biology Keystone Anchors:
BIO.A.1.2.2, BIO.B.1.2.1, BIO.B.1.2.2, BIO.B.2.2.1, BIO.B.2.2.2, BIO.A.4.1.3

Anchor(s): S11.A.1; S11.B.1, S11.A.2; S11.A.3; S11.B.1

Eligible Content:
- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to):

1. Identify and explain the composition of blood (DOK 1)
2. Recognize and process blood evidence at a scene (DOK 1)
3. Describe the function of blood cells (DOK 2)
4. Determine the blood type of a blood sample (DOK2)
5. Differentiate between animal and human blood cells through comparison (DOK 3)
6. Predict the blood type of offspring based on inheritance patterns. (DOK 2)
7. Connect blood spatter analysis to positions of victim and offender (DOK 4)
8. Assess blood stain wounds on a victim and describe the nature of the weapon (DOK 3)
9. Differentiate between the various types of DNA analysis (DOK 3)
10. Compare and contrast the methods of extracting DNA (DOK 3)
11. Display the proper methods of collecting DNA evidence at a crime scene (DOK2)
12. Analyze, evaluate and draw conclusions about which suspect is responsible for the 'crime' based on applying the concepts of DNA profiling as well as blood typing (DOK 3 and DOK 4)
13. Connect instruments used at a scene to reconstruction patterns of blood pattern evidence left at the scene (DOK 4)

Core Activities and Corresponding Instructional Methods: *****Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.***

1. Identify the components of blood, its genetics, and its use as DNA evidence

- Students will take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented.
- Students will provide a written response to daily at the bell discussion questions. For example: Why is DNA thought of as an essential and conclusive piece of evidence in many investigations? What type of information can blood evidence provide in an investigation?
- Students will participate in and complete a blood typing activity lab investigating a homicide case and the suspect's blood is left as the scene. Students will work in partners to complete this lab. This activity is used to continue the development of communication and critical thinking skills needed throughout the course.
- Students will work on different Punnett square problems using blood types to determine paternity.

2. Analyze blood pattern evidence for reconstruction of crime scene events

- Students will work at designated lab stations in partners to complete a lab analysis on presumptive blood tests using luminol and the Kastle Meyers test. This will serve as structured practice for students to use observational, communication, and reasoning skills.
- Students will review the responsibilities of an investigative team and their respective roles in the identification and collection of blood and DNA evidence through direct instruction of teacher generated PowerPoint or Smart Notebook software.
- Students will conduct blood spatter analysis and texture lab using a variety of different textured surfaces. Examples include: hardwood, tile, fabric, and glass.
- Students will conduct blood spatter analysis and Angle of Impact lab analysis. Students will calculate the angle of impact to determine positioning of victim and offender.
- Students will conduct a direction of travel and velocity of blood spatter analysis lab. Students will be able to identify blood droplet and stain characteristics associated with different velocities and direction of travel.
- Students will complete note sheets, worksheets, vocabulary evaluations, and content evaluations to demonstrate understanding of the concepts within the unit.
- Students will read case studies to answer content questions, write summary paragraphs, or create materials for debate, discussion, or presentation.

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning
- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets
- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals

- Structured class discussion
- Activities and Review Games

Summative:

- Characteristics of blood Quiz
- Forensic Serology/DNA Unit Exam

<u>Unit 4:</u> Fingerprints and Pattern Evidence
<u>Time Range in Days:</u> 7-15

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology, Science as Inquiry

Standards Addressed:

PA Academic Standards: 3.1.12.A5.; 3.1.12.A8.; 3.1.12.A9.; 3.4.12.A2; 3.4.12.A3; 3.4.12.B1.

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.B.; CC.3.5.11-12.E.; CC.3.6.11-12.C.; CC.3.6.11-12.D.; CC.3.6.11-12.E.; CC.3.6.11-12.G.

Biology Keystone Anchors: BIO.A.4.2.1, BIO.A.1.2.2

Anchor(s): S11.A.1; S11.B.1; S11.A.1.2; S11.A.1.3; S11.A.2.1; S11.A.3.1; S11.A.3.2; S11.A.3.3; S11.B.3.2

Eligible Content:

- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to):

1. Summarize the history of fingerprinting (DOK 2)
2. Summarize the Bertillon system and identify why it is no longer an accepted system (DOK 1 and DOK 2)
3. Identify the anatomy of a fingerprint and how it is created (DOK 1)
4. State the fundamental principles of fingerprints (DOK 1)
5. Identify the three types of fingerprints, whorls, loops, and arches (DOK 1)
6. Classify print characteristics in diagrams (DOK 2)
7. Predict print characteristics of oneself (DOK 2)
8. Analyze prints in diagrams to determine loops, whorls, and arches (DOK 4)
9. Analyze class prints to determine percentages of whorls, loops, and arches (DOK 4)
10. Compare plain and tented arches (DOK 3)
11. Compare the four whorl patterns (DOK 3)
12. Compare ulnar and radial loops (DOK 3)
13. Summarize how ridgeology makes a fingerprint an individual characteristic (DOK 2)
14. Identify the minutiae details that can be present in a fingerprint (DOK 1)
15. Label the minutiae details in diagrams and pictures (DOK 1)
16. Calculate primary classification number from a set of prints (DOK 1)
17. State what AFIS is (DOK 1)
18. Identify a latent print (DOK 1)
19. Define how latent prints can be collected (DOK 1)
20. Illustrate how to lift latent prints (DOK 1)
21. Analyze lifted latent prints to identify fingerprint characteristics (DOK 4)
22. Students will be able to analyze, evaluate and draw conclusions about prints they have lifted from a mock scene and determine the source from which they came (DOK 3 and DOK 4)
23. Identify other sources of pattern evidence, examples being shoe prints, toe prints, palms, and lips (DOK 1)

