Marking Period	Unit Title	Recommended Instructional Days
1	Introduction to Forensic Science	25

NJSLS - Science: TItle	NJSLS - Science: Performance Expectations	
History Of Forensic Science Physical Evidence Other types of evidence Entering Crime Scene	Science and Engineering Practices: 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	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit

	well as possible social, cultural, and environmental impacts. 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-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	

Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question(s) • What does physical evidence tell us? • What is the relationship between human assumptions and physical evidence during investigations? • Is it safe to rely on deductive reasoning when examining evidence? • How does temperature effect crime scenes? Enduring Understanding Scientific methods are useful tools in making sense of the natural world and in solving problems Science is both a process of learning and a body of knowledge. Scientific claims must be verified by independent investigations Outline a brief history of forensics Identify basic services provided by crime laboratories Detail the functions of a forensic scientist List and explain the procedure for approaching a crime scene Sketch crime scenes Discuss various types of evidence collected at crime Describe scenes including clothing, hairs, fibers, swabs, bullets, and scrapings Explain ideas with sufficient, relevant details Use content-specific vocabulary accurately Vary sentence beginnings and lengths • Use end marks and commas correctly
FOUNDATION Science and Engineering Practices: Core Idea	FOUNDATION Science and Engineering Practices: Statement	
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems: Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1)	

multiple and independent student- generated sources of evidence consistent with scientific ideas, principles, and theories.	Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	• Create a CSI Crime Scene • Collaborate with local police department Provide fictional books to compare the fiction of the books with the reality of true forensic science Students will • Understand the workings of the classroom, the process and procedures that are in place to facilitate a collaborative learning environment. • Identify and describe the purpose of the lab equipment used in the course. • Use a compound light microscope to magnify images too small to see with the naked eye. • Explain why observation skills are important to forensic investigators. • Use deductive reasoning to synthesize a situation where only partial information is known. • Create an argument for and against the use of eye witness testimony in crime scene investigation. • Follow appropriate steps and procedures when working a crime scene. • Secure and package evidence according to the Chain of Custody. • Choose the appropriate search pattern when investigating a crime scene. • Use appropriate procedures when taking crime scene photographs. • Explain how evidence moves from the crime scene to the court room.
FOUNDATION Crosscutting Concepts: Core Idea	FOUNDATION Crosscutting Concepts: Statement	
Patterns Cause and Effect Scale, Proportions, Quantity Systems and Models Structure and Function Stability and Change	Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and	

	the mechanisms by which they are mediated, is a major activity of science and engineering. Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. Systems and Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. Structure and Function: The way an object is shaped or structured determines many of its properties and functions. Stability and Change: For both designed and natural	• Define basic criminology and judicial terms. • Explain how Forensics has changed over time and how new technological advances have shaped Forensics today. Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts* • 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. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) • WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3) • WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics* • MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key

	systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) • HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) • MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) • HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) • HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)
Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
Social Awareness • Act as a responsible and contributing citizen • Apply appropriate academic and technical skills • Communicate clearly and effectively with reason • Consider the environmental, social and economic impacts of decisions • Demonstrate creativity and innovation	Recognizeand identify the thoughts, feelings, and perspectives of others • Demonstratean awareness of the differences among individuals, groups, and others' cultural backgrounds • Demonstratean understanding of the need for mutual respect when viewpoints differ • Demonstratean awareness ofthe expectations for social	Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL

• Employ valid and reliable research strategies • Utilize critical thinking to make sense of problems and persevere in solving them • Plan education and career paths aligned to personal goals • Use technology to enhance productivity • Work productively in teams while using cultural global competence	interactions in a variety of settings	

Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:	Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:
Formative Assessments: ● Apply what you know; lesson check; self check; notebooks Assessments	Benchmarks: ● District Assessment Summative Assessments:

• Performance Task: Due to the nature of popular TV shows like CSI, many people have a heightened awareness of forensic science. However, misconceptions about the profession have been reinforced by the popularity of TV shows. Write a pamphlet for prospective students who are interested in forensic science outlining the information you have learned in this unit. Dispel some of the myths while confirming some of the realities of the work of forensic scientists. • Student Investigate and attempt to solve a simulated crime • Watch videos of crimes to analyze evidence and the use there of forensic techniques • Complete Tests, Quizzes, and Other Quick and Ongoing Checks for Understanding	• End of lesson quizzes • End of unit assessments • *Discover the Classroom*- student directed activity • Differentiated worksheets and activities (differentiated by learning style) • *The Case of the Missing Quiz*- inquiry lab • Microscope quiz • Mock Crime Scene- group assessment • Observation skills quiz • JIGSAW activity (student directed learning task) • Doodle notes • Deductive reasoning game- class assessment • *From the Crime Scene to Court Room* Tarsia Puzzle • WebQuests (2) • Investigative Processes Escape Room Challenge • Jenga Review Game • Interactive Crime Scene • History of Forensics digital timeline project •

Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources
Student Chromebooks	Leveled Readers	Multilingual Glossary on	

Video Based Projects for each Unit	Vocabulary Card Game for each unit	HMH Ed website	Students should be asking their own questions Students should be designing their own experiments Students create questions for furtherinvestigation and study Students reflect on redesign of their experiment Students research and connect the lab experiment to a current science industry practices and real life applications
Supplemental Resources			
Technology: Smartboard			

Computer
Items for “crime scene”
Fictional Forensic science books

Other:
Technology Integration

- Digital Assessments
- Digital Performance tests
- Google Expeditions
- Video-based projects

