

**Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI 100: Forensic Science 100**



Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

Forensic Science 100 is an introduction to the Forensic Science pathway. This course will expose students to a basic understanding of Forensic and provide an overview of the roles of Forensic Scientists. Students will engage in basic laboratory and analytical tasks. This course is intended to provide an introduction to the science behind crime detection. Topics included are forensic skills, the legal system, crime scene investigation, the history of forensic science, hair analysis, fingerprints, forensic dentistry, science fair, impression evidence, blood typing, and crime mapping.

Pre-Requisites

N/A

Course Objectives

Students will

1. Explain the professional, legal, and ethical responsibilities of forensic science professionals.
2. Document and process evidence from a crime scene.
3. Perform comparative analysis on forensic evidence (fingerprints, hair, ballistics, blood).
4. Plan and carry out investigations to address emerging research questions.
5. Engage in argument from evidence.
6. Research and address issues of crime in the community.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials
- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds, or headphones

Textbook

Bertino, A. J. (2012). *Forensic Science: Fundamentals and Investigations*. Boston, MA: Cengage Learning.

Grading

These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

- 25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
- 25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
- 25% **Projects**
- 25% **Classwork:** Most work will be completed in class.

Assignments: In order to receive full credit, work must be complete before the bell rings on the day it is due. **Late or incomplete work is NOT accepted for full credit.** If an absence is excused, you will have as many days as you were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. **It is your responsibility to organize and keep track of your assignments!** Most work will be turned in as a packet at the end of a unit or electronically via email or other means.

Labs: Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.

Lab Safety: In case an accident occurs, report it immediately! Do not try to hide anything out of embarrassment - you will be making the situation worse, endangering yourself and others. Let the instructors decide on the proper course of action. Those not involved should clear the area.

Exams: It is YOUR responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following your return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.

Academic Integrity Policy: Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian, and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Additional Course Policies

All school policies shall be enforced at all times. Please refer to **SCSD's Code of Conduct, Character and Support**. Listed below are the expectations and rules in our classroom. The **3 R's (Respect, Responsibility and Resilience)** are the keys to success in this class!

1. **Respect** everyone, including yourself, the class space, and class materials.
 - *Respect yourself:* Use appropriate academic language and keep street language on the street. (No swearing, hurtful language).
 - *Respect others:* Know when to step back and when to step up. Raise your hand in class discussions before contributing. Actively listen when others are talking. Give the teacher your attention quickly.
 - *Respect your classroom:* No food or drink when in lab. Clean up after yourself and leave things nicer than you found them.

2. **Act Responsibly.** Arrive on time and prepared for class. Begin the bellringer before the bell rings. Remain seated until the teacher (not the bell) dismisses at the end of class. Turn in work on time.
3. **Practice Resiliency.** Actively and positively participate in class. Practice a growth mindset.

Consequences: Students are expected to behave according to the **3 R's** described above. Consequences for students who demonstrate inappropriate or unacceptable behavior include, but are not limited to: warning, confiscation or loss of privilege, removal from room/activity, loss of break/lunch time, detention, and parent conference. Consequences depend on the severity and consistency of the action or mutual agreement. Referral or parent notification may occur at any time depending on the nature of the incident.

Tardy: If you arrive after the bell, enter the room quietly and go directly to your seat. Multiple unexcused tardies in one week will have consequences (see above). If a tardy is excused, provide the pass to the teacher. Any necessary follow-up conversation should happen without disrupting class.

Cell phones and electronic devices: If there is an emergency, let the teacher know. Phones and electronic devices should be OFF and OUT OF SIGHT unless given approval for classroom use. They may not be charged in the classroom. After one warning, phones will be confiscated and returned at the end of the period. If this is a chronic issue, parents will be notified and privileges will be lost (see consequences above).

Food and Drink: Food and drink is a privilege in the classroom that must be earned and can be lost. See "Respect your classroom" above. No food and drink around lab spaces or technology.

Bathroom use: Students are not allowed in the hallway during class time without an escort. Do your best to use the bathroom at an appropriate time between class periods. Bathrooms will not be open during the first and last ten minutes of class. If you foresee this as an issue, please see the teacher ASAP.

Extra Help: If you are struggling, it is your responsibility to ask for help. The teacher is available at the office hours posted in the classroom. The best way to succeed in this class is to regularly do your best.

Communication: Assignments and grades will be posted online. Check often! The teacher will respond to calls/emails within two school days. The teacher will request a translator for lengthy conversations in other languages.

Course Calendar

Quarter	Units of Study
1	• Forensic Science Skills • Probative Value of Evidence • Crime Scene Investigation Procedures • Historical Foundations of Forensic Science
2	• Trace Evidence: Introduction to Microscopy • Class Evidence: Hair Analysis • Individual Evidence: Fingerprints • Physical Evidence: Skeletal Remains
3	• Science Fair • Impression Evidence
4	• Serology: Blood Typing • Crime Mapping and Criminal Justice Issues • Crime Scene Technician Simulation

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI 100: Forensic Science 100



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Weeks 1-2 Unit 1 Forensic Science Skills	- What are the expectations of this class? - Why is lab safety vital in science?	- Demonstrate safe practices in labs and field investigations. - Exhibit appropriate behavior in the lab. - Demonstrate proper handling of laboratory equipment and chemicals. including proper disposal and clean-up procedures. - Demonstrate proper hand washing technique. - Perform the steps of laboratory protocols accurately and in sequence. - Follow standard operating procedures for maintaining a lab manual. - Document laboratory work following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion). - Write a claim and support with evidence.	- Building Rules: Qualities of a Good/Bad Teacher, Student - Annotation: Rose that Grew from Concrete - Summary Tweet: Rose that Grew from Concrete - Google Presentation Slide: Forensic Science Disciplines - Google Presentation Slide: Lab Safety - Lab: Ooblek-Is it a Solid or Liquid? Claim-Evidence-Reason - Uniform Inspection - Create a Professional Google Account - Composition Lab Notebook	Career Ready Practices CRP 1,3,4,5,9,11,12	ELA RI.9-10.1,2,4,6 W.9-10.1,4,6 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6	Literacy RST.9-10.1,2,3,4,7 WHST.9-10.2,5,7
				Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	Math MP 5
				Industry Standards MF 2 PSS 1	Science NGSSP 3 HS-PS1-3
Weeks 3-5 Unit 2 Probative Value of Evidence	How can scientific methods help solve problems?	- Describe the CSI Effect. - Explain how science is used to solve crimes. - List the types of evidence (eyewitness, class evidence, and physical evidence). - Describe the importance of physical evidence. - Differentiate between class and individual evidence. - Discuss how evidence is used to	- Close Reading: CSI Effect - Google Document Summary: CSI Effect - Anticipation Guide: Criminal Justice System - Close Reading: "Six Astonishing Mistakes that will Make You Rethink the Death Penalty" - Notes: Crime Science - Lab: Class vs. Individual	Career Ready Practices CRP 1,3,4,5,9,11,12	ELA RI.9-10.1,2,4,6 W.9-10.1,2,4,6,9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6	Literacy RST.9-10.1,2,3,4,7 WHST.9-10.2,5,7
				Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6,12	Math

