Crime Scene Investigation

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Arkansas Department of Career Education
Model Framework

Course Title: **Crime Scene Investigation (Formerly Law Enforcement II)**

Career Cluster: **Law, Public Safety, Corrections & Security**

Secondary – School Improvement	
Course Number	494600 Credit:1
CIP Number	43.0111
Grade Level	9-12
Prerequisite	None
Course Type	Elective
Teacher Certification	603
CTSO	SKILLS
Facility Requirements	http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx
Industry Certifications	Emergency Telecommunicator Certification

Course Description:
The course provides students with methods and procedures employed in a crime scene investigation from discovery of evidence to its presentation in courts of law. Topics include how to secure a crime scene, how to recognize various types of forensic evidence, how to collect and preserve evidence, maintain chain of custody and avoid contamination of physical evidence and biological specimens.

Program Purpose/Structure:
The purpose of this instructional program is to prepare students to process crime scenes and perform the duties of a crime scene investigator.

Arkansas Department of Career Education
Student Performance Standards

Course Title: **Crime Scene Investigation** **Course Number:** **494600** **Course Credit:** **1**

Course Description: At the completion of the course the student will be able to:

1.0 Assess Procedures Related to Crime Scene Investigation

1.1 Examine the history and evolution of the field of forensic science
1.2 Examine the role and function of the Arkansas State Crime Lab
1.3 Investigate the responsibilities of the first police officer to arrive at a crime scene
1.4 Examine the complex steps required to properly process the crime scene
1.5 Investigate the concept of chain of custody.

2.0 Assess the Use of Fingerprinting Technology in Crime Scene Investigation

2.1 Investigate the fundamental principles of fingerprinting
2.2 Examine methods of detecting and identifying fingerprints

3.0 Make the Connection between Trace Evidence, the Crime Scene, and the Suspect

3.1 Investigate the use of forensics in examining hair and fibers
3.2 Investigate the use of forensics in soil analysis.
3.3 Investigate the use of forensics in the analysis of paint.
3.4 Investigate the use of forensics in the analysis of glass samples.

4.0 Analyze Ballistics, Tool Marks, and Other Impressions

4.1 Assess the use of bullet and cartridge comparisons in forensics.
4.2 Investigate how tool marks and other impressions may be used as evidence

5.0 Assess the Use of DNA in Forensic Science

5.1 Investigate the use of DNA as crime scene evidence.
5.2 Assess the use of the Combined DNA Index System

6.0 Investigate the Role Drug Identification Plays in Forensics

6.1 Examine the different classifications of drugs, assessing their impact on the body
6.2 Explore the collection, preservation and analysis of drug and alcohol evidence

7.0 Assess the Use of Forensic Serology in Crime Scene Investigations

7.1 Assess the need for and use of forensic blood-typing.
7.2 Interpret bloodstain patterns to reconstruct the crime scene

Standard 1.0 Assess Procedures Related to Crime Scene Investigation			
Performance Indicator 1.1 **Examine the history and evolution of the field of forensic science**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.1.1 Identify the primary contributors in the field of forensics.	• Research the primary contributors to the field of forensic science, developing a chart highlighting their accomplishments and contributions to the field.	R11-12.1 R11-12.2	
1.1.2 Assess the impact of forensic science on modern-day crime scene investigations.		R11-12.1 R11-12.2	
Performance Indicator 1.2 **Examine the role and function of the Arkansas State Crime Lab**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.2.1 Identify the various sections of the Arkansas State Crime Lab (ASCL), noting the functions of each.	• List various sections of AR State Crime Lab and their responsibilities.	R11-12.1	
1.2.2 Recognize physical evidence associated with a crime scene.		R11-12.2	
Performance Indicator 1.3 **Investigate the responsibilities of the first police officer to arrive at a crime scene**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.3.1 Assess crime scenes to determine the presence of a suspect and need for medical personnel.		R11-12.8	
1.3.2 Evaluate the need for additional law enforcement personnel at a crime scene.	• Role-play a crime scene investigation determine whether suspect is still present and if medical attention is necessary	SL11-12.1 SL11-12.1	
Performance Indicator 1.4 **Examine the complex steps required to properly process the crime scene**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.4.1 Formulate a plan to effectively process a crime scene.	• Describe proper procedures for conducting a systematic search of a crime scene for physical evidence including: o Overall photography o Locate and mark evidence o Up-close photography	SL11-12.2	