Differentiated Student Access to Content: Recommended Strategies & Techniques			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core
Utiize a multi-sensory (VAKT) approach during instruction, provide alternate	Extend time requirements, preferred seating, positive	Deliver instruction utilizing varied learning styles including audio, visual, and	Create an enhanced set of introductory activities, integrate active

presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric. Heterogeneous learning levels within lab group Smaller group sizes Confirm understanding of labprocedure Lab instructions with visual support Pre- teach essential laboratory vocabulary Provided a graphic organizer of graphing procedure	tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

	Teach self-regulation strategies		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities. • Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students 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. Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)							
	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law: N.J.S.A. 18A:35-28		LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	x	Standards in Action: Climate Change

Marking Period	Unit Title	Recommended Instructional Days
1	Unit 2: Forensic Evidence	25

NJSLS - Science: TItle	NJSLS - Science: Performance Expectations	Recommended Activities, Investigations,

Evidence Glass Soil Fingerprints Hair Morphology Fiber DNA	• 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. • 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-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	

Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question(s) • What does physical evidence tell us? • What is the relationship between human assumptions and physical evidence during investigations? Is it safe to rely on deductive reasoning when examining evidence? Enduring Understanding • Identify the anatomical structure of hair and explain how macroscopic and microscopic characteristics of hair can be used in crime scene investigation. • Evaluate the significance of hair evidence found at a crime scene. • Explain the difference between mitochondrial DNA and nuclear DNA as it pertains to hair. • Solve a case using hair specimens. • Identify various types of fibers and explain how microscopic properties of fibers can be used in crime scene investigation.
FOUNDATION Science and Engineering Practices: Core Idea	FOUNDATION Science and Engineering Practices: Statement	
Models Problems	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems: Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	
FOUNDATION Crosscutting Concepts: Core Idea	FOUNDATION Crosscutting Concepts: Statement	

Patterns Cause and Effect Scale, Proportions, Quantity Systems and Models Structure and Function Stability and Change	Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. Systems and Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. Structure and Function: The way an object is shaped or structured determines many of its properties and functions. Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and	• Test fibers using a burn analysis to determine the identity of an unknown fiber. • Classify fingerprints found at a crime scene. • Identify minutiae patterns found in an unknown fingerprint and compare those patterns to minutiae patterns of a suspect print. • Solve a crime using fingerprint analysis and appropriate lifting techniques. • Construct an explanation of DNA's significance to the field of Forensics and evaluate it's use in solving crimes. • Follow procedures for extracting and processing DNA through the process of gel electrophoresis. • Read DNA profiles and compare them to suspect DNA profiles. • Describe how DNA has evolved over the past thirty years and understand how this evolution connects to the work of the Innocence Project.

	understand.	• Explain how serological evidence can be significant in solving crimes. • Test and identify blood samples and determine the blood type of those samples. • Design an experiment to test the affect that gravity and height has on falling blood. • Use mathematical formulas to calculate the angle at which a blood stain strikes a surface. • Compare blood stain patterns at different velocities, heights, with different weapons, and on different surfaces. • Analyze and interpret blood stains found at a crime scene. • Identify different characteristics of firearms and cartridges as they pertain to ballistics. • Draw evidence from striation patterns, breech markings, and firing pin patterns and explain their significance in different scenarios.
Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
● Self-Awareness ● Self-Management ● Social Awareness ● Responsible Decision-Making ● Relationship Skills Act as a responsible and contributing citizen Apply appropriate academic and technical skills Communicate clearly and effectively with reason Consider the environmental, social and economic impacts of decisions Demonstrate creativity and innovation Employ valid and reliable research	● Recognize one's feelings and thoughts ● Recognize the impact of one's feelings and thoughts on one's own behavior ● Understand and practice strategies for managing one's own emotions, thoughts, and behaviors ● Recognize and identify the thoughts, feelings, and perspectives of others ● Demonstrate an awareness of the differences among individuals, groups, and others' cultural background ● Develop, implement, and model effective problem-solving and critical thinking skills ● Establish and maintain healthy relationships ● Utilize positive communication and social skills to interact effectively with others	

strategies Utilize critical thinking to make sense of problems and persevere in solving them Plan education and career paths aligned to personal goals Use technology to enhance productivity Work productively in teams while using cultural global competence		• Explain how arson investigators determine if an arson crime has occurred. Scientific methods are useful tools in making sense of the natural world and in solving problems 🎬 Physical evidence is crucial in linking victims and suspects to a crime scene. Physical evidence must be collected in a specific and strategic manner, as well as systematically documented, in order to ensure that no tampering or contamination occurs. Physical evidence can link specific persons or objects to a crime scene, or may contain class characteristics linking a type of object to a crime scene. Physical evidence collected from crime scenes (i.e. fingerprints and DNA) are shared on national databases. This dramatically enhances the role of forensic science in criminal investigation. Science is both a process of learning and a body of knowledge.

