

**COURSE TITLE**

Forensic Science

**LENGTH**

Full Year

**DEPARTMENT**

STEM Department

**SCHOOL**

Rutherford High School

**DATE**

September 10, 2018

# Forensic Science

## I. Introduction/Overview/Philosophy

Forensic Science focuses on the analysis of evidence collection, the decomposition process, crime scenes, skeletal remains, toxicology, and document validity. Case studies and crime scenarios help students to understand the implications and complicated issues that are emerging as the science of forensics continues to develop. In a world where technology plays an increasing role in solving crimes, it is important that our students appreciate the role that forensics plays in modern criminal court cases.

As American citizens, our students will be called upon to fulfill their civic duty as jurors. It is therefore crucial that our students be informed as to the nature of criminal investigations and the procedures used to process and examine evidence, and their role in the courts. Field and laboratory investigations are a core part of this course as students employ the scientific concepts and principles applicable to the various scenarios studied.

## II. Objectives

### *Course Outline:*

1. Describe responsibilities of various personnel involved in crime scene investigations by:
  - a. Defining the job skills of such personnel as police, detectives, laboratory specialists, and medical examiners.
  - b. Explaining how to search, sketch, and record data from a crime scene.
2. Explain ways to collect and preserve evidence from a crime scene by:
  - a. Distinguishing between physical evidence and witness evidence.
  - b. Comparing the three main pattern types that combine to form an individual's unique fingerprint.
  - c. Explaining different methods of latent fingerprint development.
  - d. Identifying origins of impressions, including footwear and tire treads.
  - e. Describing ways to identify hair, fiber, and blood evidence.
3. Distinguish between class and individual characteristics of firearms, such as toolmark, caliber, and scatter pattern.
4. Describe presumptive and confirmatory tests such as blood type comparisons and DNA testing.
5. Describe the importance of genetic information to forensics by using the process of gel electrophoresis to identify patterns in DNA.
6. Describe the decomposition process by:
  - a. Using rigor mortis to determine corpse position.
  - b. Identifying decomposition by-products to determine cause of death.
  - c. Using entomology life cycles to determine time of death.
7. Identify the importance of skeletal remains in forensics by:
  - a. Comparing bones and skulls based on age, sex, and race.
  - b. Using forensic dentistry to establish identity.
8. Describe general categories of drugs and poisons and their effects on humans by explaining ways poisons are detected at autopsy.
9. Use laws of physics to explain forensic evidence by:
  - a. Analyzing blood spatter patterns in relation to speed, height, and direction.
  - b. Tracking trajectories of collected evidence.

10. Describe techniques used to determine the validity of documents by analyzing fiber and handwriting samples and using ink chromatography.
11. Explore careers in forensic science.

### ***Student Outcomes:***

After successfully completing this course, the student will:

- Refine interrelationships among concepts and patterns of evidence found in different central scientific explanations.
- Develop and use mathematical, physical, and computational tools to build evidence-based models and to pose theories.
- Use scientific principles and theories to build and refine standards for data collection, posing controls, and presenting evidence.
- Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
- Build, refine, and represent evidence-based models using mathematical, physical, and computational tools.
- Revise predictions and explanations using evidence, and connect explanations/arguments to established scientific knowledge, models, and theories.
- Develop quality controls to examine data sets and to examine evidence as a means of generating and reviewing explanations.
- Reflect on and revise understandings as new evidence emerges.
- Use data representations and new models to revise predictions and explanations.
- Consider alternative theories to interpret and evaluate evidence-based arguments.
- Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences.
- Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
- Demonstrate how to use scientific tools and instruments.

## ***New Jersey Student Learning Standards***

### ***CAREER READY PRACTICES***

#### ***CRP1 Act as a responsible and contributing citizen and employee.***

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

#### ***CRP2 Apply appropriate academic and technical skills.***

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation

***CRP4 Communicate clearly and effectively and with reason.***

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

***CRP5. Consider the environmental, social and economic impacts of decisions.***

Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

***CRP6. Demonstrate creativity and innovation.***

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

***CRP7. Employ valid and reliable research strategies.***

Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

***CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.***

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

***CRP11. Use technology to enhance productivity.***

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

***CRP12. Work productively in teams while using cultural global competence.***

Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

***TECHNOLOGY***

**Standard 8.1 Educational Technology:** All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

**Strand A. Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.12.A.1- Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.