	o Additional overall photography o Collect evidence o Diagram crime scene • Conduct a mock crime scene search and process accordingly.		
1.4.2 Assess methods to package and secure different types of physical evidence.	• Properly seal evidence to prevent tampering and maintain integrity	R11-12.1	
Performance Indicator 1.5 **Investigate the concept of chain of custody.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.5.1 Explain how critical the chain of custody is when relating to evidence recovered at a crime scene.	• Create an evidence transmittal sheet	SL11-12.1a	
1.5.2 Explain how evidence is presented in a criminal case using the chain of evidence.	• Role play introduction of evidence in to a trial	SL11-12.1	
Standard 2.0 Assess the Use of Fingerprinting Technology in Crime Scene Investigation			
Performance Indicator 2.1 **Investigate the fundamental principles of fingerprinting**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.1.1 Examine the history of fingerprints.	• Create a timeline in order to have an understanding of how fingerprints are used today	R11-12.2	
2.1.2 Describe how fingerprints are used today to solve crimes.	•	SL11-12.1a	
2.1.3 Examine the composition of fingerprints.	• Name the composition of fingerprints • Discuss the significance of prints lifted at a crime scene	R11-12.1 R11-12.2	
2.1.4 Research and distinguish between the different fingerprint patterns.		R11-12.1	
2.1.5 Explain the difference between patent, latent and plastic prints.		SL11-12.1a L11-12.1c	
Performance Indicator 2.2 **Examine methods of detecting and identifying fingerprints**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

2.2.1 Research methods of locating fingerprints.	• Demonstrate the use of oblique lighting. • Demonstrate the use of fingerprint powders.	R11-12.2 R11-12.3	
2.2.2 Examine different surface types and determine the likelihood of gathering prints.		R11-12.2	
2.2.3 Examine how fingerprints are developed, processed and preserved	• Demonstrate the different types of powders used to process prints • Discuss superglue/CAE fuming and when it would be used • Discuss Ninhydrin and when it would be used • Construct a superglue/CAE fuming tank • Locate and lift a fingerprint and place on lift card with appropriate information	SL11-12.1a R11-12.2 R11-12.3	
2.2.4 Determine the number of matching points necessary to confirm a fingerprint match.		R11-12.8	
2.2.5 Investigate the use of the Automated Fingerprint Identification System (AFIS) in connecting suspects to the crime scene.		R11-12.2	
Standard 3.0 Make the Connection Between Trace Evidence, the Crime Scene, and the Suspect			
Performance Indicator 3.1 Investigate the use of forensics in examining hair and fibers	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.1.1 Distinguish between the different parts of hair and what the criminalist looks for to make comparisons.	• Use microscope to determine similarities and inconsistencies.	R11-12.2	
3.1.2 Assess the types of fiber seen by the forensic scientist.	• Differentiate between natural and synthetic fibers	R11-12.2	
3.1.3 Explain collection methods used and the skills needed to collect and preserve fiber evidence.		SL11-12.1a	
3.1.4 Investigate the comparison between known and unknown hair and fiber samples.	• Use microscope to determine similarities and inconsistencies.	R11-12.2	

Performance Indicator 3.2 **Investigate the use of forensics in soil analysis**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.2.1 Investigate soil makeup and explain soil's importance to the crime scene.	• Determine differences in soil based on geographical locations	R11-12.1	
3.2.2 Research collection methods for soil.		R11-12.2	
3.2.3 Investigate the comparison between known and unknown soil samples.		R11-12.2	
Performance Indicator 3.3 **Investigate the use of forensics in the analysis of paint.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.3.1 Explore situations in which paint would be indispensable in solving a crime.	• Compare types of commonly used paints •	R11-12.2	
3.3.2 Research collection methods for paint.		R11-12.1	
3.3.3 Investigate the comparison between known and unknown paint samples.	• Determine how many times a vehicle has been painted	R11-12.2	
Performance Indicator 3.4 **Investigate the use of forensics in the analysis of glass samples.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.4.1 Investigate the break patterns in glass found at crime scenes.	• Compare fractured edges for "jigsaw" confirmation back to comparative source.	R11-12.2	
3.4.2 Research collection methods for glass.		R11-12.1	
3.4.3 Investigate the comparison between known and unknown glass samples	• Compare glass shards to link suspect to crime scene	R11-12.2	
Standard 4.0 Analyze Ballistics, Tool Marks, and Other Impressions			
Performance Indicator 4.1 **Assess the use of bullet and cartridge comparisons in forensics.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