		Identify and discuss types of analyses for physical evidence including comparison, visual, microscopic and chemical List common types of physical evidence Identify and extrapolate information from glass fractures, stress marks, and successive penetrations Differentiate between radial and concentric fractures Discuss the forensic characteristics of soil Examine materials under florescent conditions and interpret results Study completed soil comparisons Complete a soil comparison including the use of density-gradient tubes Outline the fundamental principles of fingerprints Identify ridge characteristics Label and discuss the importance of classifying fingerprints based on patterns: loops, whorls, and arches Outline the process undertaken by automated fingerprint identification systems Discuss and practice taking crime scene fingerprints

		Dust for fingerprints Determine when it is appropriate to lift fingerprints using iodine fuming, ninhydrin solution, silver nitrate Identify other ridge patterns of the fingers, palms, toes, and bottom of the feet Explain ideas with sufficient, relevant details Use content-specific vocabulary accurately Vary sentence beginnings and lengths Use end marks and commas correctly Discuss the morphology of hair – color and structure Label a cross section of skin to identify the anatomical structures of hair Identify cuticle characteristics Conduct experiments with molding to identify and study cuticle characteristics of hair Use medullary characteristics to more accurately identify the source of a hair Compare and identify hair based on a large control sample Distinguish different types of fibers Examine fibers for possible source options

		• Students will be given a simulated scene where they must collect physical evidence – glass, soil & fingerprints. Working in small groups, students will apply techniques learned during the unit to collect, analyze and interpret the evidence provided in the simulated scene. Students will write up a detailed report outlining the process they went through, the various conclusions they considered based on the evidence, and the rationale behind their ultimate explanation of the evidence. • Fingerprinting lab • Breaking glass lab • Soils from around the USA lab • Class Discussions Journal Entries Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts*

		• 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. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) • WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3) • WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics*

		• MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) • HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) • MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) • HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) • HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7) Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL
Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:		Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:

Formative Assessments: Assessments • Student Investigate and attempt to solve a simulated crime • Watch videos of crimes to analyze evidence and the use there of forensic techniques • Complete Tests, Quizzes, and Other Quick and Ongoing Checks for Understanding • Read fictional books and compare them to the reality of forensic science Formative: Apply what you know; lesson check; self check; notebooks • Ballistics Share-a-Thon • Ballistics Flipbook • Ballistics Review Maze • Ballistics Review Stations (Around the Room) • 5-4-3-2-1 Review • Ballistics Quiz • Arson Doodle Notes • Arson WebQuest • Arson Case Study Podcast • Arson Tarsia Puzzle Review Activity • Arson Quiz • Forensic Evidence Classroom Escape Challenge • Forensic Evidence Review Game • Forensic Evidence Mystery Picture	Benchmarks: Benchmarks: • District Assessment Summative Assessments: • End of lesson quizzes • End of unit assessments • Case Studies (Real World Applications) • Hair Doodle notes • Hair Inquiry Activity • Hair Review Maze • Exit Tickets • The Case of Mr. Big- Hair Analysis Investigation • Hair Analysis Task Cards • Hair Analysis Quiz • Fibers WebQuest • Fiber Burn Analysis Lab Investigation • Fiber Scavenger Hunt • Fiber Quiz • Fingerprint Doodle Notes • Fingerprint Analysis Lab Activity • The Case of the Teacher's Lounge Thief-Inquiry Lab • DNA Profiling QR Quest • DNA Case Study Project • Gel Electrophoresis virtual lab • The Case of the Desert Bones- DNA Investigation

	● DNA Extraction Lab ● DNA Profiling Review Game (Kahoot!) ● DNA Profiling Quiz ● Blood as Evidence Doodle Notes ● Blood Typing Student-Directed Research Activity ● The Case of Lenny Smith- simulated blood typing lab ● Blood spatter WebQuest ● 3-2-1 Review ● The Case of the Missing Wife- mock investigation ● Passive Blood Stains- student led inquiry lab ● Blood as Evidence review stations ● Blood evidence Domino Review Activity ● Blood Spatter Scavenger Hunt ● Blood Evidence Quiz ● Climate Change and How it effects Forensic Evidence

Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources

● Student Chromebooks ● Video Based Projects for each Unit	● Leveled Readers ● Vocabulary Card Game for each unit	● Multilingual Glossary on HMH Ed website	● Leveled Readers

Supplemental Resources

Technology:

Smartboard
Computer
Items for " scene"
Fictional Forensic science books pdf

Other: Technology Integration

- Digital Assessments
- Digital Performance tests
- Google Expeditions
- Video-based projects
- The Science Spot
- http://sciencespot.net/Pages/classforsci.html
- OREGON STATE POLICE FORENSIC SERVICES DIVISION –
- http://www.crime-scene-investigator.net/Phys_Evid_Manual_OR.pdf
- World of Forensic Science –
- http://www.encyclopedia.com/doc/1G2-3448300449.html
- BSAPP Forensics –

http://www.bsapp.com/forensics_illustrated/forensic_text_adobe/text_unit_2_physical_evidence.pdf

Students will use digital tools (microscope, QR readers, internet, digital camera, Google Classroom, and online crime scene simulations, online gaming platforms and interactive lab activities) to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and communicate knowledge.

Students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed word as they relate to the individual, global society and the environment.

Differentiated Student Access to Content: Recommended Strategies & Techniques			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core
Utiize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric. Assigned Role Frequent Check ins Heterogeneous learning levels within lab group Smaller group sizes Confirm understanding of	Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

segments of shorter tasks.	labprocedure Lab instructions with visual support Pre- teach essential laboratory vocabulary Provided a graphic organizer of graphing procedure		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities. • Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

		• 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students 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. Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.	