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		convince a jury of guilt. • Describe the probative value of evidence. • Use evidence to identify an individual. • Demonstrate appropriate use of personal protective devices. • Define and apply vocabulary: <i>CSI Effect, probative value, physical evidence, eyewitness, trace evidence, motive, suspect, class evidence, individual evidence, federal, local, jury.</i>	Evidence • Lab: Garbage-ology • Presentation: Suspect Identification • Guest Speaker: Evidence, CSI Effect	ST-SM 3 Industry Standards MF 1	Science HS-ETS1-2
Weeks 6-8 Unit 3 Crime Scene Investigation Procedures	- How is evidence collected and analyzed? - What is the value of evidence? - What procedures are implemented at a crime scene and why are they important?	- Work as a productive member of a team. - Identify and explain the role of the: medical examiner, CSI, first responder, forensic specialists, photographers. - Describe the steps in processing a crime scene. - Conduct a systematic search of a mock crime scene. - Demonstrate crime scene sketching. - Measure the boundaries of a crime scene and distance between evidence. - Draw inferences and analyze crime scene evidence to develop a hypothesis. - Reconstruct a crime scene from pieces of evidence. - Explain and demonstrate correct techniques to collect and package crime scene evidence. - Demonstrate chain of custody and proper handling of evidence. - Correctly process trace evidence (examples are fibers, blood, hair,	- Movie: 48 Hours Doctor's Daughter - Anticipation Guide: Eyewitness Myths - Scenarios: Process Crime Scene Mistakes - Eyewitness: Frontline: What Jennifer Saw - Lab: Trace Evidence Lab - Blog Reflection: Eyewitness - Lab: Chain of Custody - Triangulation of Evidence - Lab: Crime Scene Sketch Reconstruction - Classmate Interview - YouTube: Zodiac Killer Documentary - Notes: Forensic Scientist Legal Responsibilities - Ethical Case Studies Scenarios: Crime Scene Processing Mistakes	Career Ready Practice CRP 1,2,4,8,9,11,12	ELA RI.9-10.1.2.4.6 W.9-10.2,4,6 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 3 LW 3 ST 1,2	Literacy RST.9-10.1,2,3,4,7 WHST.9-10.2,4,5,7
				Pathway Standards HL-BRD 1 LW-ENF 1,4,12 ST-SM 1,2,4	Math MP 1,2,4,5,6
				Industry Standards MF 3 PSS 12	Science NGSSP 1,2,5,6,7,8 HS-ETS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		glass, or soil) collected in a simulated crime scene. • Differentiate between testimonial and physical evidence. • Define and apply vocabulary: <i>chain of custody, eyewitness evidence, real evidence, circumstantial evidence</i> .			
Weeks 9-10 Unit 4 Historical Foundations of Forensic Science	- What are the roles, functions, and responsibilities of forensic science professionals? - What is legally and ethically expected of forensic scientists and crime scene investigators? - What are the distinguishing duties for various forensic specialists, and how does the legal system control these responsibilities? - What are some examples of careers in forensic science? - What is a crime scene lab and how does it work? - How has forensics science developed over time?	- Describe the legal responsibilities of forensic science professionals within and outside of the courtroom. - Summarize what a crime lab is and how it works. - Discuss the organization of the crime laboratory and detail the functions it serves. - Compare the Crime Lab with a crime lab from another state and an international crime lab. - Prepare a mission and vision statement for a police agency or crime lab. - Illustrate the history of forensic science. - Explain J. Edgar Hoover's contributions to the formation of the FBI. - Discuss the federal programs established in the United States to investigate crimes (Homeland Security, INTERPOL, ATF, FBI, US Attorney General, U.S. Marshal's Service). - Define and apply vocabulary: <i>crime lab, expert witness</i>.	- Infographic: Criminal Justice System - History of Forensic Science Prezi - Movie Notes: History Channel FBI Crime Lab - Venn Diagram: Crime Lab - Case Study: Halloween History Horror	Career Ready Practice CRP 1,2,4,7	ELA RI.9-10.1,2,4,6 W.9-10.1,2,4,5,6,7,9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 1 LW 1,5 ST 4	Literacy RST.9-10.1-10 WHST.9-10.1,2,4,6-10
				Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6 ST-SM 2,3	Math
				Industry Standards PSS 12	Science
Weeks 11-12 Unit 5	How are microscopes used in forensic science?	- Identify parts and functions of a microscope. - Use a microscope effectively in the	- Lab: Microscope Structure Identification - Lab: Locard T-Shirt	Career Ready Practice CRP 2,8,11,12	ELA RI.9-10.1,4 W.9-10.4 SL.9-10.1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Trace Evidence: Introduction to Microscopy	How are the properties of light used in the collection and analysis of trace evidence?	- lab setting. - Competently focus a compound microscope. - Examine trace evidence using a microscope, chromatography, and other techniques. - Define and list examples of trace evidence. - Explain the importance of the Locard Exchange Principle in forensic science. - Collect and analyze various types of trace evidence (dust, pollen, fiberglass, etc.). - Define and identify a variety of microbes using measurement and microscopy techniques in a simulated professional setting. - Define and apply vocabulary: <i>Locard's Exchange Principle</i>.	- Activity: Prepare a dry mount slide - Prepare a wet mount slide - Lab: Microbe Identification		L.9-10.1,2,6
				Cluster Standards HL 1 LW 4 ST 1,2,6	Literacy RST.9-10.3,4,7,9 WHST.9-10.2,5,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,5 ST-SM 1,2,4	Math MP 1,2,5,6
				Industry Standards MF 3	Science NGSSP 1,2,3,7,8
Weeks 13-14 Unit 6 Class Evidence: Hair Analysis	- What are the differences between class characteristics and individual characteristics? - How is the structure of hair used for analysis and identification?	- Sketch detailed views of objects as seen through a microscope. - Identify and describe the function of hair structures: medulla, cortex, cuticle, corticle fuci, pigment granules and ovoid bodies. - Prepare slides of hair evidence and cuticle impressions. - Identify different medulla and cuticle patterns using a microscope. - Differentiate between animal and human hair. - Identify the species that hair originated from. - Explain the difference between guard, fur, and tactile animal hairs. - Summarize the importance of the presence of DNA in analyzing hair evidence.	- Paper Bindle: Collect Trace Evidence in the Field - Activity: Hair Impression Slides - Notes: Identify Hair Structures - Venn Diagram: Animal vs. Human Hair - Lab: Animal and Human Hair Comparison - Lab: Identify an unknown hair - Activity: Categorizing somatic and racial differences - Lab: Characteristics of Hair Scales Lab - Activity: Teach a Hair Lesson	Career Ready Practice CRP 2,8,11,12	ELA RI.9-10.1,4 W.9-10.2,4-9 SL.9-10.1,2,4,5,6 L.9-10.1,2,6
				Cluster Standards HL 1 LW 4 ST 1,2,6	Literacy RST.9-10.3,4,7,9 WHST.9-10.2,5,7
				Pathway Standards HL-BRD LW-ENF 1,5 ST-SM 1,2,4	Math MP 1,2,5,6
				Industry Standards MF 5 PSS 3,4	Science NGSSP 1,2,3,7,8 HS-ETS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		- Identify signs of violence shown by hair evidence. - Describe how to determine natural vs. dyed hair, cut vs. uncut hair. - Give examples of how chemical analysis of hair can provide clues in a crime such as in a poisoning, heavy metal exposure, drug use or nutritional issues. - Identify the racial and somatic origin of unknown hairs based on their characteristics. - Define and apply vocabulary: <i>medulla, cortex, cuticle, coronal, spinous, imbricate, medullary index, lattice, vacuolated, uniserial, multiserial, fragmented, DNA tag, anagen phase, bifurcation, catagen phase, telogen phase.</i>	- Activity: Murder in the Hair Salon - Light Diffraction Hair Diameter Lab		
Weeks 15-17 Unit 7 Individual Evidence: Fingerprints	- How and when was the science of fingerprints discovered? - What are the requirements for a quality set of fingerprints? - What are different methods of developing fingerprints? - How are fingerprints that may not be visible developed?	- Describe the history of fingerprinting. - Describe the structures and functions of the skin. - Explain how ridge patterns are caused in skin. - Compare the three major fingerprint patterns of arches, loops, and whorls, and their respective subclasses. - Describe the fingerprint minutiae (major characteristics of fingerprints): ending ridge, fork, island ridge, dot, bridge, spur, eye, double bifurcation, delta, trifurcation. - Determine the reliability of fingerprints as a means of identification and discuss how criminals attempt to alter their	- Fingerprint Minutiae Notes - Lab: Magnetic Powder Dusting - Activity: History of Fingerprinting Timeline - Project: Fingerprint Minutiae Model - Activity: Fingerprint Lifting Digital SKILLS USA Lesson (blog, podcast, video) - Lab: Fingerprint Comparison Analysis - Discussion: Fingerprinting, Identification, and Privacy in Society - Privacy and Identification Op-Ed (IAFIS)	Career Ready Practice CRP 2,8,11	ELA RI.9-10.1,2,4,6 W.9-10.1,2,4-9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 1 LW 2 ST 2,6	Literacy RST.9-10.1,2,3 WHST.9-10.2,5,7
				Pathway Standards HL-BRD 6 LW-ENF 1,6,12 ST-SM 2,4	Math MP 1,3,5
				Industry Standards MF 4 PSS 3,4	Science NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		fingerprints. • Demonstrate how fingerprint evidence is collected and select appropriate techniques for the development of latent prints on various surfaces. • Apply proper procedures for dusting a crime scene for collecting latent fingerprints. • Properly lift and mount a latent fingerprint from a designated item of evidence. • Demonstrate the proper procedure for marking a latent fingerprint card. • Determine if a fingerprint matches a fingerprint on record. • Engage in argument from evidence. • Define and apply vocabulary: <i>bifurcation, core, cortex, delta, fingerprint, fingerprint lifting, friction ridge, loop pattern, minutiae, ridge, ridge count, trace evidence, visible fingerprints, whorl pattern.</i>			
Weeks 18-20 Unit 8 Physical Evidence: Skeletal Remains	• How are physical remains identified? • What are characteristics of physical evidence and remains?	• Describe how teeth are used in forensic identification. • Name and number deciduous (baby) and permanent teeth. • Employ dentition patterns as a means for bite mark identification. • Compare bite mark patterns antemortem and postmortem. • Describe the use of forensic dentistry in regards to mass disasters and body identification.	• Case Study: 9/11 Forensic Science Dentistry Identification • Lab: Odontology Identification Bite Mark Impression Lab • Case Study: Ted Bundy • Teeth analysis • Odontology lab with radiographs and teeth molds	Career Ready Practices CRP 2,4,8,10,11	ELA RI.9-10.1,4 W.9-10.4 SL.9-10.1 L.9-10.1,2,6
				Cluster Standards HL 1 LW 1,2,4 ST 2,6	Literacy RST.9-10.1,2,3,4,7,8,9 WHST.9-10.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards MF 9	Science HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Weeks 21-26 Unit 9 Science Fair	- How do forensic scientists plan and carry out investigations? - How do forensic scientists construct explanations and design solutions?	- Create an experimental research question. - Write a hypothesis to test a research question. - Use credible sources to compile research on a topic. - Outline and draft a background research paper. - Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. - Create a paper and digital data table to collect quantitative and qualitative data. - Create a graph to display quantitative data. - Analyze data for patterns and trends. - Draft conclusions from data to support or abandon hypothesis and explain results. - Prepare a research presentation display board. - Present research conclusions to a public audience. - Reflect on and revise work.	- Activity: How to brainstorm - Conference: Research Plan and Project Proposal - Presentation: Credible Source Pyramid and Analysis - Activity: Research Notes - Writing Outline: Research Background - Reflection: Science Fair Journal - Conference: Experimental Design - Lab: Conduct Research Experiment - Activity: Gather and Display Data and Graph - Writing: Analyze data and summarize conclusions - Project: Science Fair Display Board - Presentation: Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	PSS 11 Career Ready Practice CRP 2,4,6,7,8,11,12 Cluster Standards HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3 Industry Standards MF 2	ELA RI.9-10.1,2,4,6 W.9-10.1,2,4-9 SL.9-10.1,2,4,5,6 L.9-10.1-6 Literacy RST.9-10.1,2,4,7,10 WHST.9-10.1,2,4-10 Math MP 1,2,3,4,5,6,7,8 Science NGSSP 1,3,4,5,6,7,8 HS-ETS1-1 HS-ETS1-2 HS-ETS1-3
Weeks 27-30 Unit 10 Impression Evidence	How do crime scene investigators examine tool mark impressions, bullet fragments, and bullet holes?	- Explain the individual characteristics of tool marks. - Recognize characteristics of bullet and cartridge cases. - Explain laboratory methodologies used to determine whether an individual has fired a weapon, such as identifying gunshot residue. - Recognize the type of information available through the National Integrated Ballistics Information	- Toolmark Analysis Experiment - Firearms and Trajectory Activity - Firearms and Tool Marks Examination - Firearms and tool Marks Crossword Puzzle - Marshmallow Shooters - JFK - Oscar Pistorius	Career Ready Practice CRP 2,4,6,8,11,12 Cluster Standards HL 1 LW ST 1,2,6 Pathway Standards HL-BRD LW-ENF 1,5	ELA RI.9-10.1,4 W.9-10.4 SL.9-10.1 L.9-10.1,2,6 Literacy RST.9-10.1,2,3 WHST.9-10.2,5,7 Math MP 1,2,3,5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		Network.	- Frontline: Ring of Fire-The Crisis of American Made Handguns - Ballistics NOVA: Who Shot JFK?	ST-SM 1,2,4 Industry Standards MF 12	Science NGSSP 1,2,3,4,6,7,8
Weeks 31-33 Unit 11 Serology: Blood Typing	What is serology and how is it used to solve crimes?	- Identify the components and chemical properties of blood. - Identify the antigens and antibodies that determine ABO blood types and the Rh factor. - Use a Punnett Square to determine blood type probabilities. - Apply the use of a Punnett Square to solve paternity questions.	- Blood Basics Notes - Lab: Who's the Daddy? Blood Type Laboratory - Punnett Square Blood Type Activity - Blood Basics Online (Computer Lab) - Forensic Serology Exam - Blood Quiz	Career Ready Practice CRP 2,4,8,11,12	ELA RI.9-10.1,4 W.9-10.4 SL.9-10.1 L.9-10.1,2,6
				Cluster Standards HL 1 LW ST 1,2,6	Literacy RST.9-10.1,2,4,7,10 WHST.9-10.1,2,4,5,6
				Pathway Standards HL-BRD LW-ENF 1,5 ST-SM 1,2,4	Math MP 2,3,4,5,7
				Industry Standards MF 6	Science NGSSP 1,2,3,4,6,7,8. HS-LS3-1 HS-LS3-3
Weeks 34-37 Unit 12 Crime Mapping and Criminal Justice Issues	- What is GIS? - What is crime mapping? - What crimes occur in our community? - How do forensic scientists develop and use models? - How do forensic experts obtain, evaluate, and communicate information?	- Identify methods for measuring crime. - Interpret a topographical map. - Read a compass. - Identify relevant issues in the community. - Design and carry out a service project to address a community need.	- NAMIS: Missing Persons Search - Current Events Summary Blog/Newspaper Article - Twitter Map - Co-Curricular GIS Map creation - Service Project	Career Ready Practice CRP 2,4,5,6,7,8,11,12	ELA RI.9-10.1,2,4,6 W.9-10.1,2,4-9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6	Literacy RST.9-10.1,2,4,7,10 WHST.9-10.1,2,4-10
				Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	Math MP 1-8
				Industry Standards MF 1	Science NGSSP 1-8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
					HS-ETS1-3 HS-ETS1-4
Weeks 38-40 Unit 13 Crime Scene Technician Simulation	- What have you learned this year? - What is the role of a crime scene investigator?	- Work as a member of team and in cross-curricular groups. - Compile accomplishments in a resume. - Write a cover letter. - Explore and identify various fields of expertise in forensic science (anthropology, psychiatry, engineering, entomology, geology, environmental science, polygraphy, odontology, pathology). - Explore and discuss the different education and training requirements for the various careers in forensic science. - Describe the roles of crime laboratory analyst, clinical laboratory technician, microbiologist, fingerprint analyst, criminalist, crime scene photographer, phlebotomist, forensic serology DNA criminalist, serology technician, forensic psychologist, mental health counselor, toxicologist, biochemist, pharmacologist, geneticist, medical examiner.	- Practical Exam - Crime Scene Scenario Run Through - Sketch UP - Resume - Cover Letter - Portfolio - Presentation - Interview of Professional Working in the Field of Forensic Science	Career Ready Practice CRP 1,2,3,4,5,9,10,11,12	ELA RI.9-10.1,4 W.9-10.2,4-9 SL.9-10.1,2,4,5,6 L.9-10.1,2,6
				Cluster Standards HL 3 LW 3 ST 1,2	Literacy RST.9-10.1,2,4,7,10 WHST.9-10.1,2,4-10
				Pathway Standards HL-BRD 1 LW-ENF 1,4,12 ST-SM 1,2,3,4	Math MP 1,2,3,4,5,6,7,8
				Industry Standards MF 1	Science NGSSP 1,3,4,5,6,7,8