4.1.1 Investigate the unique ways in which bullets and cartridges are marked by individual weapons.	• Using research, explain the unique markings/striations caused by a bullet traveling down the barrel of a gun • Explain the comparison between the crime scene bullet and the known test fired bullet.	R11-12.1 R11-12.2	
4.1.2 Examine how automated firearms systems work and how the systems are important to firearms identification.	• Explain NIBIN (National Integrated Ballistics Information Network) and how it provides investigative leads.	R11-12.2	
4.1.3 Research the importance of gunshot residue (GSR) to the forensic investigation.	• Demonstrate steps in performing GSR test. • Explain the process of how the GSR is submitted for testing, explaining how residues can be used to identify the shooter of a firearm.	SL11-12.1a R11-12.1	
4.1.4 Investigate the ways in which firearm serial numbers can be restored and the process of restoration.	• Explain and demonstrate the procedure for restoring serial numbers which have been removed from firearms.	SL11-12.1 R11-12.3	
4.1.5 Explain how to recover and preserve firearm evidence	• Demonstrate the proper way to ensure a weapon is made safe prior to collecting and storage	SL11-12.1a	
Performance Indicator 4.2 Investigate how tool marks and other impressions may be used as evidence.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.2.1 Explain how a tool mark is made and how it can be used as evidence.	• Use various tools and surfaces to demonstrate the marks left by the tools of the trade • Match tools back to the impressions they have left		
4.2.2 Research and examine other impressions and how they have been used for comparison in forensic cases.	• Demonstrate tire mark retrieval • Demonstrate footwear impression retrieval	R11-12.1	
4.2.3 Examine methods for documenting and collecting impressions.		R11-12.2	
Standard 5.0 Assess the use of DNA in Forensic Science			
Performance Indicator 5.1 Investigate the use of DNA as crime scene evidence.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.1.1 Discuss the history of DNA and how it pertains to solving crimes.	• Discuss websites such as “The Innocence Project” • Review the data of the scientific certainty of a DNA profile	SL11-12.2	

5.1.2 Research DNA to understand the complex structure and decoding, explaining the difference between nuclear and mitochondrial DNA.	• Use DNA Necklace classroom kit to allow students to extract their own DNA and develop their profile	R11-12.3	
5.1.3 Investigate the importance of proper collection and storage of DNA evidence.	• Explain the need for cold storage	SL11-12.1a R11-12.1	
5.1.4 The student will investigate the importance of semen characterization and testing in sex related crimes.	• Discuss the importance of DNA in solving sexual crimes	SL11-12.3 R11-12.3	
5.1.5 Assess the contents and use of sexual assault evidence collections kits and the preservation of the collected evidence.	• Discuss sexual assault kits. • Discuss the role of forensic (SANE) nurse	SL11-12.1c	
Performance Indicator 5.2 Assess the use of the Combined DNA Index System (CODIS).	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.2.1 Explore what the criteria is for a DNA profile to be submitted to the CODIS databank		R11-12.2	
5.2.2 The student will understand how CODIS is used to store profiles of convicted offenders, unsolved crimes-scene evidence, and profiles of missing people	• Explain how evidence submitted to the crime lab is compared to DNA profiles stored in CODIS	R11-12.2	
Standard 6.0 Investigate the Role Drug Identification Plays in Forensics			
Performance Indicator 6.1 Examine the different classifications of drugs, assessing their impact on the body.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.1.1 Distinguish between drug classifications and their effects on the body.	• List the different classifications of drugs, researching the effects of each on the body.	R11-12.1	
6.1.2 Describe the how alcohol intoxication works in the human body.	• Bring in guest speaker such as narcotics officer or pharmacist • Bring drug dog into class	SL11-12.2	