New Jersey Legislative Statutes and Administrative Code (place an “X” before each law/statute if/when present within the curriculum map)							
	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law:		LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35		Standards in Action: Climate Change and how it effects Forensic Evidence

			N.J.S.A. 18A:35-28			

Marking Period	Unit Title	Recommended Instructional Days
2	Unit 3: Physical Evidence	45 Days

NJSLS - Science: TItle	NJSLS - Science: Performance Expectations	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student
	• 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. • 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-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. • 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	Experiences to Explore NJSLS-S within Unit

	cells. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. *Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.* • 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. *Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen. Assessment is limited to chemical reactions involving main group elements and combustion reactions.* • 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. *Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds. Examples of data*	

	could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object sliding down a ramp, or a moving object being pulled by a constant force. • HS-PS2-4: Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. *Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields. Assessment is limited to systems with two objects* • HS-PS4-2: Evaluate questions about the advantages of using digital transmission and storage of information. *Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.* • HS-PS4-5: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with	

	matter to transmit and capture information and energy. *Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology. Assessments are limited to qualitative information. Assessments do not include band theory.*	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	
Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question(s) Why is it important to collect evidence in a procedural manner? What is the difference between the identification and comparison of physical evidence? Why is it important that physical evidence collected from a crime scene is shared on national databases? Who does climate change effect physical evidence?
FOUNDATION Science and Engineering Practices: Core Idea	FOUNDATION Science and Engineering Practices: Statement	
Models Problems	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems:	

	Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	Enduring Understanding Explain ideas with sufficient, relevant details Use content-specific vocabulary accurately Vary sentence beginnings and lengths Use end marks and commas correctly Activity Description: • Create a CSI Crime Scene • Collaborate with local police department • Discover slides of hair and fibers • Class Discussions • Journal Entries Provide fictional books to compare the fiction of the books with the reality of true forensic science Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts*
FOUNDATION Crosscutting Concepts: Core Idea	FOUNDATION Crosscutting Concepts: Statement	
Patterns Cause and Effect Scale, Proportions, Quantity Systems and Models Structure and Function Stability and Change	• Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. • Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. • Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. • Systems and Models: A system is an	

	organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. • Structure and Function: The way an object is shaped or structured determines many of its properties and functions. • Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	• 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. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) • WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the
Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
●Self-Awareness ● Self-Management ● Social Awareness ● Responsible Decision-Making	Recognize one's feelings and thoughts Recognize the impact of one's feelings and thoughts on one's own behavior Understand and practice strategies for managing one's own emotions, thoughts, and behaviors Recognize and identify the thoughts, feelings, and perspectives of others	

● Relationship Skills	Demonstrate an awareness of the differences among individuals, groups, and others' cultural background Develop, implement, and model effective problem-solving and critical thinking skills Establish and maintain healthy relationships Utilize positive communication and social skills to interact effectively with others	subject, demonstrating understanding of the subject under investigation. (HS-LS1-3) ● WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics* ● MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) ● HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) ● MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) ● HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) ● HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of

		multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7) Interdisciplinary Connections: Interdisciplinary Connection: Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL Content: ;NJSLS#:

Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:	Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:
Formative Assessments: Formative Assessments: Apply what you know; lesson check; self check; notebooks Assessments ● Performance Task: Due to the nature of popular TV shows like CSI, many people have a heightened awareness of forensic science. However, misconceptions about the profession have been reinforced by the popularity of TV shows. Write a pamphlet for prospective students who are interested in forensic science outlining the information you have learned in this unit. Dispel some of the myths while confirming some of the realities of the work of forensic scientists.	Benchmarks: Benchmarks: ● District Assessment Summative Assessments: ● End of lesson quizzes ● End of unit assessments

Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources
● Student Chromebooks ● Video Based Projects for each Unit	● Leveled Readers ● Vocabulary Card Game for each unit	● Multilingual Glossary on HMH Ed website	● Leveled Readers
Supplemental Resources			

Technology:
Smartboard
Computer
Items for “crime scene”
Fictional Forensic science books
Schoology
Other:
Technology Integration

- Digital Assessments
- Digital Performance tests
- Google Expeditions
- Video-based projects
- The Science Spot http://sciencespot.net/Pages/classforsci.html
- Hair Analysis in Forensic Science http://www.hairphysician.com/hair-analysis-in-forensic-science.html
- CSI: Web Adventures http://forensics.rice.edu/

Wayne Williams Case Study
http://www.rocklin.k12.ca.us/staff/lbrun/chemweb/Forensics/Unit_6_Trace_Evidence/Wayne%20Williams%20Case%20Study.pdf

Differentiated Student Access to Content: Recommended Strategies & Techniques			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core
Utiize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when	Deliver instruction utilizing varied learning styles	Create an enhanced set of introductory activities, integrate active

varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric.	including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities. Students should be asking their own questions Students should be designing their own experiments Students create questions for further investigation and study Students reflect on redesign of their experiment Students research and connect the lab experiment to a current science industry

			practices and real life application

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities. • Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students 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. Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)							
	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law: N.J.S.A. 18A:35-28		LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	x	X Standards in Action: Climate Change

Marking Period	Unit Title	Recommended Instructional Days
3	Unit 4: Death and the Human Body	45

NJSLS - Science: TItle	NJSLS - Science: Performance Expectations	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student

Death Human Function Ballistics	• 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. • 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-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. • HS-LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Experiences to Explore NJSLS-S within Unit

	• 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-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. *Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.* • HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. *Examples of investigations could include heart rate response to exercise, stomate response to moisture*	

	and temperature, and root development in response to water levels. • 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-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-PS3-1: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. •	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	

Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question/s: • How can scientists tell that a specific tool created a mark, not one like it? • How are different types of impressions used in forensic investigations? • Although they might seem easy to cover up, why might foot prints, bite marks and tire tracks can be difficult to conceal? • How are the unique characteristics of firearms important to criminal investigations? Enduring Understanding Scientific methods are useful tools in making sense of the natural world and in solving problems Science is both a process of learning and a body of knowledge. Scientific claims must be verified by independent investigations Identify various types of firearms including handguns, revolvers, semiautomatic pistols, rifles, shotguns,
FOUNDATION Science and Engineering Practices: Core Idea	FOUNDATION Science and Engineering Practices: Statement	
Patterns Cause and Effect Scale, Proportions, Quantity Systems and Models Structure and Function Stability and Change	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems: Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	
FOUNDATION Crosscutting Concepts:	FOUNDATION Crosscutting Concepts: Statement	