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CSI 200: Forensic Science 200**



Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

Forensic Science 200 is the second course in the Forensic Science pathway. This course provides an overview of the criminal justice system and introduces specialized forensic topics including safety and career readiness, the U.S. justice system, the history and role of forensic science in the legal system, crime scene investigation and crime scene photography, fiber evidence, serology, physical evidence and remains, mortality, science fair, toxicology, psychology, and ecology. Students will also do a focused study of Anatomy and Physiology during the first semester with students from the EMT program. As part of this course, students will enroll in CRJ 101: Criminal Justice Systems at Onondaga Community College that includes study of police, courts, corrections, individual rights vs. public order, due process, and discretionary and ethical issues.

Pre-Requisites

CSI 100: Forensic Science 100

Course Objectives

Students will:

1. Explain the professional, legal, and ethical responsibilities of Forensic Science professionals.
2. Document and process evidence from a crime scene.
3. Perform comparative analysis on forensic evidence (fingerprints, hair, ballistics, blood).
4. Plan and carry out investigations to address emerging research questions.
5. Engage in argument from evidence.
6. Research and address issues of crime in the community.

Integrated Academics

1 Integrated Science Credit

Concurrent Enrollment College Credit: Upon successful completion of Forensic Science 100, students will earn 3 college credits for CRJ 101: Criminal Justice Systems from Onondaga Community College.

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials

- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbooks

- Brown, R., & Davenport, J. (2016). *Forensic Science: Advanced Investigations*. Boston, MA: Cengage Learning.
- Saferstein, R. (2014). *Criminalistics: An Introduction to Forensic Science, 11th Edition*. New York: Pearson.
- Spencer, J. T. (2012). *Introduction to Forensic Science: The Science of Criminalistics*. Boston, MA: Cengage Learning.

Grading

These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

- 25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
- 25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
- 25% **Projects**
- 25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences.

Assignments: In order to receive full credit, work must be complete before the bell rings on the day it is due. **Late or incomplete work is NOT accepted for full credit.** If an absence is excused, you will have as many days as you were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. **It your responsibility to organize and keep track of your assignments!** Most work will be turned in as a packet at the end of a unit or electronically via email or other means.

Labs: Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.

Lab Safety: In case an accident occurs, report it immediately! Do not try to hide anything out of embarrassment - you will be making the situation worse, endangering yourself and others. Let the instructors decide on the proper course of action. Those not involved should clear the area.

Exams: It is YOUR responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following your return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.

Academic Integrity Policy: Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Additional Course Policies

All school policies shall be enforced at all times. Please refer to **SCSD's Code of Conduct, Character and Support**. Listed below are the expectations and rules in our classroom. The **3 R's (Respect, Responsibility and Resilience)** are the keys to success in this class!

1. **Respect** everyone, including yourself, the class space, and class materials.
 - *Respect yourself:* Use appropriate academic language and keep street language on the street. (No swearing, hurtful language).
 - *Respect others:* Know when to step back and when to step up. Raise your hand in class discussions before contributing. Actively listen when others are talking. Give the teacher your attention quickly.
 - *Respect your classroom:* No food or drink when in lab. Clean up after yourself and leave things nicer than you found them.
2. **Act Responsibly.** Arrive on time and prepared for class. Begin the bellringer before the bell rings. Remain seated until the teacher (not the bell) dismisses at the end of class. Turn in work on time.
3. **Practice Resiliency.** Actively and positively participate in class. Practice a growth mindset.

Consequences: Students are expected to behave according to the **3 R's** described above. Consequences for students who demonstrate inappropriate or unacceptable behavior include, but are not limited to: warning, confiscation or loss of privilege, removal from room/activity, loss of break/lunch time, detention, and parent conference. Consequences depend on the severity and consistency of the action or mutual agreement. Referral or parent notification may occur at any time depending on the nature of the incident.

Tardy: If you arrive after the bell, enter the room quietly and go directly to your seat. Multiple unexcused tardies in one week will have consequences (see above). If a tardy is excused, provide a pass to the teacher. Any necessary follow-up conversation should happen without disrupting class.

Cell phones and electronic devices: If there is an emergency, let the teacher know. Phones and electronic devices should be OFF and OUT OF SIGHT unless given approval for classroom use. They may not be charged in the classroom. After one warning, phones will be confiscated and returned at the end of the period. If this is a chronic issue, parents will be notified and privileges will be lost (see consequences above).

Food and Drink: Food and drink is a privilege in the classroom that must be earned and can be lost. See "Respect your classroom" above. No food and drink around lab spaces or technology.

Bathroom use: Students are not allowed in the hallway during class time without an escort. Do your best to use the bathroom at an appropriate time between class periods. Bathrooms will not be open during the first and last ten minutes of class. If you foresee this as an issue, please see the teacher ASAP.

Extra Help: If you are struggling, it is your responsibility to ask for help. The teacher is available at the office hours posted in the classroom. The best way to succeed in this class is to regularly do your best.

Communication: Assignments and grades will be posted online. Check often! The teacher will respond to calls/emails within two school days. The teacher will request a translator for lengthy conversations in other languages.

Course Calendar

Quarter	Units of Study
1	• Safety and Career Readiness • US Justice System • Role of Forensic Science in the Legal System • Anatomy and Physiology: ○ Identification of Physical Evidence and Remains ○ Mortality: Investigation of Various Aspects of Death
2	• Technical Integrity of the Investigation • Fiber Evidence and Analysis • Anatomy and Physiology ○ Mortality: Investigation of Various Aspects of Death (cont.) ○ Toxicology
3	• Science Fair • CRJ 101: Criminal Justice Systems ○ Police as a Pillar of the Criminal Justice System ○ Courts as a Pillar of the Criminal Justice System ○ Corrections as a Pillar of the Criminal Justice System ○ Individual rights vs. Public Order ○ Due Process • Toxicology
4	• CRJ 101: Criminal Justice Systems ○ Discretionary and Ethical Issues • Forensic Psychology • Forensic Ecology: Soil Analysis and Water Testing • Mock Court • Final Examination