**Standard 8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

**Strand E. Computational Thinking: Programming:** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

8.2.12.E.1- Demonstrate an understanding of the problem-solving capacity of computers in our world.

***21ST CENTURY LIFE AND CAREERS******9.2 Career Awareness, Exploration, and Preparation******Strand C: Career Preparation***

9.2.12.C.7 Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.

9.2.12.C.8 Assess the impact of litigation and court decisions on employment laws and practices.

***COMPANION STANDARDS FOR SCIENCE AND TECHNICAL SUBJECTS***

RST.11-12.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.

RST.11-12.2. Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

WHST.11-12.6. Use technology, including the Internet, to produce, share, and update writing products in response to ongoing feedback, including new arguments or information.

WHST.11-12.9. Draw evidence from informational texts to support analysis, reflection, and research.

***NEW JERSEY STUDENT LEARNING STANDARDS- SCIENCE***

HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS2-1. Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.

HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

HS-LS2-6. Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

### **III. Proficiency Levels**

Forensic Science is available to junior and senior students who have completed Biology.

## **IV. Methods of Assessment**

### **Student Assessment**

The teacher will provide a variety of assessments, including homework, teacher-made tests and quizzes, projects, laboratory reports, and presentations.

### **Curriculum/Teacher Assessment**

The teacher will provide the subject area supervisor with suggestions for changes on an ongoing basis.

## **V. Grouping**

Forensic Science is a heterogeneously grouped junior/senior level course.

## **VI. Articulation/Scope & Sequence/Time Frame**

Course length is one year.

## **VII. Resources**

### ***Texts/Supplemental Reading/References***

Resources include but are not limited to:

#### A. Text

1. Forensic Science, South-Western Cengage Learning, 2009.

#### B. References

1. Crime Scene Investigation (CSI) Real-Life Science Labs for Grades 6-12, Walker, P. and Wood, E., John Wiley & Sons, 1999.
2. Introductory Forensic Science Educational Activities, Kowalyk, A., <http://www.forensicsinschool.com/id13.html>
3. Advanced Forensic Science Educational Activities, Kowalyk, A. and Christensen, S., <http://www.forensicsinschool.com/id13.html>
4. Teacher Tech: Clues in Crime-The Role of Forensic Science in Criminal Investigations, Duke University Talent Identification Program.
5. Various other Internet sites.

## **VIII. Suggested Activities**

Appropriate activities are listed in the curriculum map.

## **IX. Methodologies**

Forensic Science is a laboratory science with class time spent on laboratory experiments and hands-on activities. Group instruction, cooperative learning and individual projects are also utilized.

## **X. Interdisciplinary Connections**

This course combines math, chemistry, biology, physics, psychology, and earth science with topics introduced in each content area. Hands-on activities help student to see these associations and actual case studies reinforce the connections between forensic science and other disciplines. In addition, current news items, journal articles, and other external resources provide real-time information connected to course content.

## **XI. Differentiating Instruction for Students with Special Needs: Students with Disabilities, Students at Risk, English Language Learners, and Gifted & Talented Students**

Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways as they celebrate students' prior knowledge. By providing appropriately challenging learning, teachers can maximize success for all students.

Differentiating in this course includes but is not limited to:

### *Differentiation for Support (ELL, Special Education, Students at Risk)*

- Peer mentoring on problems
- Differentiated teacher feedback on assignments
- Modeling out problems on whiteboard
- Visual aids as we project problems on whiteboard
- Study guides
- Tiered assignments
- Scaffolding of materials and assignments
- Re-teaching and review
- Guided note taking
- Exemplars of varied performance levels
- Multi-media approach to accommodating various learning styles

### *Differentiation for Enrichment*

- Supplemental reading material for independent study
- Flexible grouping
- Tiered assignments
- Topic selection by interest
- Enhanced expectations for independent study
- Elevated questioning techniques using Webb's Depth of Knowledge matrix

## **XII. Professional Development**

The teacher will continue to improve expertise through participation in a variety of professional development opportunities.