	• Drug Recognition Expert (DRE) • Use simulation goggles or contact state police for DUI presentation/demonstration		
Performance Indicator 6.2 Explore the collection, preservation and analysis of drug and alcohol evidence.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.2.1 Investigate how drug screening tests work and the different color tests used to identify certain drugs.	• Show field drug analysis kits and how they work	R11-12.1	
6.2.2 Describe the process of gas chromatography in determining blood alcohol levels in the human body.		SL11-12.2	
6.2.3 Chronicle evidence collection and proper preservation techniques for drug and alcohol evidence.	• Demonstrate the use of the Blood Alcohol Content test • Explain how urinary and blood samples are collected, discussing the importance of cold storage.	SL11-12.1a R11-12.1	
Standard 7.0 Assess the Use of Forensic Serology in Crime Scene Investigations			
Performance Indicator 7.1 Assess the need for and use of forensic blood-typing.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.1.1 Distinguish between the types of tests used to determine blood type.		R11-12.1a	
7.1.2 Assess the use of chemicals in detecting the presence of blood.	• Demonstrate Phenolphthalein use	R11-12.3	
7.1.3 Identify the chemicals used to enhance the detection of blood.	• Demonstrate Luminol use • Demonstrate Leucocrystal Violet use	R11-12.2	
7.1.4 Examine tests used to distinguish between animal and human blood.	• Demonstrate OBTI human blood test	R11-12.2	

Performance Indicator 7.2 **Interpret bloodstain patterns to reconstruct the crime scene.**	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.2.1 Investigate how the location, distribution, and appearance of bloodstains and spatters are useful.	• Use bloodstain patterns to determine direction of travel and impact angle. • Determine relative position and movement of victim and assailant	R11-12.3	
7.2.2 Assess the need for and methods of documenting blood spatters.	• Using brightly-colored string as markers, apply mathematical equations to determine the point of convergence.	R11-12.3	

Common Core State Standards Grades 9-12

ELA Speaking and Listening Standards Grades 9-10

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. **SL9-10.1**
    a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL9-10.1a**
    b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. **SL9-10.1b**
    c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. **SL9-10.1c**
    d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **SL9-10.1d**
2. Integrate multiple sources of information presented in diverse media or format(e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **SL9-10.2**
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **SL9-10.3**
4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. **SL9-10.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL9-10.5**

ELA Speaking and Listening Standards Grades 11-12

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. **SL11-12.1**
    a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL11-12.1a**
    b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. **SL11-12.1b**

c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. **SL11-12.1c**
d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task. **SL11-12.1d**

2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. **SL11-12.2**
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used. **SL11-12.3**
4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. **SL11-12.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL11-12.5**

ELA Language Grades 9-10

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. **L9-10.4**
   a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L9-10.4a**
   b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy). **L9-10.4b**
   c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. **L9-10.4c**
   d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). **L9-10.4d**
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L9-10.6**

ELA Language Grades 11-12

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies. **L11-12.4**

a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L11-12.4a**
b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable). **L11-12.4b**
c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. **L11-12.4c**
d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary **L11-12.4d**

6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L11-12.6**

Reading Standards for Literacy in Science and Technical Subjects Grades 9-10

1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **R9-10.1**
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **R9-10.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **R9-10.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. **R9-10.4**
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). **R9-10.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. **R9-10.6**
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **R9-10.7**
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. **R9-10.8**
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. **R9-10.9**
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **R9-10.10**

Reading Standards for Literacy in Science and Technical Subjects Grades 11-12

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. **R11-12.1**
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. **R11-12.2**
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. **R11-12.3**
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. **R11-12.4**
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **R11-12.5**
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. **R11-12.6**
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. **R11-12.7**
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. **R11-12.8**
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. **R11-12.9**
10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently. **R11-12.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9-10

1. Write arguments focused on discipline-specific content. **W9-10.1**
    a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. **W9-10.1a**
    b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. **W9-10.1b**
    c. Use words, phrases, and clauses 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. **W9-10.1c**
    d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.1d**
    e. Provide a concluding statement or section that follows from or supports the argument presented. **W9-10.1e**

2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W9-10.2**
   a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W9-10.2a**
   b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W9-10.2b**
   c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. **W9-10.2c**
   d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. **W9-10.2d**
   e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.2e**
   f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). **W9-10.2f**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W9-10.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
   W9-10.4
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W9-10.5**
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **W9-10.6**
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W9-10.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **W9-10.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W9-10.9**
10. 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. **W9-10.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 11-12