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI 200: Forensic Science 200



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 1 Safety and Career Readiness	What are the professional, industry and academic skills required in the forensic science field?	- Exhibit appropriate behavior in the lab. - Explain the dangers of evidence contamination through food, drink, cosmetics, lotion, eye drops, and contact lenses. - Use laboratory equipment correctly and safely. - Follow laboratory procedures. - Perform the steps of laboratory protocols accurately and in sequence. - Follow standard operating procedures and comply with policies and requirements for maintaining a lab manual. - Document laboratory work following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion).	- Article: Ground Zero Flag - Lab: American Flag Identification - Uniform inspection - Career Readiness Personal Assessment once per marking period (quarter) with reflection journaling with and personal improvement goals - Composition Lab Notebook	Career Ready Practices CRP 2,4,5,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.1,4,6 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 5 LW 5 ST 4	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	Math MP 5
				Industry Standards MF 2 PSS 1,5	Science NGSSP 3 HS-ETS1-2
Weeks 2-6 M/W/F US Justice System	- What are the legal foundations for criminal justice in the United States? - How is the criminal justice system organized?	- Identify the constitutional rights of individuals within U.S. justice system. - Examine how the First Amendment relates to commercial speech and the rights of private citizens. - Explain the protections from illegal search and seizure outlined in the Fourth Amendment. - Explain the due process and equal protection clauses in the Fifth and Fourteenth Amendments. - Describe rights protected by the	- First Amendment Game - iCivics - Tinker Case: Precedent Notes - First Amendment Cartoon - Tinker Precedent Case: Amicus Curie Legal Brief - Case Study: Miranda - Activity: Forensic Professional Ethics Scenarios - Bill of Rights Posters	Career Ready Practices CRP 2,4,5,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,5,6,7,9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 5 LW 5 ST 4	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	Math MP 5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		Ninth Amendment. - Outline the steps of the judicial process from identification of a suspect through the trial. - Discuss how evidence is used to convince a jury of guilt. - Demonstrate appropriate use of personal protective devices. - Define and apply vocabulary: <i>integrity, ethics, reputation, precedent, defendant, defense, prosecution, exhibit.</i>	- Visit Court and Booking - Blog Reflection: Court Case	Industry Standards MF 1	Science NGSSP 3
Weeks 7-10 M/W/F Role of Forensic Science in the Legal System	- How is forensic science portrayed in the media? - Where are the intersections of forensic science and the law? - What are the legal responsibilities of forensic scientists?	- Summarize how forensic science is portrayed in literature, media, and society. - Compare fictional detectives and modern forensic scientists. - Summarize the history of criminology, and differentiate types of crime. - Explain how forensic science relies on multiple disciplines to solve crimes. - Differentiate, identify, and provide examples of infractions, misdemeanors, and felony crimes. - Describe and provide examples of statutory, common, civil, criminal, equity and administrative laws. - Explain the CSI Effect and analyze how has it influenced scientific evidence in the courtroom. - Describe the legal and ethical responsibilities of forensic science professionals within and outside of the courtroom. - Evaluate the importance of a code of ethics to professional organizations. - Simulate ethically challenging	- Movie: 48 Hours: Casey Anthony Judgement Day - Summary: Casey Anthony Trial - Analysis: Case Anthony Evidence - Argument: Casey Anthony Verdict Claim-Evidence-Reason Graphic Organizer - Mock Court: Casey Anthony - Serial Podcast Notes - Podcast/Blog Creation: Forensics Media Review of Serial/Concussion/CSI	Career Ready Practices CRP 2,4,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 1,5 LW 1,5,6 ST 4,5,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6,10, ST-SM 2,3,4	Math MP 1,2,4-6
				Industry Standards MF 1	Science NGSSP 1,2,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		forensic scenarios. • Define and apply vocabulary: <i>judge, jury, CSI effect, due process, burden of proof, adversarial process, district attorney, public defender.</i>			
Weeks 11-14 M/W/F Technical Integrity of the Investigation	- How can scientific methods help solve problems? - How is a crime scene processed? - What procedures are implemented at a crime scene and why are they important? - How is evidence collected and analyzed? - What is the value of evidence? - What are the distinguishing duties for various forensic specialists, and how does the legal system control these responsibilities? - How does crime scene photography differ from regular photography? - How can a photographic record that could be used in court be produced?	- Demonstrate or explain activities that occur prior to conducting a crime scene search. - Work together as a professional team to conduct a crime scene investigation. - Demonstrate the ability to assign team members tasks equal to their aptitude. - Demonstrate professional bearing and demeanor. - Obtain information from the responding officer and secure the scene. - Explain and demonstrate the use of constitutional law and federal rules of evidence governing search and seizure. - Properly search for, collect, and remove physical evidence from a crime scene. - Explain and demonstrate appropriate search pattern methods. - Properly flag all evidence. - Explain methods for collecting DNA evidence. - Explain and demonstrate proper bagging and marking of all evidence. - Draw a crime scene sketch using proper measurements, symbols, and labels. - Demonstrate proper use of	- Locard Sock Lab - Crime Scene Reconstruction: O.J. Simpson - Movie Notes: A&E American Justice: Why O.J. Simpson Won - Analysis of Forensic Mistakes During O.J. Simpson Trial - Triangulate Evidence - Skills USA Crime Scene Competition Practice Simulation	Career Ready Practices CRP 2,4,8,11,12	ELA RI.11-12.1,2,4,6 W.11-12.2,4,6 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 5 LW 4,5 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,4,5,6,10,12 ST-SM 1,2,4	Math MP 2,3,4,5,7
				Industry Standards MF 11 PSS 2	Science NGSSP 1,2,3,4,6,7,8. HS-ETS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		measurements and conversions to draw a crime scene to scale. • Geometrically triangulate evidence. • Demonstrate how to prepare an evidence inventory. • Demonstrate how to remove all evidence and equipment from crime scene. • Produce quality photographs of crime scenes including a photography log.			
Weeks 15-20 M/W/F Fiber Evidence and Analysis	• How is fiber evidence from a crime scene analyzed?	• Examine and analyze the forensic aspects of fibers. • Identify and compare natural and synthetic fiber types by using physical (microscopic) and chemical (burn, acid, base, and acetone) testing methods. • Compare and contrast common fiber weave patterns (plain, twill, satin, and knitted). • Summarize systematic procedures for collection and identification of fiber evidence.	• Weave Pattern Analysis • Fluorescence Fiber Identification • Observing Refractive Index (RI) in Fibers Lab • Light Diffraction Fiber Diameter Lab • Lab: Fiber Burn Test • Lab: Fiber Dye Test	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math
				Industry Standards MF 5	Science HS-PS4-1
Weeks 2-6 T/Th Anatomy and Physiology Identification of Physical Evidence and Remains	• What is forensic radiology? • What is forensic anthropology and what can it tell us about human remains?	• Analyze the role of forensic anthropologist in investigations. • Identify the basic bones of the skeleton: cranium, vertebrae, sternum, xiphoid process, ribs, humerus, radius, ulna, carpals, metacarpals, phalanges, pelvis, femur, patella, tibia, fibula, tarsals, metatarsals. • Use skeletal remains to determine the physical characteristics of an individual.	• Who Is the Skeleton in the Closet? Lab • One Bite Out of Crime Forensic Odontology Lab • Bone Identification • Skeleton Identification • Skeleton Foldable Notes • Bone Quiz • Bone Diagram • Skull Diagram • Lab: Estimate Age and	Career Ready Practices CRP 2,4,8,10,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 1,2,4 ST 2, 6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12	Math MP 1,3,5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		- Determine the sex of an individual based on skull, jaw, brow ridge, pelvis, and femur. - Determine the ancestry of an individual. - Estimate the age, height, build, and handedness of an individual. - Compare pre- and postmortem bone injuries (i.e., fractures). - Identify bone patterns indicating disease (i.e., arthritis). - Identify bone markings that could indicate cause of death (stab wound, bullet hole, blunt force trauma, etc.).	Gender of Unknown Skeleton • Lab: Talking Bones	ST-SM 1,2,4 Industry Standards MF 7,9 PS 8,9,10,11	Science NGSSP 1,2,3,6,7,8 HS-LS1-2 HS-LS1-3
Weeks 7-13 T/Th Anatomy and Physiology Mortality: Investigation of Various Aspects of Death	- What is forensic pathology? - What role do pathologists play in forensic science?	- Analyze the role of forensic pathologists in investigations. - Describe correct anatomical positions and the role they play in human anatomy. - Apply body planes and directional terms related to the body: sagittal, frontal, transverse, superior, inferior, anterior, posterior, dorsal, ventral, medial, lateral, proximal, distal, deep, superficial, parietal, visceral, supine, prone. - Locate the body cavities, quadrants, and body regions and identify the major organs within each: dorsal cavity (cranial, spinal), ventral cavity (thoracic, abdominal, pelvic), abdominal quadrants (RUQ, RLQ, LUQ, LLQ), body regions (right hypochondriac, epigastric, left hypochondriac, right lumbar, umbilical, left lumbar, right inguinal, hypogastric, left inguinal). - Define, list, and compare the manners and methods of death.	- Foldable: Body Planes and Cavities - Lab: Pickle Autopsy - Measurable You Inquiry Lab - Movie Notes: And the Dead Shall Speak - Forensic Entomology Lab - Inquiry Body Farm Lab - Claude Snow - Grave at Vukovar - Billy the Kid - Rwanda Genocide lab	Career Ready Practices CRP 2,4,8,10,11 Cluster Standards HL 1 LW 1,2,4 ST 2,6 Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4 Industry Standards MF 7,9 PS 8,9,10,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6 Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9 Math MP 1,3,5 Science NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		- Identify the steps of an autopsy procedure including external and internal examination. - Describe the proper technique to perform a Y-shaped incision. - Determine the cause of death using evidence from an autopsy. - Define taphonomy and describe the stages of decomposition (fresh, putrefaction, black putrefaction, butyric, dry). - Use the stages of decomposition to determine approximate time of death. - Compare algor mortis, rigor mortis, and livor mortis. - Identify common insects associated with decomposition (blowfly, carrion beetle, etc.) and diagram their life cycles. - Identify various environmental factors related to time of death (temperature, humidity, cause of death, etc.).			
Week 14-20 T/Th Anatomy and Physiology Toxicology	- What are the adverse effects of drugs? - How are the most common poisonings investigated?	- Identify the parts of the circulatory system: heart (aorta, superior vena cava, inferior vena cava, atria, ventricles), lungs (left and right, thymus gland, thyroid gland), arteries, capillaries, veins. - Identify the parts of the digestive system (esophagus, stomach, liver, spleen, pancreas, small intestine, large intestine). - Identify the parts of the urinary system (kidneys, ureters, bladder, urethra). - Compare laboratory procedures used for measuring the concentration of alcohol in the	- Body System Foldables - Drug Project Public Health Campaign - Video Notes: YouTube Grim Murders in History-Poison - Making of Medicine Video - Drug Research Project - Public Health Campaign	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards MF 10	Science NGSSP 1,2,3,6,7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		bloodstream. - Describe techniques used to measure the blood alcohol content (BAC) through the breath infrared spectrophotometry and electrochemical fuel cell technology. - Classify the five schedules of drugs by their effects on the body. - Classify the different types of drugs by their physiological effects on the body (stimulants, depressants, narcotics). - Relate the signs and symptoms of an overdose and poisoning with a specific class of drugs or toxins: hallucinogens (MDMA, mescaline, LSD, PCP), narcotics (opium, heroin, codeine, morphine, methadone, oxycodone), stimulants (amphetamines, cocaine, crack, methamphetamines), anabolic steroids, depressants (including alcohol), bacterial toxins (botulism, tetanus), heavy metals and pesticides (lead, mercury, arsenic, cyanide, strychnine). - Discuss chemical agents that may be used for bioterrorism: ricin (castor beans), anthrax (<i>Bacillus anthracis</i>). - Compare methods used to collect and package drug evidence. - Identify procedures used to collect and package plant substances, liquids, and biohazards.		PSS 12	HS-LS1-2 HS-LS1-3
Weeks 21-30 M/W/F Science Fair	How do forensic scientists plan and carry out investigations?	- Create an experimental research question. - Write a hypothesis to test a research question.	- Conference: Research Plan and Project Proposal - Activity: Research Notes	Career Ready Practices CRP 2,4,6,7,8,11,12	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1-6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	How do forensic scientists construct explanations and design solutions?	- Use credible sources to compile research on a topic. - Outline and draft a background research paper. - Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. - Display quantitative and qualitative data on a table and graphically. - Analyze data for patterns and trends. - Draft conclusions from data to support or abandon hypothesis and explain results. - Prepare a research presentation display board. - Present research conclusions to a public audience. - Reflect on and revise work.	- Writing Outline: Research Background - Reflection: Science Fair Journal - Conference: Experimental Design - Lab: Conduct Research Experiment - Activity: Gather and Display Data and Graph - Writing: Analyze Data and Summarize Conclusions - Project: Science Fair Display Board - Presentation: Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,3,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,2,3,4,5,6,7,8
				Industry Standards MF 2	Science NGSSP 1,3,4,5,6,7,8 HS-ETS1-1 HS-ETS1-2 HS-ETS1-3
Weeks 21-22 T/Th CRJ 101: Criminal Justice Systems Police as a Pillar of the Criminal Justice System	- How do police accomplish their goals within the framework of the U.S. criminal justice system? - What are the different types of policing? - What is community policing? - How are police integrated with courts and corrections?	- Identify components and levels of police agencies in the U.S. - Describe state, federal, and local law enforcement agencies, and their interaction with each other. - Survey duties assigned to local, state and federal law enforcement agencies. - Explain the role of police in the initial response and throughout the criminal justice process. - Describe the history of policing in the U.S., and consider the role of police departments in a democracy. - Assess the role of private law enforcement agencies.	- Chapter Quizzes - Chapter Summaries - Current Events Report of the Week	Career Ready Practices CRP 1,2,4,12	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.13 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 23-24 T/Th	What levels of courts exist in the U.S. criminal justice	Describe how the courts in the U.S. criminal justice system work as a check and balance for our	- Chapter Quizzes - Chapter Summaries - Current Events Report	Career Ready Practices CRP 1,2,4,8	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9 SL.11-12.1,2,4,5,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
CRJ 101: Criminal Justice Systems Courts as a Pillar of the Criminal Justice System	system? • What branch of government do courts fall under? • What roles exist in each level of the court system? • What qualifications are needed to serve as a judge/justice at different levels of the criminal justice system?	government. • Understand the right of due process and the 6 th amendment to the U.S. Constitution. • Understand the function of interpreting laws for the courts and give examples. • Describe how the courts shape the laws we abide by. • Explain the roles of district attorney, public defender, and attorney general in the court system.	of the Week		L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.13 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 25-26 T/Th CRJ 101: Criminal Justice Systems Corrections as a Pillar of the Criminal Justice System	• What is a jail? • What is prison? • What are probation and parole? • How does corrections support police and courts in the criminal justice system?	• Identify levels of corrections in the U.S. criminal justice system. • Describe recidivism and statistics that help shape sentencing. • Describe the similarities and differences between probation and parole. • Describe prison culture.	• Chapter Quizzes • Chapter Summaries • Current Events Report of the Week	Career Ready Practices CRP 2,4,5,8	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.13 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 27-28 T/Th CRJ 101: Criminal Justice Systems Individual Rights vs. Public Order	• What is meant by the “Scales of Justice”? • How does the criminal justice system keep individual rights and public order in balance?	• Describe how justice and equality apply to the criminal justice system. • Identify the decisions that have shaped how we balance rights and order. • Explain Posse Comitatus Act.	• Chapter Quizzes • Chapter Summaries • Current Events Report of the Week	Career Ready Practices CRP 2,4,5,8	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.13 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 29-30 T/Th	• What laws and constitutional	• Identify the laws and constitutional amendments that guarantee due	• Chapter Quizzes • Chapter Summaries	Career Ready Practices CRP 2,4,5,8	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
CRJ 101: Criminal Justice Systems Due Process	amendments guarantee due process? • How does due process affect police, courts, and corrections as pillars of the criminal justice system?	process. • Describe the roles of each pillar in due process. • Describe individual, police, and victim rights in due process. • Identify the cases in U.S. history that have addressed due process and the results of those cases.	• Current Events Report of the Week		SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.13 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 31-32 T/Th CRJ 101: Criminal Justice Systems Discretionary and Ethical Issues	• What are different discretionary and ethical issues in the criminal justice system and how do they affect the pillars of the criminal justice system?	• Identify different discretionary and ethical issues as they relate to law enforcement. • Describe the effects of ethical precedents on today's criminal justice system. • Recognize the significance of ethics and professionalism in policing. • Investigate legal issues surrounding the use of force, search and seizure, police corruption and racial profiling.	• Chapter Quizzes • Chapter Summaries • Current Events Report of the Week • Evidence in Uses of Police Force Cases (Michael Brown, etc.) • Case Studies: Legal Precedents in Contemporary Police Brutality Criminal Investigations • Blog: Criminal Justice Current Events News Story • NY Times Student Op-Ed Competition	Career Ready Practices CRP 2,4,5,7,8	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4,6,9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards LW 4	Literacy RST.11-12.1,3 WHST.11-12.2,4
				Pathway Standards LW-ENF 1,5	Math
				Industry Standards	Science
Weeks 31-34 Forensic Psychology	• What are the major structures of the central nervous system? • How are criminals profiled? • How reliable are the tests used to diagnose brain abnormalities? • Why do serial killers kill?	• Locate and identify the major organs of the nervous system: brain (cerebral cortex, cerebellum, lobes, and brainstem), and spinal cord. • Describe the three layers of meninges (dura mater, arachnoid mater, pia mater) and their importance. • Identify the three types of hemorrhage involving the meninges. • Identify and describe offender-	• Notes: Brain Anatomy and Nervous System • Interview of a Forensic Professional • Sibling Rivalry • Drive-By Shooting • Notes: Profiling Process Stages • Case Study: New York's Mad Bomber • Serial Killer Research	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.2,4,5,6,7,8,9 SL.11-12.1,2,4,5,6 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		profiling procedures: profiling input, decision process models, crime assessment, criminal profile, investigation, apprehension. - Describe the tests used to determine the cognitive and personality types of offenders and discuss the problems with these tests. - Describe and compare brain abnormalities, genetics, and environmental factors related to the criminal mind. - Compare and contrast a PET scan and an MRI in diagnosing brain abnormalities. - Describe the physiological functions measured by a polygraph machine. - Interpret data collected from a polygraph. - Explore the psychological aspects of a serial killer. - Define and compare different types of serial killers and explore their motives.		Industry Standards MF 4 PSS 6	Science NGSSP 1,2,3,6,7,8 HS-PS4-5 HS-PS4-6 HS-LS1-2 HS-LS1-3
Weeks 35-39 Forensic Ecology: Soil Analysis and Water Testing	How are soil and water samples tested?	- Describe the distinguishing characteristics of and compositions of different soils. - Compare the different soil layers found in a soil profile. - Analyze soils using macroscopic and microscopic examination, as well as physical and chemical testing. - Describe the effects of different physical and chemical compositions of soils on the decomposition of a corpse.	- Soil Evidence Examination - Chemical and Physical Analysis of Sand - Article: Lead Pipes in Flint - Inquiry Lead Testing	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1-3,5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		Test water samples for the presence of chemicals.		Industry Standards MF 1	Science NGSSP 1,2,3,6,7,8 HS-ESS2-3 HS-ESS3-4
Week 40 Mock Court Final Examination	What are the main learning goals for this past year in forensic science?	Complete the assessment demonstrating a thorough knowledge of forensic science.	- Mock Court - Final Examination	Career Ready Practices CRP 2,4,6,7,8,11	ELA RI.11-12.1,4 W.11-12.2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,4,10,12 ST-SM 1,2,4	Math
				Industry Standards MF 1-12 PSS 1-10	Science

Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI 300: Forensic Science 300 (SUPA Forensic Chemistry)



Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

Forensic Science 300 is the culminating course in the Forensic Science pathway. This course provides a broad overview of the Forensic Sciences and an in-depth exploration of analytical tools. As part of this course, students will enroll in Syracuse University Forensic Chemistry 113. Topics included are historic development and legal system, crime scene investigation, science, pseudoscience and the law, microscopy and methods in examining biological evidence, DNA, serology, anatomical evidence, forensic medicine, science fair, ecology, medicine and anthropology, chemical evidence, spectroscopy, toxicology, explosives and arson investigation, soil, glass and paint analysis, firearms, ballistics and impression evidence, forensic document analysis, forensic engineering, and behavioral science.

Pre-Requisites

CSI 100: Forensic Science 100 and CSI 200: Forensic Science 200

Course Objectives

Students will

1. Explain the professional, legal, and ethical responsibilities of Forensic Science professionals.
2. Document and process evidence from a crime scene.
3. Perform comparative analysis on forensic evidence (fingerprints, hair, ballistics, blood).
4. Plan and carry out investigations to address emerging research questions.
5. Engage in argument from evidence.
6. Research and address issues of crime in the community.

Integrated Academics

1 Integrated ELA Credit

Concurrent Enrollment College Credit: Upon successful completion of Forensic Science 300, students will earn 4 college credits for Forensic Chemistry 113 from Syracuse University

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials
- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbook

- Brown, R., & Davenport, J. (2016). *Forensic Science: Advanced Investigations*. Boston, MA: Cengage Learning.
- Saferstein, R. (2014). *Criminalistics: An Introduction to Forensic Science, 11th Edition*. New York: Pearson.
- Spencer, J. T. (2012). *Introduction to Forensic Science: The Science of Criminalistics*. Boston, MA: Cengage Learning.