## XII. Curriculum Map/Pacing Guide

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
<b>Introduction to Forensics</b> <ul style="list-style-type: none"> <li>• History of Forensics</li> <li>• Lab Safety</li> <li>• Observation Skills</li> <li>• Evidence collection and processing: types, collection of and chain of custody</li> <li>• Locard's principle</li> <li>• Innocence Project</li> </ul>	3 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>• Modified Homework assignments</li> <li>• rephrase directions</li> <li>• teacher modeling</li> <li>• test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	HS-ETS1-1 HS-LS1-2 HS-LS2-7 HS-PS4-1 HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS1-5 CRP1,4,6,7,8,11,12 9.2.12.C.7 9.2.12.C.8	<b>Formative:</b> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Questioning</li> <li>• Classwork</li> <li>• case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• Quiz: Lab safety</li> <li>• Classification of Evidence Lab</li> <li>• Deadly Picnic Lab</li> <li>• Innocence Project Research</li> <li>• Test: Intro to Forensics</li> </ul>
<b>Hair and Fiber analysis:</b> <ul style="list-style-type: none"> <li>• parts of hair</li> <li>• structure of the medulla, cortex, and cuticle</li> <li>• Distinguish between human and nonhuman animal hair</li> <li>• Value of hair in forensic investigations</li> <li>• Calculating medullary index</li> <li>• Racial differences in hair</li> <li>• Comparison of crime scene and suspect hair</li> <li>• Identify and describe common weave patterns of textile samples</li> <li>• Compare and contrast various types of fibers through physical and chemical analysis.</li> </ul>	4 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>• Modified Homework assignments</li> <li>• rephrase directions</li> <li>• teacher modeling</li> <li>• test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	HS-LS1-1 HS-LS1-2 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9	<b>Formative:</b> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Questioning</li> <li>• Classwork</li> <li>• Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• Human and Animal Hair Lab</li> <li>• Hair Whodunit Lab</li> <li>• Fiber Analysis Lab</li> <li>• Burn Analysis of Fibers Lab</li> <li>• Hair and Fibers Test</li> <li>• Q1 Benchmark Test</li> </ul>

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
<ul style="list-style-type: none"> <li>Describe principal characteristics of common fibers used in their identification.</li> </ul>				
<b>Pollen and Spores</b> <ul style="list-style-type: none"> <li>Distinguish between pollen and spores</li> <li>Describe a pollen fingerprint</li> <li>Classify the different organisms that produce pollen and spores</li> <li>Describe the different methods by which pollen and spores are dispersed</li> <li>Discuss the value of pollen and spore evidence at a crime scene</li> </ul>	3 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>Inquiry based instruction</li> <li>Independent Study</li> <li>Higher order thinking skills</li> <li>Real-world problems and scenarios</li> <li>Critical/Analytical thinking tasks</li> </ul>	HS-LS2-2 HS-LS2-6 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3	<b>Formative:</b> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>Pollen Analysis Lab</li> <li>Pollen case studies presentation</li> <li>Pollen and spores quiz and test</li> </ul>
<b>Fingerprints and DNA Fingerprinting</b> <ul style="list-style-type: none"> <li>Analyze the common ridge characteristics of a fingerprint.</li> <li>Identify and compare the three major fingerprint patterns and their respective subclasses.</li> <li>Distinguish between patent, plastic and latent fingerprints</li> <li>Describe the concept of an automated fingerprint identification system (AFIS) and its importance to forensic investigation</li> <li>List and demonstrate the techniques for developing latent fingerprints on porous and nonporous objects.</li> <li>Describe and demonstrate the proper procedures for preserving a developed latent fingerprint.</li> <li>Identify the parts of a nucleotide and explain how nucleotides are linked to form DNA and explain the concept of base</li> </ul>	4 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>Inquiry based instruction</li> <li>Independent Study</li> <li>Higher order thinking skills</li> <li>Real-world problems and scenarios</li> <li>Critical/Analytical thinking tasks</li> </ul>	HS-ETS1-1 HS-ETS1-2 HS-ETS1-3 HS-LS1-1 HS-LS1-2 HS-LS3-1 HS-LS3-2 HS-LS3-3 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.6 8.1.12.A.1 8.2.12.E.1	<b>Formative:</b> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> <li>Fingerprint worksheets</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>Fingerprint classification Lab</li> <li>Fingerprinting techniques Lab</li> <li>DNA and Fingerprints website project</li> </ul>