Core Activities and Corresponding Instructional Methods: *****Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.***

1. Introduce the history of fingerprints and the identifications system.

- Students will take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented.

- Students will provide a written response to daily at the bell prompted discussion questions. For example: “What are the differences between the three major fingerprints?” “How is a fingerprint created?” “Why are they considered individual evidence?”
- Students will complete a case study connecting the history of fingerprinting and why the Bertillon system is no longer accepted. “Will and William West”
- Students will create a rough draft of their prints, identify their characteristics, and then calculate class percentages of each type.
- Students will be introduced to historical figures that developed multiple forensic science disciplines through direct instruction of teacher generated PowerPoint or Smart Notebook software.
- Students will complete teacher generated worksheets classifying and labeling minutiae patterns.
- Students will complete a ten card of their own prints.
- Students will calculate primary classification number based on their print characteristics.

2. Identify and practice different types of fingerprinting collection processes.

- Students will complete balloon labeling activity. Using ink pads, students will print their own fingerprints on balloons, then blow the balloon up to analyze their prints more carefully.
- Students will lift latent prints off glassware and other household items using black powder, tape, and paint brushes.
- Students will complete note sheets, worksheets, vocabulary evaluations, and content evaluations to demonstrate understanding of the concepts within the unit.
- Students will read case studies to answer content questions, write summary paragraphs, or create materials for debate, discussion, or presentation.

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning

- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets
- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals
- Structured class discussion
- Activities and Review Games

Summative:

- Fingerprint Quiz
- Fingerprint and Pattern Evidence Unit Exam

<u>Unit 5:</u> Document Analysis and Counterfeit
<u>Time Range in Days:</u> 7-15

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology, Science as Inquiry

Standards Addressed:

PA Academic Standards: 3.1.12.A5.; 3.1.12.A8.; 3.1.12.A9.; 3.4.12.A2; 3.4.12.A3; 3.4.12.B1.

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.B.; CC.3.5.11-12.E.; CC.3.6.11-12.C.; CC.3.6.11-12.D.; CC.3.6.11-12.E.; CC.3.6.11-12.G.

Anchor(s): S11.A.1; S11.B.1; S11.A.1.2; S11.A.1.3; S11.A.2.1; S11.A.3.1; S11.A.3.2; S11.A.3.3; S11.B.3.2

Eligible Content:

- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to):

1. Identify the difference between a linguist and graphologist (DOK 1)
2. Summarize how handwriting is developed (DOK 2)
3. Identify the 12 different handwriting characteristics (DOK 1)
4.Identify the two aspects of analyzing handwriting (visual and hardware) (DOK 1)
5. Discuss how these handwriting characteristics are individual (DOK 2)
6.Analyze handwriting characteristics in various samples/ransom notes (DOK 4)
7. Differentiate between hardware used in various writing samples (DOK 3)
8.Make observations of handwriting in various samples/student handwriting (DOK 2)
9. Analyze the Jon Benet Ramsey case ransom note (DOK 4)
10. Classify characteristics that can be found on each domination of money to identify if it is counterfeit (DOK 2)
11. Label the characteristics of money and where they can be found on each bill (DOK 1)
12. Analyze bills of different denominations and determine if they are counterfeit (DOK 4)

Core Activities and Corresponding Instructional Methods: *****Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.***

1. Introduce key characteristics of handwriting patterns.

- Students will take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented. Students establish connections from introductory material to being introduced to new concepts on evidence.
- Students will provide a written response to daily at the bell discussion questions. For example: “Why is handwriting an individual characteristic?” “What are some characteristics to determine if money is counterfeit?”
- Students will analyze various handwriting samples to identify handwriting characteristics.
- Students will work as collaborative pairs to compare handwriting samples with one another. In doing so, they should be able to identify individual characteristics and compare they to one another.
- Students will analyze the JonBenet Case and the ransom note left at the scene. Analyzing the ransom note, they should be making observations about the handwriting.

2. Introduce and identify key characteristics of counterfeit items.

- Students will identify characteristics of different denominations to determine if the bill is counterfeit.
- Students will complete the “Fourth Amendment” activity. They will write two samples of the fourth amendment, later be given a random sample, and analyze the characteristics to find its matching sample.
- Students will read case studies to answer content questions, write summary paragraphs, or create materials for debate, discussion, or presentation. Examples of case studies include: “JonBenet Ramsey,” “Skyway Man”, and “Lindbergh Kindnapping.”