Grading

These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

- 25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
- 25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
- 25% **Projects**
- 25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences

Assignments: In order to receive full credit, work must be complete before the bell rings on the day it is due. **Late or incomplete work is NOT accepted for full credit.** If an absence is excused, you will have as many days as you were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. **It is your responsibility to organize and keep track of your assignments!** Most work will be turned in as a packet at the end of a unit or electronically via email or other means.

Labs: Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.

Lab Safety: In case an accident occurs, report it immediately! Do not try to hide anything out of embarrassment - you will be making the situation worse, endangering yourself and others. Let the instructors decide on the proper course of action. Those not involved should clear the area.

Exams: It is YOUR responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following your return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.

Academic Integrity Policy: Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Additional Course Policies

All school policies shall be enforced at all times. Please refer to **SCSD's Code of Conduct, Character and Support**. Listed below are the expectations and rules in our classroom. The **3 R's (Respect, Responsibility, and Resilience)** are the keys to success in this class!

1. **Respect** everyone, including yourself, the class space, and class materials.

- *Respect yourself:* Use appropriate academic language and keep street language on the street. (No swearing, hurtful language).
 - *Respect others:* Know when to step back and when to step up. Raise your hand in class discussions before contributing. Actively listen when others are talking. Give Mr. Freeburg your attention quickly.
 - *Respect your classroom:* No food or drink when in lab. Clean up after yourself and leave things nicer than you found them.
2. **Act Responsibly.** Arrive on time and prepared for class. Begin the bellringer before the bell rings. Remain seated until the teacher (not the bell) dismisses at the end of class. Turn in work on time.
 3. **Practice Resiliency.** Actively and positively participate in class. Practice a growth mindset.

Consequences: Students are expected to behave according to the **3 R's** described above. Consequences for students who demonstrate inappropriate or unacceptable behavior include, but are not limited to: warning, confiscation or loss of privilege, removal from room/activity, loss of break/lunch time, detention, and parent conference. Consequences depend on the severity and consistency of the action or mutual agreement. Referral or parent notification may occur at any time depending on the nature of the incident.

Tardy: If you arrive after the bell, enter the room quietly and go directly to your seat. Multiple unexcused tardies in one week will have consequences (see above). If a tardy is excused, provide a pass to the teacher. Any necessary follow-up conversation should happen without disrupting class.

Cell phones and electronic devices: If there is an emergency, let the teacher know. Phones and electronic devices should be OFF and OUT OF SIGHT unless given approval for classroom use. They may not be charged in the classroom. After one warning, phones will be confiscated and returned at the end of the period. If this is a chronic issue, parents will be notified and privileges will be lost (see consequences above).

Food and Drink: Food and drink is a privilege in the classroom that must be earned and can be lost. See "Respect your classroom" above. No food and drink around lab spaces or technology.

Bathroom use: Students are not allowed in the hallway during class time without an escort. Do your best to use the bathroom at an appropriate time between class periods. Bathrooms will not be open during the first and last ten minutes of class. If you foresee this as an issue, please see the teacher ASAP.

Extra Help: If you are struggling, it is your responsibility to ask for help. The teacher is available at the office hours posted in the classroom. The best way to succeed in this class is to regularly do your best.

Communication: Assignments and grades will be posted online. Check often! The teacher will respond to calls/emails within two school days. The teacher will request a translator for lengthy conversations in other languages.

Course Calendar

Quarter	Units of Study
1	• Success in SUPA Forensic Chemistry • Evidence in the Legal System • Crime Scene Investigation • Science, Pseudoscience, and Statistics • Microscopy and Methods in Examining Biological Evidence
2	• DNA Analysis • Serology: Blood Spatter • Anatomical Evidence: Outside Story
3	• Careers in Forensic Medicine • Science Fair • Entomology and Soil in Death Investigation • Forensic Anthropology
4	• Chemical Evidence and Forensic Spectroscopy • Explosives and Arson Investigation • Physical Analysis of Glass and Other Trace Evidence • Firearms and Ballistics • Forensic Engineering and Computer Forensics • Behavioral Social Sciences: Psychology and Sociology • Portfolio Presentation

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI 300: Forensic Science 300 (SUPA Forensic Chemistry)