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
<p>pairing as it relates to the double-helix structure of DNA.</p> <ul style="list-style-type: none"> <li>Describe how the newest DNA typing techniques, like short tandem repeats (STRs) and polymerase chain reaction (PCR) are applied to forensic DNA typing and how CODIS is used to compare DNA samples</li> <li>Describe the difference between nuclear and mitochondrial DNA.</li> <li>List the necessary procedures for proper preservation of biological evidence for laboratory DNA analysis.</li> </ul>				
<p><b>Blood and Blood Spatter, Serial Killers</b></p> <ul style="list-style-type: none"> <li>Explain the composition of blood</li> <li>Describe the function of blood cells</li> <li>Describe the history of the use of blood and blood-spatter analysis in forensic science</li> <li>Describe how to determine blood type, given a sample</li> <li>Describe how to screen for the presence of human blood</li> <li>Calculate the probability of certain blood types with in a population</li> <li>Conduct a blood spatter analysis</li> <li>Use blood spatter evidence to recreate the events of a crime scene</li> <li>Define serial killer</li> <li>Describe traits that serial killers share</li> </ul>	5 weeks	<p><b>For Support:</b></p> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul> <p><b>For Enrichment:</b></p> <ul style="list-style-type: none"> <li>Inquiry based instruction</li> <li>Independent Study</li> <li>Higher order thinking skills</li> <li>Real-world problems and scenarios</li> <li>Critical/Analytical thinking tasks</li> </ul>	HS-LS1-1 HS-LS1-2 HS-LS3-2 HS-PS1-2 HS-ETS1-1 HS-ETS1-2 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.6	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> <li>Blood Type problems</li> <li>Probability problems</li> <li>Spatter pattern worksheets</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>Blood Typing Lab</li> <li>Blood Splatter Analysis Lab</li> <li>Blood and Blood Spatter test</li> <li>Serial killer Project</li> </ul>
<p><b>Drug I.D. and toxicology</b></p> <ul style="list-style-type: none"> <li>Identify the 5 types of controlled substances</li> <li>Relate signs and symptoms of an overdose with a specific class of drugs or toxins</li> <li>Describe the goals and practices of</li> </ul>	3 weeks	<p><b>For Support:</b></p> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul>	HS-PS1-1 HS-PS1-2 HS-PS1-5 HS-PS1-6 HS-LS1-2 HS-LS1-3	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> </ul>

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
toxicology		<b>For Enrichment:</b> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9	<b>Summative:</b> <ul style="list-style-type: none"> <li>• Urine Toxicology Lab</li> <li>• Toxicology Quiz and Test</li> </ul>
<b>Handwriting analysis, Forgery and Counterfeiting</b> <ul style="list-style-type: none"> <li>• Define questioned document, explain some of the techniques document examiners use to uncover alterations, erasures, obliterations, and variations in pen inks</li> <li>• Identify what common characteristics are associated with handwriting and list important guidelines for collecting known writings for comparison to a questioned document.</li> <li>• Describe Anti-counterfeiting features on US currency</li> </ul>	4 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>• Modified Homework assignments</li> <li>• rephrase directions</li> <li>• teacher modeling</li> <li>• test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	HS-LS1-2 HS-LS1-3 HS-LS1-5 HS-LS1-6 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9 8.2.12.E.1	<b>Formative:</b> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Questioning</li> <li>• Classwork</li> <li>• Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• Handwriting Analysis Lab Ransom Note Lab</li> <li>• Handwriting Analysis Quiz and Test</li> </ul>
<b>Death: Meaning, Manner, Mechanism, cause and time</b> <ul style="list-style-type: none"> <li>• Distinguish between cause, manner, and mechanisms of death</li> <li>• Distinguish between four manners of death: natural, accidental, suicidal, homicidal</li> <li>• Distinguish between cause, manner, and mechanisms of death</li> <li>• Explain how the development of rigor, algor and livor mortis occur</li> <li>• Describe the stages of decomposition in a corpse</li> <li>• Explain how time of death can be estimate</li> </ul>	2 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>• Modified Homework assignments</li> <li>• rephrase directions</li> <li>• teacher modeling</li> <li>• test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	HS-LS1-1 HS-LS1-2 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9	<b>Formative:</b> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Questioning</li> <li>• Classwork</li> <li>• Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• Banana Decomposition Lab</li> <li>• Quiz and Test: Death</li> </ul>