Core Idea		
Patterns Cause and Effect	Patterns • Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. Cause and Effect • Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. • Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. • Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. • Systems and Models: A system is an organized group of related objects or components; models can be used for	single shot weapons, derringers and automatic weapons Describe the effects of characteristics such as rifling Label various parts of firearms Distinguish between various types of ammunition Label the various design shapes for bullets Identify composition of bullets including lead, half-jacketed, and full metal jacket Compare bullets for defining characteristics left behind after the bullet passed through the inside of the gun using a microscope Discuss the effect on ammunition on targets Detect gunpowder residue on the hands Distinguish between latent, patent, and plastic impressions Activity Description: • Collaborate with local police department • Provide fictional books to compare the fiction of the books

	understanding and predicting the behavior of systems. • Structure and Function: The way an object is shaped or structured determines many of its properties and functions. • Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	with the reality of true forensic science • Students will be given a simulated scene where they must collect physical evidence relating to firearms. Working in small groups, students will apply techniques learned during the unit to collect, analyze and interpret the evidence provided in the simulated scene. Students will write up a detailed report outlining the process they went through, the various conclusions they considered based on the evidence, and the rationale behind their ultimate explanation of the evidence. • Begin work with the Doe Network in helping to solve old cases • Tests, Quizzes, and Other Quick and Ongoing Checks for Understanding Meet with police officers • Explain the role of a forensic toxicologist.
Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
Self-Awareness Self-Management Social Awareness Responsible Decision-Making	Recognize one's feelings and thoughts Recognize the impact of one's feelings and thoughts on one's own behavior Understand and practice strategies for managing one's own emotions, thoughts, and behaviors Recognize and identify the thoughts, feelings, and perspectives of others	

Relationship Skills Act as a responsible and contributing citizen Apply appropriate academic and technical skills Communicate clearly and effectively with reason Consider the environmental, social and economic impacts of decisions Demonstrate creativity and	Demonstrate an awareness of the differences among individuals, groups, and others' cultural background Develop, implement, and model effective problem-solving and critical thinking skills Establish and maintain healthy relationships Utilize positive communication and social skills to interact effectively with others	• Classify common drugs according to schedules (as outlined by the Controlled Substances Act). • Identify the presence of an unknown drug sample through lab testing. • Describe the effects of alcohol on the human body. • Construct an argument for the definition of death and defend your position using a real life case study. • Explain the stages of decomposition and how characteristics of the body at each stage can assist investigators in determining time of death. • Calculate approximate time of death, given information about livor, rigor and algor mortis. • Conduct an autopsy on a fetal pig to determine cause and manner of death. • Illustrate the blowfly life cycle and explain how each stage of a blowfly's life cycle can assist forensic investigators in

innovation Employ valid and reliable research strategies Utilize critical thinking to make sense of problems and persevere in solving them Plan education and career paths aligned to personal goals Use technology to enhance productivity Work productively in teams while using cultural global		determining post mortem interval. • Design and construct an experiment that studies blowflies at their different life cycle stages. • Explain how features of the skull can be used to identify an unknown individual whose skeletal remains are found. • Identify parts of the pelvic bone that can be used to determine biological sex. • Calculate the height of an unknown individual whose skeletal remains are found. • Explain how advancements in technology are able to help forensic anthropologist determine the identity of unidentified skeletal remains. Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts* • 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. (HS-LS1-1), (HS-LS1-6)

competence		• WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) • WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) • WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3) • WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics* • MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)

		• HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) • MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) • HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) • HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7) Interdisciplinary Connections: Interdisciplinary Connection: Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL Content: ;NJSLS#:

Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:	Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:
Formative Assessments: Formative Assessments: Apply what you know; lesson check; self check; notebooks Assessments • Performance Task: Due to the nature of popular TV shows like CSI, many people have a heightened awareness of forensic science. However, misconceptions about the profession have been reinforced by the popularity of TV shows. Write a pamphlet for prospective students who are interested in forensic science outlining the information you have learned in this unit. Dispel some of the myths while confirming some of the realities of the work of forensic scientists.	Benchmarks: Benchmarks: ● District Assessment Summative Assessments: ● End of lesson quizzes ● End of unit assessments ● Case Studies (Real World Applications) ● Drug Schedules Color Activity ● Toxicology WebQuest ● Toxicology Application Lab (student led) ● Alcohol's Effects on the Body- CLOSE reading passage ● Toxicology Classroom Escape Challenge ● Toxicology Quiz ● Death and the Human Body Flipbook ● Class Debate Activity- student led ● Stages of Decomposition Comic Strip ● Graphing Algor Mortis ● Illustrate It! Algor, Livor and Rigor Mortis ● Time of Death Task Cards

	● Time of Death Review Maze ● Death Investigation Quiz ● Project: The Pig Autopsy (fetal pig dissection/investigation) ● Blowfly Life Cycle Doodle Notes ● Differentiated Entomology Review Stations ● Entomology Double Puzzle ● Death and the Human Body Digital Escape Room ● Forensic Entomology Quiz ● Forensic Anthropology- Ticket in the Door ● Calculating Height from Bone activity ● Forensic Anthropology Mad Libs Puzzle ● The Secret's in the Bones- student led investigation ● Exit ticket ● Forensic Anthropology crossword puzzle ● Forensics Anthropology Scavenger Hunt ● Forensic Anthropology Quiz ● Unit 3 Review Tournament ● Quizizz Review Game ● Unit 3 Exam ● Culminating Project: Cereal Box Serial Killer Research ●
Differentiated Student Access to Content:	

Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources
● Student Chromebooks ● Video Based Projects for each Unit	● Leveled Readers ● Vocabulary Card Game for each unit	● Multilingual Glossary on HMH Ed website	● Leveled Readers

Supplemental Resources

Technology:
Smartboard
Computer
Items for “crime scene”
Fictional Forensic science books
Schoology

Technology Intergration
Students will use digital tools (Internet, Google Classroom, online crime scene simulations, online gaming platforms and interactive lab activities) to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and communicate knowledge.
Students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed word as they relate to the individual, global society and the environment.