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 1 Unit 1 Success in SUPA Forensic Chemistry	- What are the expectations of a college course? - How can students prepare for success? - What are the professional, industry and academic skills required in the forensic science field?	- Describe study skills and strategies. - Explain the mindset, qualities and skills required for success in Forensic Science. - Present a personal action plan for success. - Exhibit appropriate behavior in the lab. - Demonstrate appropriate use of personal protective devices including safe removal of gloves. - Demonstrate proper handling of laboratory equipment and chemicals. including proper disposal and clean-up procedures. - Demonstrate proper hand washing technique. - Demonstrate the proper use of equipment. - Follow laboratory procedures. - Perform the steps of laboratory protocols accurately and in sequence. - Follow standard operating procedures for maintaining a lab manual. - Document laboratory work following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion).	- SUPA Registration - Article: Active Learning Strategies - Presentation: Active Learning Strategies - Poster Teach Back - Lab: Safety - Notes: Truth, Justice, Evidence - Argument: OK-Corral Shootout - Uniform Inspection	Career Ready Practices CRP 2,4,5,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.1,4,6 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 5 LW 5 ST 4	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	Math MP 5
				Industry Standards MF 2 PSS 1,5	Science NGSSP 3
Weeks 2-3 Unit 2	What are the professional legal and	Describe what is meant by the terms forensic science and	- Lab: Anthropometry - POGIL (Process Oriented	Career Ready Practices CRP 2,4,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4-9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Evidence in the Legal System	ethical responsibilities of forensic scientists?	criminalistics. • Explain the difference between a basic and an applied science. • Explain the relationship between the law, basic science, and applied science. • Define Locard's Exchange Principle. • Explain how fiction contributed to the development of forensics science. • Describe the features fictional detectives and modern forensics scientists have in common. • Define the CSI Effect and how it has influenced scientific evidence in the courtroom. • Describe the Principle of Individuality. • Explain how precedent cases pave the way for scientific evidence in the courtroom. • Explain the key features of the Frye and Daubert cases. • Explain how the Joiner, Khumo and Melendez-Dias cases affect expert testimony. • Define and describe vocabulary and concepts: <i>anthropometry, criminalistics, CSI effect, Daubert standard, forensic science, Frye standard, joiner case, Khumo tire case, Locard's exchange principle, Melendez-Dias, precedent, principle of comparison, principle of individuality, Sherlock Holmes, stare decisis.</i>	Guided Inquiry Learning): Historic Development of Forensic Science • Debate: New Jersey v. T.L.O. • Quiz 1: Ch. 1 • Reading Questions: JTS Ch. 1 • Ch. 1 Presentations		SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 1,5 LW 1,5,6 ST 4,5,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6,10, ST-SM 2,3,4	Math MP 1,2,4-6
				Industry Standards MF 1	Science NGSSP 1,2,6,7
Weeks 4-5 Unit 3	• How is a crime scene processed?	• Explain when evidence is admissible in court and what	• Debate: New Jersey v. T.L.O.	Career Ready Practices CRP 2,4,6,8,10,11	ELA RI.11-12.1,2,4,6 W.11-12.2,4,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Crime Scene Investigation	- What procedures are implemented at a crime scene and why are they important? - How is evidence collected and analyzed?	- circumstances might render it inadmissible. - Describe the difference between class and individual characteristics. - Describe what types of comparison analyses can be done and when they are used. - Explain what is meant by probative and prejudicial evidence. - Describe and dramatize search patterns. - Identify the steps taken from the beginning of a crime scene investigation all the way through the investigation itself. - List the details of each the jobs assigned during a crime scene investigation, and apply those skills to a model. - Recognize the importance of the use of chain of custody and search warrants. - Define and describe vocabulary and concepts: <i>comparison analysis, coordinate mapping, exclusionary rule, first responder, fruit of the poisonous tree doctrine, Mincy v. Arizona, Michigan v. Tyler, plain view doctrine, prejudicial evidence, probable cause, probative evidence, search warrant, triangulation.</i>	- Reading Questions: JTS Ch. 2 - Activity: Crime Scene Search Patterns - Activity: Crime Scene Reconstruction - Lab: Scavenger Hunt - Lab: Claymation - Digital (Sketch Up) or Physical (Doll House) Crime Scene Reconstruction - Lab: Fingernail Crud - Lab: Glitter Diatoms - Intro 1 Exam: Ch. 1 and 2.		SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 1,5 LW 1,5,6 ST 4,5,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1,5,6,10 ST-SM 2,3,4	Math MP 1,2,4-6
				Industry Standards MF 1	Science NGSSP 1,2,6,7 HS-ETS1-2
Weeks 6-8	- What is science? - What is pseudoscience? - How can scientific methods help solve problems? - How are statistics and	- Explain what is necessary for science. - Describe the scientific method and explain how it applies to forensic investigations. - Describe what is meant by pseudoscience and how it can be	- Science vs. Pseudoscience Mini-Video - Accuracy, Percent Error, Reliability - Metric System Notes - Dimensional Analysis Notes	Career Ready Practices CRP 2,4,5,8,11	ELA RI.11-12.1,2,4,6 W.11-12.1,4,6 SL.11-12.1,2,4,5,6 L.11-12.1-6
Unit 4 Science, Pseudoscience, and Statistics				Cluster Standards HL 1 LW 2,4,5	Literacy RST.11-12.1,2,3,4,7,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	probability used in forensic science? • How do we estimate the reliability of measurements?	identified. • Explain circumstantial evidence and describe its limitations. • Explain probability and statistics. • Describe how the probability of an events is determined. • Discuss how ethics are important in forensics science. • Calculate probabilities of class evidence. • Use the scientific method to solve an investigation, including all the steps of the method and an experiment. • Analyze, evaluate and critique scientific explanations by using data, logical reasoning, and observations. • Identify the components necessary for 'real' science. • Perform basic statistical analyses. • Distinguish between the types of microscopes utilized during the analyses of prominent physical and biological evidence gathered at the crime scene. • Define and describe vocabulary and concepts: <i>confirmatory test, distribution, error bars, ethics, frequency, hypothesis, likelihood ratio, mean, median, outcome, probability, pseudoscience, range, scientific method, standard deviation, standard operating procedure, statistics, theory.</i>	• Science vs. Pseudo-Science POGIL • Lab: Standard Deviation of M&M Bags • Lab: M&M Statistics • Lab: Statistical Analysis • Lab: Building a Lie Detector • Notes: SU Forensic Chemistry Professor Guest Speaker • Reading Questions: JTS Chapter 3 • Product Testing • Observation Experimental Design • Commercial Presentation	ST 2,6	WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,4,5,6,10,12 ST-SM 1,2,4	Math MP 1,2,3,4
				Industry Standards	Science NGSSP 3,4,5
Weeks 9-10 Unit 5 Microscopy and	• How do scientists accurately observe and measure evidence?	• Accurately measure and express precise measurements with correct units. • Explain the difference between	• Microscope Lab • Notes: Microscopy • Reading Questions: JTS, Ch. 4	Career Ready Practice CRP 2,8,11,12	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Methods in Examining Biological Evidence		accuracy and precision of measurements. • Explain the SI system of measurement and how it works. • Convert between units of measurement. • Calculate the uncertainty of a measurement using mean, median, mode, standard deviation, and probability. • Describe electromagnetic radiation and how we perceive it. • Describe the basic principles of microscope operation. • Explain how a lens works to create a magnified image. • Apply an understanding of resolution, magnification, numerical aperture, and related terms. • List the main types of optical microscopy and how they work. • Explain how electron microscopy works. • Describe other types of microscopy and when they are used. • Demonstrate proper use and handling of a compound microscope and a stereoscope.	• Intro 2 Exam: Ch. 3 and 4 • Digital Reconstruction (Sketch Up) • Evidence Photography • Reading and Questions on Forensic Photography • Presentation of Crime Scene Photos Using iMovie	Cluster Standards HL 1 LW 4 ST 1,2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 4 LW-ENF 1,5 ST-SM 1,2,4	Math
				Industry Standards MF 2 PSS 3	Science NGSSP 1,2,3,7,8 HS-PS4-5 HS-PS4-6
Weeks 11-14 Unit 6 DNA Analysis	• What is the structure of DNA? • What are the forensic applications of DNA? • How does mitochondrial DNA (mtDNA) and Y-chromosomal typing work?	• Describe how crime-scene evidence is processed to obtain DNA. • Demonstrate how to package, collect, and analyze DNA from a crime scene. • Diagram the DNA molecule. • Describe the chemical structure of DNA and how it holds genetic	• DNA Extraction • DNA POGIL • Reading Questions: JTS Ch 5 • DNA Genetic Record • DNA Profiling Interactive • Lab: Restriction Enzyme ID • Lab: DNA Extraction	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	What are DNA databanks and how are they used in forensic science?	information. - Compare genes, chromosomes, introns, and exons. - Explain what a short tandem repeat (STR) is, and explain its importance to DNA profiling. - Explain how law-enforcement agencies compare new to existing DNA evidence. - Describe the use of DNA profiling using mtDNA and Y STRs to help identify a person using the DNA of family members. - Identify the difference between variable number tandem repeats (VNTR) and short tandem repeats (STR). - Explain how the Restriction Fragment Length Polymorphism (RFLP) method works. - Show how the polymerase chain reaction (PCR)/STR method of DNA typing works. - Follow polymerase chain reaction laboratory procedures. - Explain how frequency of occurrences of STRs in populations is determined and used. - Explain how mtDNA can be used in forensic investigations. - Calculate the random match probability (RMP) of a genetic profile. - Describe how the Combined DNA Index Systems (CODIS) is used in criminal investigations. - Define and describe vocabulary and concepts: <i>allele</i>, <i>chromosome</i>, <i>DNA fingerprint (profile)</i>, <i>electrophoresis</i>, <i>exon</i>, <i>gene</i>,	- Lab: Muscular Dystrophy <i>Extension</i>: Crime Scene DNA - Paper PCR <i>Extension</i>: PCR-Lewinsky/Clinnton Scandal Activity <i>Extension</i>: Activity: Rape Case Study <i>Extension</i>: Romanova Case Study	Pathway Standards HL-BRD 2,3,4 LW-ENF 1,5,6,10,12 ST-SM 2,4 Industry Standards MF 11 PSS 2	Math MP 2,3,4,5,7 Science NGSSP 1,2,3,4,6,7,8 HS-LS1-1 HS-LS3-1 HS-LS3-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		<i>genome, intron, karyotype, polymerase chain reaction (PCR), polymorphism, primer, restriction enzyme, restriction fragment, short tandem repeat (STR), DNA extraction, homologous chromosome, nucleotide.</i>			
Weeks 15-17 Unit 7 Serology: Blood Spatter	- What is serology and how is it used to solve crimes? - How is blood identified at a crime scene? - How are blood patterns analyzed?	- Analyze stains to determine the presence of blood. - Interpret events through blood pattern analysis. - Analyze bloodstain patterns based on source, direction, and angle of trajectory. - Compare low, medium, and high velocity blood spatter. - Identify types of blood transfer patterns. - Identify different types of blood spatter patterns (drop, castoff, transfer, swipe, spurt, expired). - Properly perform and explain a presumptive blood test (Kastle-Meyer). - Preserve blood evidence according to proper procedures.	- Ernie's Exit Lab - Blood Basics Online (Computer Lab) - Blood Spatter Lab-Single and Multiple Droplets - Blood Spatter Lab (with Motion and Angle of Impact) - Dr. Neulander Case Blood Spatter - Lab: Catalase Enzyme Activity - Reading Questions: JTS Ch. 6	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1,3 LW 3,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 2,3,4,5,7
				Industry Standards MF 6 PSS 7	Science NGSSP 1,2,3,4,6,7,8 HS-PS2-3
Week 18-20 Unit 8 Anatomical Evidence: Outside Story	How is fingerprint evidence analyzed in a crime scene?	- Model the integumentary system. - Describe the structure of friction skin: sweat pore, sweat pore duct, sweat gland, papillae, dermis, epidermis, friction ridge. - Describe how can ridge patterns can be transferred and detected as fingerprints. - Describe fingerprint classification. - Describe the three fundamental principles of fingerprinting (first, second, and third principles). - Identify the first, second, and third	- Fingerprint Lab - Fiber Microscopy - Fiber Burn Testing - Reading Questions: JTS Ch 7 - Activity: Chemical Reactions Demonstration <i>Extension:</i> Op-Ed: Debunk FBI Hair Forensics - Activity: Skin Model - Fingerprint TRC Statistics Lab	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		degrees of fingerprinting. • Compare latent, plastic, and visible fingerprints. • Develop latent fingerprints using dusting, staining, and chemical fuming. • Develop a plastic fingerprint using a mold (wax, soap, putty, etc.). • Create and document visible fingerprints using digital photography. • Calculate total ridge count (TRC). • Define and describe vocabulary: <i>triangular</i> , <i>polygenic trait</i> , <i>triradius</i> . • Compare lab methods to develop fingerprints: ninhydrin, iodine fuming, cyanoacrylate, silver nitrate. • Use digital photography to compare and analyze fingerprints. • Select appropriate techniques for the development of latent prints on various surfaces. • Determine the reliability of fingerprints as a means of identification and discuss how criminals attempt to alter their fingerprints. • Describe the function of IAFIS (Integrated Automated Fingerprint Identification System). • Utilize the primary classification (the Henry System) “fraction” calculations. • Analyze the pores and spots between the friction ridges using tertiary classification. • Explain the ACEV (analysis, comparison, evaluation, and verification) method to reach a	• Fingerprinting Methods Lab • Iodine Fuming Demonstration • Ninhydrin Development • Superglue Fuming • Acidified Hydrogen Peroxide Brass Cartridge Cases • Demonstration: Latent Fingerprint Visualization Methods	Industry Standards MF 4 PSS 6	Science NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		determination on each print. • Utilize ALS (alternate light source) to identify a print. • Create and document visible fingerprints using digital photographs. • Define biometrics and explain how biometric information can be used. • Discuss the limitations and strengths of biometric information.			
Week 21-22 Unit 9 Careers in Forensic Medicine	• What is forensic pathology? • What are the medical careers in forensics?	• Analyze the role of forensic pathologists and anthropologists in investigations. • Identify career-related information that is relative to making career decisions. • Explain the processes and timelines of human death and decomposition. • Describe the role mitochondrial DNA in bone identification. • Describe the aspects of medicine are involved in a medicolegal practice. • Explain the duties and training for coroners and medical examiners (pathologists). • Interpret manner or death, cause of death, and mechanism of death. • Describe and apply the classifications for manner of death. • Perform a digital autopsy. • Investigate the major systems of the body. • Characterize the major types of trauma. • Define and describe vocabulary and concepts: <i>post-mortem interval</i> , <i>rigor mortis</i> , <i>livor mortis</i> , and <i>algor mortis</i> .	• Inquiry Body Farm Lab • Lab: Anthropometry • Reading Question: JTS Ch 8 • Video Autopsy • WebQuest-Virtual Autopsy • Life Masks: Biometrics of the Face • Human Forensic Anatomy POGIL • And the Dead Shall Speak Story, Video, Interview • Claude Snow • Grave at Vukovar • Billy the Kid • Bone identification • Footprint, pattern vs. height measurements • <i>Extension</i> : Interview of Professional Working in the Field of Forensic Science	Career Ready Practices CRP 2,4,8,10,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 1,2,4 ST 2, 6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards MF 7,9 PS 8,9,10,11	Science NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Weeks 23-26 Unit 10 Science Fair	- How do forensic scientists plan and carry out investigations? - How do forensic scientists construct explanations and design solutions?	- Create an experimental research question. - Write a hypothesis to test a research question. - Use credible sources to compile research on a topic. - Outline and draft a background research paper. - Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. - Create a paper and digital data table to collect quantitative and qualitative data. - Create a graph to display quantitative data. - Analyze data for patterns and trends. - Draft conclusions from data to support or abandon hypothesis and explain results. - Prepare a research presentation display board. - Present research conclusions to a public audience. - Reflect on and revise work.	- Conference: Research Plan and Project Proposal - Activity: Research Notes - Writing Outline: Research Background - Reflection: Science Fair Journal - Conference: Experimental Design - Lab: Conduct Research Experiment - Activity: Gather and Display Data and Graph - Writing: Analyze Data and Summarize Conclusions - Project: Science Fair Display Board - Presentation: Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	Career Ready Practices CRP 2,4,6,7,8,11,12	ELA RI.11-12.1,2,4,6 W.11-12.1,2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1-6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,3,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,2,3,4,5,6,7,8
				Industry Standards MF 2	Science NGSSP 1,3,4,5,6,7,8 HS-ETS1-1 HS-ETS1-2 HS-ETS1-3
Weeks 27-28 Unit 11 Entomology and Soil in Death Investigation	- How is the time of death determined? - What are the different fields of forensic ecology? - What are different methods of chemical analysis?	- Analyze physical and chemical properties of evidence collected from a crime scene. - Identify flies, maggots and pupa that visit a dead body. - Describe the insect life cycle. - Describe the make-up of soil. - Describe how soil affects the decomposition of dead bodies. - Distinguish between physical and chemical properties. - Determine the elements within a	- POGIL: Maggots to Murder - Forensic Entomology Notes - Lab: Anthropology - Lab: Entomology and Crime Solving Insects <i>Extension</i>: Body Farm Inquiry - Physical Characteristics of Soil Lab: Soil Density, Settling Time, Particle	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12	Math

