Course Overview - Forensic Science S1-S2

Content Area: **Science**
Course(s): **FORENSIC SCIENCE**
Time Period:
Length: **N/A**
Status: **Published**

Cover

Course Overview

Forensic Science is a course composed of four quarters of study. Students in this class learn the fundamentals of a criminal investigation and how it is used in a court of law. This course uses forensic science to practice science as inquiry. Using the scientific method, students will process and analyze mock crime scenes. Topics to be covered include the history of forensic science, admissible evidence, search and seizure laws, crime scene safety and processing of evidence, fingerprinting, serology, DNA, hair, handwriting analysis, anthropometry, and student designed mock crime scenes. By stepping into the role of the forensic scientist, the students learn and apply numerous technical strategies and skills. Students will find this course fun while challenging their understanding of the sciences. This course emphasizes the multidisciplinary of forensic science. The class includes science concepts in biology, chemistry, physics, as well as mathematics, statistics, anthropology, psychology, communications and law. The course enhances the student's ability to apply concepts and solve science based puzzles using logical reasoning.

(Prerequisites: Biology)

Modifications

Each teacher, each student, each classroom is unique and adaptations are specific to each situation. Differentiating instruction and providing multiple ways to assess allows more flexibility for students to meet the standards and requirements of the class. Below are samples of the types of adaptations/modifications that may occur for students based on need including ELLs, students with a 504 Plan, Special Education, Basic Skills and Gifted and Talented students.

Adaptations/Modifications:

Input Adapt the way instruction is delivered to the learner. *For example:* • Use different visual aids, • Plan more concrete examples, • Provide hands-on activities, • Place students in cooperative groups.	Output Adapt how the learner can respond to instruction. *For example:* • Allow a verbal vs. written response, • Use a communication book for students, • Allow students to show knowledge with hands-on materials.	Time Adapt the time allotted and allowed for learning, task completion or testing. *For example:* • Individualize a timeline for completing a task, • Pace learning differently (increase or decrease) for some learners.
Difficulty Adapt the skill level, problem type, or the rules on how the learner may approach the work.	Level of Support Increase the amount of personal assistance with specific learner.	Size Adapt the number of items that the learner is expected to learn or complete.

For example: • Simplify task directions. • Use of calculator.	*For example:* • Assign peer buddies, teaching assistants, peer tutors or cross-age tutors.	*For example:* • Reduce the number of vocabulary words a learner must learn at any one time.
Degree of Participation Adapt the extent to which a learner is actively involved in the task. *For example:* • Allow for small group/individual presentations vs. presentations to the whole class.	**Alternate Goals** Adapt the goals or outcome expectations while using the same materials. *For example:* • Students in the same class are expected to either write a paragraph, write a bulleted response, or meet with the teacher to provide a verbal response.	**Substitute Curriculum** Provide differentiated instruction and materials to meet a learner's individual goals. *For example:* • Individualize a timeline for completing a task, pace learning differently (increase or decrease) for some learners, • Use of Learning Ally.

Materials and Resources

CRIMINALISTICS	RICHARD SAFERSTEIN	PRENTICE HALL	2001

Content Specific Standards

SCI.9-12.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.
SCI.9-12.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.
SCI.9-12.HS-LS4-2	Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
SCI.9-12.HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
SCI.9-12.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.
SCI.9-12.HS-PS2-3	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
SCI.9-12.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.

| SCI.9-12.HS-PS2-6 | Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. |
| SCI.9-12.HS-PS4-2 | Evaluate questions about the advantages of using a digital transmission and storage of information. |

Interdisciplinary Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
LA.RST.9-10.1	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.
LA.RST.9-10.2	Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
LA.RST.9-10.5	Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LA.RST.9-10.6	Determine the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LA.RST.9-10.8	Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
LA.RST.9-10.9	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
LA.WHST.9-10.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant sufficient textual and non-textual evidence.
LA.WHST.9-10.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.9-10.3	(See note; not applicable as a separate requirement)
LA.WHST.9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.WHST.9-10.6	Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display

information flexibly and dynamically.

LA.WHST.9-10.7	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.
LA.WHST.9-10.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
LA.WHST.9-10.9	Draw evidence from informational texts to support analysis, reflection, and research.

