

# FORENSIC SCIENCE NXG SCIENCE STANDARDS

## HIGH SCHOOL

## FORENSIC SCIENCE CONTENT

S.HS.FS.1	identify evidence which encompasses materials establishing a link between a crime and its victim or a crime and its perpetrator:				
	• impressions (tire, tool, teeth, shoes)				
	• prints (finger, lip, voice)				
	• hair and fiber analysis				
	• drugs and poisons				
	• ballistics				
	• soil and pollen				
	• glass				
	• serology				
	• questioned documents.				
S.HS.FS.2	distinguish between types of evidence:				
	• testimonial				
	• physical: individual and class				
	• quantitative				
	• qualitative.				
S.HS.FS.3	analyze modes of transfer and the factors affecting persistence of evidence (Locard's Exchange Principle):				
	• indirect				
	• direct				
S.HS.FS.4	demonstrate steps of crime scene processing:				
	• Note-taking				
	• Photography				
	• Sketching to scale				
	• Evidence collection				
	• chain of custody.				
S.HS.FS.5	validate, classify, and analyze fingerprints as individual evidence:				
	• type				
	• pattern				
	• minutiae.				
S.HS.FS.6	model techniques of collecting and developing prints on various objects and textures:				
	• physical (dusting powders)				
	• chemical (ninhydrin, iodine, cyanoacrylate).				
S.HS.FS.7	examine the absorption and effects of toxins in the human body:				
	• alcohol				
	• drugs				
	• poisons.				
S.HS.FS.8	identify known and unknown substances utilizing the techniques of forensic toxicology:				
	• white powders				
	• blood alcohol				
	• over the counter/illicit drugs				
	• gas chromatography charts.				
	discuss and cite evidence of biological and chemical hazards and their impact on society and the environment:				

S.HS.FS.9	<ul style="list-style-type: none"> <li>• arson</li> <li>• bombs</li> <li>• bioterrorism</li> <li>• environmental terrorism.</li> </ul>				
S.HS.FS.10	<p>apply forensic entomology to assess a crime scene:</p> <ul style="list-style-type: none"> <li>• Berlese funnel</li> <li>• life cycles.</li> </ul>				
S.HS.FS.11	<p>analyze bones and teeth as forensic evidence:</p> <ul style="list-style-type: none"> <li>• type</li> <li>• articulation</li> <li>• origin</li> <li>• sex</li> <li>• age</li> <li>• race</li> <li>• stature</li> <li>• disease/injury.</li> </ul>				
S.HS.FS.12	<p>analyze the composition of blood as evidence:</p> <ul style="list-style-type: none"> <li>• ABO system</li> <li>• Rh factor</li> <li>• DNA fingerprinting.</li> </ul>				
S.HS.FS.13	<p>investigate forensic applications of chromatography:</p> <ul style="list-style-type: none"> <li>• inks and dyes</li> <li>• cosmetics</li> <li>• calculation of <math>R_f</math> values.</li> </ul>				
S.HS.FS.14	<p>explore earth science concepts as they relate to forensic science:</p> <ul style="list-style-type: none"> <li>• rock and mineral identification</li> <li>• classify soils' common constituents in relation to crime scene location.</li> </ul>				
S.HS.FS.15	<p>identify and describe agents and processes of degradation of evidence:</p> <ul style="list-style-type: none"> <li>• weathering</li> <li>• scavengers.</li> </ul>				
S.HS.FS.16	<p>solve multi-step problems involving velocity, acceleration, net force, and projectile motion during analysis of crime scene:</p> <ul style="list-style-type: none"> <li>• ballistics</li> <li>• vehicular collisions</li> <li>• blood spatter.</li> </ul>				
S.HS.FS.17	investigate and analyze forensic evidence utilizing optical and acoustical applications				
S.HS.FS.18	<p>utilize biometric techniques for forensic science investigations:</p> <ul style="list-style-type: none"> <li>• prints</li> <li>• recognition scans</li> <li>• anthropometry.</li> </ul>				
S.HS.FS.19	research and evaluate technological advances and careers related to the field of forensics.				

## HIGH SCHOOL ENGINEERING, TECHNOLOGY, AND APPLICATIONS OF SCIENCE

Topic	Engineering Design				
S.HS.ETS.1	analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.				

S.HS.ETS.2	design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.				
S.HS.ETS.3	evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.				
S.HS.ETS.4	use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.				

## HIGH SCHOOL SCIENCE LITERACY

Topic	Reading- Key Ideas and Details				
S.11-12.L.1	cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.				
S.11-12.L.2	determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.				
S.11-12.L.3	follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.				
Topic	Reading- Craft and Structure				
S.11-12.L.4	determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.				
S.11-12.L.5	analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.				
S.11-12.L.6	analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.				
Topic	Reading- Integration of Knowledge and Ideas				
S.11-12.L.7	integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.				
S.11-12.L.8	evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.				
S.11-12.L.9	synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.				
Topic	Reading- Range of Reading and Level of Text Complexity				
S.11-12.L.10	by the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.				
Topic	Writing- Text Types and Purposes				
S.11-12.L.11	write arguments focused on <i>discipline-specific content</i> :				
	introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons and evidence.				
	develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values and possible biases.				
	use words, phrases and clauses, as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.				
	establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.				
	provide a concluding statement or section that follows from or supports the argument presented.				
	write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes:				
	<ul style="list-style-type: none"> <li>introduce a topic and organize complex ideas, concepts and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures and tables), and multimedia when useful to aid comprehension.</li> </ul>				

S.11-12.L.12	<ul style="list-style-type: none"> <li>develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</li> </ul>				
	<ul style="list-style-type: none"> <li>use varied transitions and sentence structures to link the major sections of the text, create cohesion and clarify the relationships among complex ideas and concepts.</li> </ul>				
	<ul style="list-style-type: none"> <li>use precise language, domain-specific vocabulary and techniques such as metaphor, simile and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</li> </ul>				
	<ul style="list-style-type: none"> <li>provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</li> </ul>				
<b>Topic</b>	<b>Writing- Production and Distribution of Writing</b>				
S.11-12.L.13	produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.				
S.11-12.L.14	develop and strengthen writing as needed by planning, revising, editing, rewriting or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.				
S.11-12.L.15	use technology, including the Internet, to produce, publish and update individual or shared writing products in response to ongoing feedback, including new arguments or information.				
<b>Topic</b>	<b>Writing- Research to Build and Present Knowledge</b>				
S.11-12.L.16	conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.				
S.11-12.L.17	gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.				
S.11-12.L.18	draw evidence from informational texts to support analysis, reflection and research.				
<b>Topic</b>	<b>Writing- Range of Writing</b>				
S.11-12.L.19	write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes and audiences.				