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning
- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets
- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals
- Structured class discussion
- Activities and Review Games

Summative:

- Handwriting Quiz
- JonBenet Ramsey Ransom note evaluation
- Document analysis and counterfeit Unit Exam

<u>Unit 6:</u> Cyber Crimes and Final Reconstruction
<u>Time Range in Days</u>: 15

Standard(s): PA Academic Standards, PACCS Reading and Writing for Science and Technology, Science as Inquiry

Standards Addressed:

PA Academic Standards: 3.1.12.A5.; 3.1.12.A8.; 3.1.12.A9.; 3.4.12.A2; 3.4.12.A3; 3.4.12.B1.

2025 Standards: 3.1.9-12.A , 3.1.9-12.B, 3.1.9-12.C, 3.1.9-12.Q , 3.1.9-12.R, 3.1.9-12.S, 3.1.9-12.X

PACCS: CC.3.5.11-12.B.; CC.3.5.11-12.E.; CC.3.6.11-12.C.; CC.3.6.11-12.D.; CC.3.6.11-12.E.; CC.3.6.11-12.G.

Anchor(s): S11.A.1; S11.B.1; S11.A.1.2; S11.A.1.3; S11.A.2.1; S11.A.3.1; S11.A.3.2; S11.A.3.3; S11.B.3.2

Eligible Content:

- Analyze and explain the accuracy of scientific facts, principles, theories, and laws.
- Explain how specific scientific knowledge or technological design concepts solve practical problems.
- Analyze or compare the use of both direct and indirect observation as means to study the world and the universe.
- Explain and apply scientific concepts to societal issues using case studies.
- Use case studies to propose possible solutions and analyze economic and environmental implications of solutions for real world problems.
- Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.
- Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.
- Communicate results of investigations using multiple representations.
- Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations.
- Explain how technology is used to extend human abilities and precision.

Objectives: (Students will be able to):

1. Identify typical uses of the internet (DOK 1)
2. Differentiate between the three general categories of Cyber Crimes (DOK 3)
3. Analyze the process of investigating and process various types of computer evidence (DOK 4)
4. Identify various types of evidence that can be collected at a Cyber Crime scene and the forensic value of each (DOK 1)
5. State concerns associated with the future of Cyber Crimes (DOK 1)
6.Recall proper crime scene protocol (DOK 1)
7.Make observations while processing witness statements, evidence, autopsy reports, and crime scene (DOK 2)
8. Compare the roles of the lead investigator, criminal photographer, sketch artist, and evidence technician in a criminal investigation (DOK 2)
9. Classify the three different types of documentation during a crime scene investigation (DOK 2)
10. Identify how to correctly package and preserve evidence (DOK 1)
11. Recognize that if evidence is not properly collected it will be admissible (DOK 1)
12. Recall the four different sketch patterns (DOK 1)
13. List important details that should be included within a sketch (DOK 1)
14. Recall how to correctly take photos (DOK 1)
15. Distinguish between the different crime scene logs and identify which each is used for (DOK 1 and DOK 2)
16. Illustrate how to identify and evaluate evidence (DOK 1)
17. Hypothesize events that occurred in a crime scene investigation (DOK 3)
18. Summarize events that occurred throughout mock crime scene (DOK 2)
19. Draw conclusions based on documentation and analysis of evidence (DOK 3 and DOK 4)
20. Apply concepts of crime scene protocol to mock crime scene (DOK 4)

Core Activities and Corresponding Instructional Methods: *****Due to ongoing current events, cases, technology, and topics in the course, flexibility is needed by the instructor in the presentation of materials and content of this course.***

1. Introduce different forms of technology and analyze cyber crimes.

- Students will take notes via PowerPoint presentation or Smart Notebook software and use graphic organizers and concept maps to organize major concepts of the content being presented.
- Students will provide a written response to daily at the bell prompted discussion questions. For example: “Why is proper collection, packaging, and preservation

of evidence essential to analysis and evaluation?" or "What are the general types of Cyber Crimes?
- Students will complete teacher generated activities to evaluate Cyber Crimes. Examples include Activity 14-1 Password Protected and Activity 14-2 Hidden Secrets.
- Students will read articles on cyber bullying (example, Rebecca Sedwick) and generate class discussions about the long terms effects of the popularity of social media and bullying.

2. Practice and complete crime scene protocol processes.

- In groups, students will become a crime scene investigative team. Each student will have a role/job they are responsible for. Students will evaluate a mock crime scene using proper crime scene protocol to determine the events leading up to the crime and finding the suspect.
- Students will complete note sheets, worksheets, vocabulary evaluations, and content evaluations to demonstrate understanding of the concepts within the unit.

Assessments:

Diagnostic:

- Informal Questioning
- Pre-Assessment Activity
- Teacher Observation
- Class Discussion
- At-the-Bell Questions

Formative:

- Informal Questioning
- Teacher Observation
- Class Discussion
- At-the-Bell Questions
- Assorted worksheets
- Teacher-generated assignments
- Laboratory Exercises
- Current case logs/journals
- Structured class discussion
- Activities and Review Games

Summative:

- Cyber crime Quiz
- Mock Crime Scene