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		compound or mixture. • Identify four types of chemical reactions. • Conduct assay phosphate concentrations in soil specimens. • Identify the spectroscopic characteristics of soil. • Extract ion species from a soil sample. • Use spectrometer to analyze samples.	Size Distribution • Microscopic Characteristics of Soil • Science of Mixtures • Milk Kaleidoscope Lab • Assay Lab • Reading Questions: JTS, Chapter 9	ST-SM 1,2,4 Industry Standards MF 7 PSS 9	Science HS-LS2-6
Weeks 29-30 Unit 12 Forensic Anthropology	• What is forensic anthropology and what can it tell us about human remains? • What role do anthropologists play in forensic science? • What is forensic radiology?	• Analyze the role of forensic pathologists and anthropologists in investigations. • Identify career-related information that is relative to making career decisions. • Describe the structure and function of the bones of the human body. • Describe how bone is formed. • Process a crime scene containing bones. • Describe the techniques used to excavate bones. • Determine if an object is bone or not. • Compare the composition and structure of human and animal bones. • Identify a bone as human. • Determine the age of a bone. • Describe how bones contain a record of injuries and disease. • Construct a biological profile from skeletal remains. • Distinguish between male and female skeletal remains based on skull, jaw, brow ridges, pelvis, and femur. • Determine the unique characteristic	• Skulls, Hips, and Femurs POGIL • Reading Questions: JTS Ch. 10 • Measurable You Inquiry Lab • Interview of Professional Working in the Field of Forensic Science • Bone Quiz • Who Is the Skeleton in the Closet? Lab • One Bite Out of Crime Forensic Odontology Lab • Claude Snow • Grave at Vukovar • Billy the Kid • Bone Identification • Footprint, Pattern vs. Height Measurements	Career Ready Practices CRP 2,4,8,10,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 1,2,4 ST 2, 6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards MF 7,9 PS 8,9,10,11	Science NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		of an individual (e.g. age, gender, race, and height) from his or her bones. • Explain the differences in facial structures among different races. • Prepare a facial reconstruction from a skull. • Examine someone's bones to gain insight into how they died. • Define forensic taphonomy. • Explain the processes and timelines of human death and decomposition. • Describe the role of mitochondrial DNA in bone identification.			
Weeks 31-33 Unit 13 Chemical Evidence and Forensic Spectroscopy	• How is chemical evidence analyzed? • How can paint chips be observed, compared, and used to prove ownership?	• Explain the difference between quantitative and qualitative chemical analysis. • Determine the key questions in deciding upon an analytical method. • Apply the basic concepts underlying atomic theory. • Utilize the Law of Conservation of Mass. • Balance chemical reactions in analytical chemistry. • Use the mole to solve chemistry problems. • Apply the chemical and physical properties of matter. • Describe mixtures and separate into their components. • Use chromatography to separate mixtures. • Use classical analytical chemistry methods. • Use gravimetric and volumetric analysis. • Identify the different components of	• Reading Questions: JTS Ch. 11 • Lab: Chromatography • Lab: Spectroscopy • POGIL: Spectroscopy and Chromatography • Reading Questions: JTS Chapter 12 • Lab: Paint Layer Determination	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards	Science NGSSP 1,2,3,6,7,8 HS-PS1-1 HS-PS1-8 HS-PS1-10 HS-PS2-6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		automobile paint. • Characterize the microscopic examination of paint. • List and define the techniques used in paint comparisons. • Explain how to properly collect and preserve paint evidence. • Perform gas chromatography (GC) spectrum analysis. • Conduct GC for to identify propellants in arson investigations.			
Week 34 Unit 14 Explosives and Arson Investigation	• How is arson investigated?	• Define fire and explain the fire tetrahedron. • Describe the chemical components of fire. • Define arson and identify its signs. • Describe the parts of a fire investigation. • Explain the four types of fires and give examples: natural, accidental, intentional, undetermined. • State the information that smoke and colors from a fire provide. • Describe the process of collection and preservation of arson evidence. • Explain the importance of the determination of the point of origin and give examples of different burn patterns: chimney effect, v patterns, char patterns, heat shadows. • State the characteristics of different accelerants: gasoline, kerosene, paint thinner, acetone, turpentine. • Give examples of the primary motives for arson: revenge, mental illness, crime concealment, monetary profit, malicious vandalism. • Explain the difference between fire	• Reading Questions: JTS Chapter 14 • Explosives/Arson: The Nightclub Fires of 2002 • 911 • NOVA: The Serial Arsonist • Death by Fire Case Study • Reading: Oklahoma City Bombing • Guest Speaker: Onondaga County Arson Investigator • World Trade Center Bombing	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1,3,5
				Industry Standards	Science NGSSP 1,2,3,6,7,8 HS-PS1-5 HS-PS1-6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		and explosions. • Identify and compare different types of explosives: primary explosives, low explosives, high explosives. • Describe the role of forensic science in relation to terrorism and homeland security.			
Week 35 Unit 15 Physical Analysis of Glass and Other Trace Evidence	• How do crime scene investigators examine glass? • How do investigators examine other kinds of trace evidence?	• Identify chemical and physical properties and changes. • Measure density and viscosity. • Determine refractive index and birefringence. • Explain the formation of color, color perception in additive and subtractive methods. • Calculate the direction of a projectile by examining glass fractures. • Compare the composition of glass fragments. • Correctly process trace evidence (e.g. fibers, blood, hair, glass, or soil) collected in a simulated crime scene. • Describe the electromagnetic spectrum and light characteristic including waves, wavelength, frequency, and speed. • Explain and utilize scientific technology, including various microscopes, types of lasers, and the spectrophotometer, that apply the properties of light to investigate trace evidence. • Determine the identity of trace evidence by applying scientific theories of light such as light refraction, diffraction, dispersion, and the atomic emission spectrum.	• Reading Questions: Chapter 15 • Forensic Glass Analysis Experiment • Density Phenomenon Beads • Density of Glass: The Flotation Method • Density: Displacement • Density Inquiry • Forensic Glass Quiz and Exam • Refractive Index (RI) of Glass by Submersion Lab • Observe and Compare Glass Shards • Alan Alda Flame Challenge: Science Communication Video Competition	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1-3,5
				Industry Standards MF 3	Science NGSSP 1,2,3,6,7,8 HS-PS1-1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 36 Unit 16 Firearms and Ballistics	How do crime scene investigators examine tool mark impressions, bullet fragments, and bullet holes?	- Explain the individual characteristics of tool marks. - Identify characteristics of bullet and cartridge cases. - Explain laboratory methodologies used to determine whether an individual has fired a weapon, such as identifying gunshot residue. - Describe the information available through the National Integrated Ballistics Information Network. - Discuss Goddard and ballistic issues of the Sacco and Vanzetti case. - Describe the caliber, gauge, mm measurements, firing pin markings, cartridge propellants, structure of cartridge and contents to analyze the origin of a bullet or casing. - Describe the differences among firearm types. - Categorize the lands and grooves on a shell casing.	- Reading Questions: JTS Chapter 16 - Tool Mark Analysis Experiment - Firearms and Trajectory Activity - Firearms and Tool Marks Examination - Firearms and Tool Marks Crossword Puzzle - Firearms ID certification - Lands and Grooves Lab - Marshmallow Shooters - JFK - Oscar Pistorius - Frontline: Ring of Fire-The Crisis of American Made Handguns - Ballistics NOVA: Who Shot JFK? - Frontline: Ring of Fire-The Crisis of American Made Handguns	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1-3,5
				Industry Standards	Science NGSSP 1,2,3,6,7,8
Week 37 Unit 17 Forensic Engineering and Computer Forensics	- What is the role of digital evidence in forensic investigations today? - How are digital documents analyzed?	- Discuss the role of the FBI, CIA, NSA, and Office of Homeland Security in the 21st Century. - Describe the process of security encryption. - Describe the process of identifying and securing digital evidence. - Analyze digital evidence.	- Reading Questions: JTS Chapter 18 - NOVA: Decoding Nazi Secrets - NOVA: Decoding Enigma 9/11 WTC Tower Collapse - Lab: Tower Building - Lab: Bridge Failure Forensic Analysis	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.4 SL.11-12.1 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math MP 1-3,5
				Industry Standards	Science NGSSP 1,2,3,6,7,8 HS-PS4-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 38-39 Unit 18 Behavioral Social Sciences: Psychology and Sociology	- What is criminal psychology and what does it tell us about criminal behavior? - Can we create a profile of a criminal/ serial killer?	- List key contributors and their work in the field of criminal profiling. - Explain the stages of the criminal profiling process. - Differentiate between the roles of the investigator and the profiler. - Compare an interview and an interrogation. - Describe the cognitive approach for interviewing. - Discuss special considerations for interviewing children. - Differentiate between the five common models of interrogation. - Explain the importance of objectivity in report writing.	- Reading: JTS Chapter 19 - Criminal Psychology and Profiling Exam - Analysis of Serial Killers - Fakebook Criminal Laboratory	Career Ready Practices CRP 2,4,8,11	ELA RI.11-12.1,4 W.11-12.2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1,2,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	Math
				Industry Standards	Science
Week 40 Unit 19 Portfolio Presentation	What are the main learning goals for this past year in forensic science?	Complete the assessment demonstrating a thorough knowledge of forensic science.	- Crime Scene Simulations - Crime Scene Reports - Develop a FS Career/Education Recruiting Presentation: College Entrance Requirements, etc. - Pathbrite Portfolios - Resumes	Career Ready Practices CRP 1,2,4,6,7,8,10,11,12	ELA RI.11-12.1,4 W.11-12.2,4-9 SL.11-12.1,2,4,5,6 L.11-12.1,2,6
				Cluster Standards HL 1 LW 5,6 ST 4,5	Literacy RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9
				Pathway Standards HL-BRD 6 LW-ENF 1 ST-SM 2,3,4	Math
				Industry Standards	Science