1. Write arguments focused on discipline-specific content. **W11-12.1**

a. 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. **W11-12.1a**
b. 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. **W11-12.1b**
c. 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. **W11-12.1c**
d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W11-12.1d**
e. Provide a concluding statement or section that follows from or supports the argument presented. **W11-12.1e**

2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W11-12.2**
   a. 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, tables), and multimedia when useful to aiding comprehension. **W11-12.2a**
   b. 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. **W11-12.2b**
   c. 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. **W11-12.2c**
   d. 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. **W11-12.2d**
   e. 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). **W11-12.2e**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W11-12.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
   W11-12.4
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W11-12.5**
6. 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. **W11-12.6**

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W11-12.7**
8. 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. **W11-12.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W11-12.9**
10. 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. **W11-12.10**

Common Career and Technical Core Standards

Science, Technology, Engineering & Mathematics Career Cluster

Science, Technology, Engineering & Mathematics Career Cluster Standards (ST)

1. Apply engineering skills in a project that requires project management, process control and quality assurance. **ST1**
2. Use technology to acquire, manipulate, analyze and report data. **ST2**
3. Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. **ST3**
4. Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy. **ST4**
5. Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways. **ST5**
6. Demonstrate technical skills needed in a chosen STEM field. **ST6**

Engineering & Technology Career Pathway (ST-ET)

1. Use STEM concepts and processes to solve problems involving design and/or production. **ST-ET1**
2. Display and communicate STEM information. **ST-ET2**
3. Apply processes and concepts for the use of technological tools in STEM. **ST-ET3**
4. Apply the elements of the design process. **ST-ET4**
5. Apply the knowledge learned in STEM to solve problems. **ST-ET5**
6. Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner. **ST-ET6**

Common Career and Technical Core Career Ready Practices (CCTC CRP)

Career Ready Practices (CRP)

Documenting students as “career ready” is difficult but career-ready individuals are employable because of the value added to the employer.

1. Act as a responsible citizen in the workplace and the community. **(CRP1)**
Career-ready individuals understand the obligations and responsibilities of being a member of a community, and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them and think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

2. Apply appropriate technical skills and academic knowledge. **(CRP2)**
Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and other work related practices.

3. Practice personal health and understand financial literacy. **(CRP3)**
Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

4. Communicate clearly, effectively, and with reason. **(CRP4)**
Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others; are active listeners and speak clearly and with purpose, and are comfortable with the terminology common to the workplace environment. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

5. Understand the environmental, social, and economic impacts of decisions made. **(CRP5)**
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact on other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials and adhere to regulations affecting the nature of their work. They are cognizant of the impact on the social condition, the environment, workplace, and profitability of the organization.

6. Demonstrate creativity and innovation. **(CRP6)**

Career-ready individuals recommend ideas that solve problems in new and different ways that contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek out new methods, practices, and ideas from a variety of sources and apply\those ideas to their own workplace practices.

7. Employ valid and reliable research strategies. **(CRP7)**
Career-ready individuals employ research practices to plan and carryout investigations, create solutions, and keep abreast of the most current findings related to the workplace environment and practices. They use a reliable research process to search for new information and. Confirm the validity of sources when considering the use and adoption of external information or practices.

8. Utilize critical thinking to make sense of problems and persevere in solving them. **(CRP8)**
Career-ready individuals recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider options to solve the problem and once agreed upon, follow through to ensure the problem is resolved.

9. Model integrity, ethical leadership, and effective management. **(CRP9)**
Career-ready individuals consistently act in ways that align to personal and community held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and recognize the short—term and long—term effects that management's actions and attitudes can have on productivity, morale and organizational culture.

10. Develop an education and career plan aligned to personal goals. **(CRP10)**
Career-ready individuals take personal ownership of their own educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process, and that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

11. Apply technology to enhance productivity. **(CRP11)**
Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks--personal and organizational–of technology applications, and they take actions to prevent or mitigate these risks.

12. Work productively in teams while integrating cultural/global competence. **(CRP12)**

Career-ready individuals positively contribute to every team as both a team leader and team member. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.