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
using insect evidence <ul style="list-style-type: none"> <li>Describe how various environmental factors may influence the estimated time of death</li> </ul>				
<b>Forensic Anthropology</b> <ul style="list-style-type: none"> <li>Describe how bone is formed</li> <li>Distinguish between male and female skeletal remains based on skull, jaw, brow ridge, pelvis and femur</li> <li>Describe how bones contain a record of disease and injury</li> <li>Describe how age determination may be based upon an analysis of bone</li> <li>Explain human facial structure differences based upon race</li> <li>Describe the role of mitochondrial DNA in bone identification</li> </ul>	3 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>Inquiry based instruction</li> <li>Independent Study</li> <li>Higher order thinking skills</li> <li>Real-world problems and scenarios</li> <li>Critical/Analytical thinking tasks</li> </ul>	HS-LS1-6 HS-LS1-7 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9	<b>Formative:</b> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>Skeletal Remains Identification Lab</li> <li>Forensic Anthropology Quiz and Test</li> </ul>
<b>Casts and Impressions</b> <ul style="list-style-type: none"> <li>Distinguish between latent, patent, and plastic impressions</li> <li>Explain how various types of impressions can be used as trace evidence</li> <li>Use track width and wheelbase information to identify a motor vehicle</li> </ul>	3 weeks	<b>For Support:</b> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> <li>teacher modeling</li> <li>test modification</li> </ul> <b>For Enrichment:</b> <ul style="list-style-type: none"> <li>Inquiry based instruction</li> <li>Independent Study</li> <li>Higher order thinking skills</li> <li>Real-world problems and scenarios</li> <li>Critical/Analytical thinking tasks</li> </ul>	HS-ETS1-2 HS-PS1-2 CRP1,4,6,7,8,11,12 RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9 8.2.12.E.1	<b>Formative:</b> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> <li>Classwork</li> <li>Case studies</li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>Shoe Impression Lab</li> <li>Casts and Impressions Quiz and Test</li> </ul>
Ballistics <ul style="list-style-type: none"> <li>Describe rifling on a gun barrel and explain how it marks a bullet</li> </ul>	1 week	<b>For Support:</b> <ul style="list-style-type: none"> <li>Modified Homework assignments</li> <li>rephrase directions</li> </ul>	HS-PS2-1 HS-PS2-2 HS-PS2-3 CRP1,4,6,7,8,11,12	<b>Formative:</b> <ul style="list-style-type: none"> <li>Homework</li> <li>Questioning</li> </ul>

Unit Topic	Time Allocated	Differentiating Instruction for Students with Disabilities, Students at Risk, English Language Learners, & Gifted & Talented Students	Standards	Assessments
<ul style="list-style-type: none"> <li>• Explain barrel size and caliber</li> <li>• Describe how bullets are test fired and matched</li> <li>• Discuss the role of ballistics recovery and examination at a crime scene</li> <li>• Determine the position of the shooter based on bullet trajectory</li> </ul>		<ul style="list-style-type: none"> <li>• teacher modeling</li> <li>• test modification</li> </ul> <p><b>For Enrichment:</b></p> <ul style="list-style-type: none"> <li>• Inquiry based instruction</li> <li>• Independent Study</li> <li>• Higher order thinking skills</li> <li>• Real-world problems and scenarios</li> <li>• Critical/Analytical thinking tasks</li> </ul>	RST.11-12.1 RST.11-12.2 RST.11-12.3 WHST.11-12.9	<ul style="list-style-type: none"> <li>• Classwork</li> <li>• Case studies</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• Firing Pin Match Lab</li> <li>• Q4 Benchmark</li> </ul>