Other:
- Digital Assessments

- Digital Performance tests
- Google Expeditions
- Video-based projects
- The Science Spot http://sciencespot.net/Pages/classforsci.html
- Forensic Dentistry http://science.howstuffworks.com/forensic-dentistry.htm
- Ballistics Webquest http://www.firearmsid.com
- The Forensics Library http://aboutforensics.co.uk/firearms-ballistics/
- Firearms Tutorial http://library.med.utah.edu/WebPath/TUTORIAL/GUNS/GUNINTRO.html
- Footwear and Tire track Examination http://www.forensicsciencesimplified.org/fwtt/how.html

Differentiated Student Access to Content: Recommended Strategies & Techniques			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core
Utiize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric.	Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.			

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept: • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities. • Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance

		critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students 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. Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.	

New Jersey Legislative Statutes and Administrative Code (place an “X” before each law/statute if/when present within the curriculum map)							
	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law: N.J.S.A. 18A:35-28		LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35		Standards in Action: Climate Change

<table>
<tr><th>Marking Period</th><th>Unit Title</th><th>Recommended Instructional Days</th></tr>
<tr><td>3</td><td colspan="2">Unit 5: Drugs & Chemical Analyses, Toxicology</td><td>20</td></tr>
<tr><td>NJSLS - Science: TItle</td><td>NJSLS - Science: Performance Expectations</td><td rowspan="3">Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit</td></tr>
<tr><td>Drug Analysis

Toxicology</td><td>• Standard: 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.
• Standard: 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.
Standard: 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.</td></tr>
<tr><td>FOUNDATION Disciplinary: Core Idea</td><td>FOUNDATION Disciplinary: Statement</td></tr>
</table>

Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question/s: What laboratory tests do forensic scientists rely on to identify unknown chemicals? How does chromatography work and how can it be modified to accomplish a specific chemical identification? What methods are available to determine the level of sobriety in a suspected impaired driver? Enduring Understanding ● Discuss terminology related to and common reasons for intensive drug use ● Identify various narcotics and the effects on the human system ● Discuss various types of hallucinogens, depressants and stimulants ● Identify the various drug schedules used for criminal penalties
FOUNDATION Science and Engineering Practices: Core Idea	FOUNDATION Science and Engineering Practices: Statement	
Patterns Cause and Effect Scale, Proportions, Quantity Systems and Models Structure and Function Stability and Change	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems: Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	
FOUNDATION	FOUNDATION Crosscutting Concepts:	

Crosscutting Concepts: Core Idea	Statement	
Patterns Cause and Effect	• Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. • Cause and Effect: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. • Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. • Systems and Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. • Structure and Function: The way an object is shaped or structured	● Discuss the importance of chemical analysis to forensic science ● Conduct chemical analyses of samples obtained ● Explain the theory of Chromatography ● Perform various color tests including marquis, dillie-koppanyi, duquenois-levine, van urk and the scott test ● Identify the procedure for conducting microcrystalline tests ● Perform qualitative analysis on samples to identify drugs and poisons ● Discuss various instruments used for chemical analysis including spectrophotometry, gas chromatography/mass spectrometry, spectrographic analyzer and an auto sampler ● Chemical compounds are classified in the Controlled Substances Act are ● regulated by the United States government.

	determines many of its properties and functions. • Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	● 🎬 Understand the significance of drug analysis and toxicology to forensic ● investigations and will be able to identify various drugs and describe ● methods drug analysts and toxicologists use in identifying substances. ● 🎬 Toxicology has a long historical presence and many applications in ● assessing possible cause of death. ● Identify unknown substances by utilizing a series of chemical tests of the chemical and physical properties of substances ● Describe techniques that forensic toxicologists use to isolate and ● identify drugs and poisons. ● Human metabolism of alcohol and calculation of blood alcohol content ● How alcohol is absorbed and processing in a living system ● Explain ideas with sufficient, relevant details
Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
● Self-Awareness ● Self-Management ● Social Awareness ● Responsible Decision-Making ● Relationship	● Recognize one's feelings and thoughts ● Recognize the impact of one's feelings and thoughts on one's own behavior ● Understand and practice strategies for managing one's own emotions, thoughts, and behaviors ● Recognize and identify the thoughts, feelings, and perspectives of others ● Demonstrate an awareness of the differences among	

Skills	individuals, groups, and others' cultural background ● Develop, implement, and model effective problem-solving and critical thinking skills ● Establish and maintain healthy relationships ● Utilize positive communication and social skills to interact effectively with others	Use content-specific vocabulary accurately Activity Description: • Collaborate with local police department • Provide fictional books to compare the fiction of the books with the reality of true forensic science • Students will be given a simulated scene where they must collect physical evidence relating to firearms. Working in small groups, students will apply techniques learned during the unit to collect, analyze and interpret the evidence provided in the simulated scene. Students will write up a detailed report outlining the process they went through, the various conclusions they considered based on the evidence, and the rationale behind their ultimate explanation of the evidence. • Begin work with the Doe Network in helping to solve old cases