21st Century Life and Career Ready Practice Standards

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP5.1	Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

CRP.K-12.CRP7.1	Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP9.1	Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
CRP.K-12.CRP11.1	Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
CRP.K-12.CRP12.1	Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Technology Standards

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.12	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.12.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.12.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.12.D	Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
TECH.8.2.12.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

Pacing Guide

Forensic Science 1		
Topic	**Pacing**	**Unit**
Types of Crime Units	2 blocks	Crime Scene Investigation
History of Criminalistics	1 block	Crime Scene Investigation
Criminalistics and the Law	1 block	Crime Scene Investigation
Eyewitnesses	1 block	Crime Scene Investigation
Crime scene protocols	2 blocks	Crime Scene Investigation
Crime scene sketches	2 blocks	Crime Scene Investigation
Fingerprint origin	½ block	Fingerprint Analysis

Fingerprint classifications	1 block	Fingerprint Analysis
Ridgeology	1 block	Fingerprint Analysis
Latent Prints	½ block	Fingerprint Analysis
Lifting techniques	2 blocks	Fingerprint Analysis
Hair Structure	1 block	Hair Analysis
Color and textural differences	1½ blocks	Hair Analysis
Human vs animal hair	2½ blocks	Hair Analysis
What is toxicology?	½ block	Toxicology (expanding for new course)
What do toxicologists test?	½ block	Toxicology (expanding for new course)
Dosages	½ block (add 1½ blocks for new topics)	Toxicology (expanding for new course)
Naming of bones	½ block	Forensic Anthropology
Significance of bone shape, size and ridges	½ block	Forensic Anthropology
Male vs female skeleton	2 blocks	Forensic Anthropology
Bones and body proportions	1½ blocks	Forensic Anthropology
Bite mark identification	1 block	Forensic Anthropology
Parts of blood	½ block	Blood Analysis
Human vs. animal blood	1 block	Blood Analysis
Human blood types	½ block	Blood Analysis

Blood Spatter Analysis: effects of height	1 block	Blood Analysis
Blood Spatter Analysis: angle of impact	1 block	Blood Analysis
Blood Spatter Analysis: area of convergence	1 block	Blood Analysis
Blood Spatter Analysis: point of origin	1 block	Blood Analysis
Structure of DNA	1 block	DNA Analysis
How DNA is unique among individuals	1 block	DNA Analysis
DNA extraction	1 block	DNA Analysis
PCR	1 block	DNA Analysis
Gel Electrophoresis	1 block	DNA Analysis
DNA comparison	1 block	DNA Analysis
	4 blocks	Final Project

Topic	Pacing	Unit
Handwriting analysis	2 blocks	Document Analysis
Paper chromatography	1 block	Document Analysis
Counterfeiting	1 block	Document Analysis
Money/document authentication	2 blocks	Document Analysis
History of firearms	1 block	Ballistics
Anatomy of a gun	1 block	Ballistics

How a gun fires	½ block	Ballistics
Bullet comparison	1½ blocks	Ballistics
Cartridge comparison	1½ blocks	Ballistics
Bullet Trajectory	1½ blocks	Ballistics
Tire tracks	1½ blocks	Impression Evidence
Tool markings	2½ blocks	Impression Evidence
Footwear impressions	2 blocks	Impression Evidence
Types and identification of cybercrimes	2 blocks	Cybercrimes
Cyber safety	2 blocks	Cybercrimes
Cybercrime laws	2 blocks	Cybercrimes
Determining arson or accident	2 blocks	Arson
Point of origin	1½ blocks	Arson
Fire accelerants	1½ blocks	Arson
Fabric burns	1 block	Arson
What is entomology?	1½ blocks	Entomology
Life cycle of a blowfly	2 blocks	Entomology
PMI and ADH	1½ blocks	Entomology
Determining time of death	1 block	Entomology
	4 blocks	Final Project

Formative and Summative Assessment

Teachers ultilize a variety of methods for assesment including:

	Unit Tests and Quizzes	Labs, Projects & Classwork	Lab Assessments	Homework
Category Criteria	Individual assessments based on specific or general content knowledge.	Any group work primarily completed in class to be checked and/or graded for completion.	Individual assessments based on group lab work. Lab data and other notes may sometimes be used.	Any work assigned to be completed outside of the classroom.

All students take a common Midterm and Final Exam.

Grading and Evaluation Guidelines

While assessments of proficiency levels must be valid and reliable they do not need be the same for all students.

In terms of proficiency level the East Brunswick grades equate to:

       A   Excellent   Advanced Proficient

       B   Good   Above Average Proficient

       C   Fair   Proficient

       D   Poor   Minimally proficient

       F   Failing   Partially Proficient

Marking period grades for Forensic Science will be determined using the following weighting:

50% Classwork/Lab work

40% Assessments: Tests, Quiz, Project

10% Quizzes

Other Details

SCED

03210 SCIENCE, TECHNOLOGY AND SOCIETY

Science, Technology, and Society courses encourage students to explore and understand the ways in which science and technology shape culture, values, and institutions and how such factors, in turn, shape science and technology. Topics covered may include how science and technology enter society and how they change as a result of social processes.