		Use chromatography to separate colors into their components. Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts* ● 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. (HS-LS1-1), (HS-LS1-6) ● WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) ● WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) ● WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)

		• WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics* • MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) • HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) • MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) • HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) • HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7) Interdisciplinary Connections: Interdisciplinary Connection: Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical

		Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL Content: ;NJSLS#:

Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:	Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:
Formative Assessments: Formative Assessments: Apply what you know; lesson check; self check; notebooks Assessments ● Performance Task: Due to the nature of popular TV shows like CSI, many people have a heightened awareness of forensic science. However, misconceptions about the profession have been reinforced by the popularity of TV shows. Write a pamphlet for prospective students who are interested in forensic science outlining the information you have learned in this unit. Dispel some of the myths while confirming some of the realities of the work of forensic scientists.	Benchmarks: Benchmarks: ● District Assessment Summative Assessments: ● End of lesson quizzes ● End of unit assessments

Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources
● Student Chromebooks ● Video Based Projects for each Unit	● Leveled Readers ● Vocabulary Card Game for each unit	● Multilingual Glossary on HMH Ed website	● Leveled Readers

Supplemental Resources

Technology:

Smartboard
Computer
Items for "crime scene"
Fictional Forensic science books
Schoology

Other:

- Digital Assessments
- Digital Performance tests
- Google Expeditions
- Video-based projects
- CSI Web Adventures http://forensics.rice.edu/index.html
- NIH –alcohol metabolism - http://pubs.niaaa.nih.gov/publications/AA72/AA72.htm
- Elmhurst College Alcohol Information - http://www.elmhurst.edu/~chm/vchembook/642alcoholmet.html

DEA Schedule of Controlled Substances - http://www.deadiversion.usdoj.gov/schedules/304;http://www.justice.gov/dea/druginfo/ds.shtml

Differentiated Student Access to Content: Recommended Strategies & Techniques

Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core
Utiize a multi-sensory (VAKT) approach during instruction, provide alternate	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review,	Deliver instruction utilizing varied learning styles including audio,	Create an enhanced set of introductory activities, integrate active teaching/learning

presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric.	visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY	Disciplinary Concept: • Creativity and Innovation • Critical Thinking and Problem Solving • Global and Cultural Awareness	
	Core Ideas:	• Innovative ideas or innovation can lead to career opportunities.

SKILLS		• Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed. • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.
	Performance Expectation/s:	•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Demonstrate creativity and innovation. Students 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. Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)							
	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law: N.J.S.A. 18A:35-28		LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35		Standards in Action: Climate Change

Marking Period	Unit Title	Recommended Instructional Days
4	Unit 6: Autopsy , Entomology & DNA Testing	40 days

NJSLS - Science: TItle	NJSLS - Science: Performance Expectations	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
Autopsy Entomology DNA Testing	Standard: 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. Standard: 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. Standard: 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 (30 mutations caused by environmental factors. Standard: HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. Standard: HS-LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	
Scientific Knowledge Assumes an Order and Consistency in Natural Systems	Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	Essential Question/s: • How do we decide which scientific claims to believe? • How has DNA testing changed the processes and ethics of investigation? • How is death defined?
FOUNDATION	FOUNDATION	

Science and Engineering Practices: Core Idea	Science and Engineering Practices: Statement	
Models Problems	Developing and Using Models: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) Asking Questions and Defining Problems: Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) Engaging in Argument from Evidence: Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	• How can an autopsy help to solve a crime? • Why is time of death important? • How does climate change effect death and evidence of autopsy? How can environmental factors influence the time estimate? • Identify various methods of identifying dead bodies • Discuss the process involved in facial reconstruction for identification purposes • Explain the role of the coroner and methods used to determine cause of death in the home, at crime scenes and in vehicular accidents • Distinguish between four manners of death: natural, accidental, suicidal, homicidal • Outline when an autopsy is appropriate • Detail the process and equipment used for an autopsy • Read and interpret the results of an autopsy report
FOUNDATION Crosscutting Concepts: Core Idea	FOUNDATION Crosscutting Concepts: Statement	
Patterns Cause and Effect	• Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. • Cause and Effect: Events have causes, sometimes simple, sometimes	

	multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. • Scale, Proportion and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. • Systems and Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. • Structure and Function: The way an object is shaped or structured determines many of its properties and functions. • Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.	● Describe the structure of DNA molecules and the process of replication ● Identify genetic disorders and their effects ● Describe different genetic terms (e.g. allele, dominant/recessive alleles) and provide examples of each ● Explain the difference between genotypes and phenotypes ● Identify and describe the process of using the four main types of forensic DNA testing – Restriction Fragment Length Polymorphism, Polymorphism Chain Reaction, Short Tandem Repeat, and Mitochondrial DNA analysis ● List places to find DNA to be used for testing ● Provide an example of the succession of different types of insects that are found on a body as it decomposes ● Describe how various environmental factors may

Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies	
Self-Awareness Self-Management Social Awareness Responsible Decision-Making Relationship Skills	Recognize one's feelings and thoughts Recognize the impact of one's feelings and thoughts on one's own behavior Understand and practice strategies for managing one's own emotions, thoughts, and behaviors Recognize and identify the thoughts, feelings, and perspectives of others Demonstrate an awareness of the differences among individuals, groups, and others' cultural background Develop, implement, and model effective problem-solving and critical thinking skills Establish and maintain healthy relationships Utilize positive communication and social skills to interact effectively with	influence the estimated time of death ● Explain the role of anthropologists and entomologists in forensic science. ● Identify the characteristics of human remains that can be used in determining the estimated time of death. ● Explain how human remains are recovered and processed from a crime scene. ● Analyze skeletal remains in order to determine the race, gender, height, and age of an individual ● Match DNA test results ● Explain ideas with sufficient, relevant details ● Use content-specific vocabulary accurately ● Vary sentence beginnings and lengths ● Use end marks and commas correctly Activity Description:

	others	• Provide fictional books to compare the fiction of the books with the reality of true forensic science • Students will be given a simulated scene where they must collect physical evidence relating to firearms. Working in small groups, students will apply techniques learned during the unit to collect, analyze and interpret the evidence provided in the simulated scene. Students will write up a detailed report outlining the process they went through, the various conclusions they considered based on the evidence, and the rationale behind their ultimate explanation of the evidence. • Continue work with the Doe Network in helping to solve old cases • Pre-assessment for concepts developed during previous learning experiences

		• Introduce and discuss essential questions for the unit throughout unit instruction • Create opportunities for students to investigate key concepts • Investigation through lab activities/experiments • Analyze data collected during activities and experiments • Practice skills and strategies • Explore connections to real-world in small groups • Discuss real life application of skills and strategies • Model problem solving and critical thinking • Discuss outcomes and student responses • Have students work in pairs to apply new skills and strategies • Provide specific feedback to students on their thinking and communication of ideas and outcomes • Performance Task:In this lab you will extract or “spool” DNA (genetic material) from strawberry cells. Most of the

		unusual properties of DNA result from it being such a long thin molecule. Each cell contains approximately six feet of very thin DNA. Ripe strawberries are producing pectinases and cellulases which are already breaking down the cell walls. Most interestingly, strawberries have enormous genomes. They are octoploid, which means they have eight of each type of chromosome. The detergent in the shampoo helps to dissolve the phosholipid bilayers of the cell membrane and organelles. The salt helps to keep the proteins in the extract layer so they aren't precipitated with the DNA. DNA is not soluble in ethanol. When molecules are soluble, they are dispersed in the solution and are therefore not visible. When molecules are insoluble, they clump together and become visible. The colder the ethanol, the less soluble the DNA will be in it. This is why it is

		important for the ethanol to be kept in the freezer or in an ice bath. Interdisciplinary Connections: Content: ;NJSLS#: *Connections to NJSLS – English Language Arts* ● 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. (HS-LS1-1), (HS-LS1-6) ● WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (HS-LS1-1), (HS-LS1-6) ● WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6) ● WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject,

		demonstrating understanding of the subject under investigation. (HS-LS1-3) ● WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches *Connections to NJSLS – Mathematics* ● MP.4 Model with mathematics. (HS-LS1-4)HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4) ● HSF-BF.A.1 Write a function that describes a relationship between two quantities. (HS-LS1-4) ● MP.2 Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7) ● HSS-IC.B.6 Evaluate reports based on data. (HS-LS2-6) ● HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7) Interdisciplinary Connection: Math=MA, English= ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU,

		Technology=TECH, World Language=WL Content: ;NJSLS#:

Assessments (Formative) To show evidence of meeting the standard/s, students will successfully engage within:	Assessments (Summative) To show evidence of meeting the standard/s, students will successfully complete:
Formative Assessments: Formative Assessments: Apply what you know; lesson check; self check; notebooks Assessments ● Performance Task: Due to the nature of popular TV shows like CSI, many people have a heightened awareness of forensic science. However, misconceptions about the profession have been reinforced by the popularity of TV shows. Write a pamphlet for prospective students who are interested in forensic science outlining the information you have learned in this unit. Dispel some of the myths while confirming some of the realities of the work of forensic scientists.	Benchmarks: Benchmarks: ● District Assessment Summative Assessments: ● End of lesson quizzes ● End of unit assessments

Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources
● Student Chromebooks	● Leveled Readers	● Multilingual Glossary on HMH Ed website	● Leveled Readers

● Video Based Projects for each Unit	● Vocabulary Card Game for each unit		

Supplemental Resources

Technology:

Computer
Items for “crime scene”
Fictional Forensic science books
Schoology

Other:

- Digital Assessments
- Digital Performance tests
- Google Expeditions
- Video-based projects
- The Science Spot http://sciencespot.net/Pages/classforsci.html
- What happens when a body dies http://www.madsci.org/posts/archives/2005-04/1114460899.Gb.r.html
- Autopsy http://www.pathguy.com/autopsy.htm
- National Geographic Body Farm http://video.nationalgeographic.com/video/body-farm-sci
- Forensic Entomology http://www.forensic-entomology.com

Differentiated Student Access to Content: Recommended Strategies & Techniques

Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core

Utiize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric.	Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

	Disciplinary Concept:

<table>
<tr><td rowspan="5">NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS</td><td colspan="2">• Creativity and Innovation
• Critical Thinking and Problem Solving
• Global and Cultural Awareness</td></tr>
<tr><td>Core Ideas:</td><td>• Innovative ideas or innovation can lead to career opportunities.
• Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
• Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.</td></tr>
<tr><td>Performance Expectation/s:</td><td>•9 .4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
• 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
• 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
• 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).</td></tr>
<tr><td colspan="2">Career Readiness, Life Literacies, & Key Skills Practices</td></tr>
<tr><td colspan="2">Demonstrate creativity and innovation.
Students 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.</td></tr>
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	Utilize critical thinking to make sense of problems and persevere in solving them. Students 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.

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)			
Amistad Law: N.J.S.A. 18A 52:16A-88	Holocaust Law: N.J.S.A. 18A:35-28	LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35	X Standards in Action: Climate Change