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| **UNIT 6: Serology / DNA****Forensic Science / Grade 12** | **Estimated Unit Length**: 4 Week**Date Created**: August, 2016 |

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| **The students will understand . . .** | **Essential Questions:** |

**Unit Components/Sub-Headings**

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| **Introduction to Serology** | **The Nature of Blood** | **Immunoassay** | **Forensic Characterization of Bloodstains** | **Principles of Heredity** | **Forensics and DNA** | **Biological Evidence** |

**Knowledge—The students will know . . .**

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| **Concepts/Topics**IntroductionThe Grim SleeperVocabularyAcid PhosphataseAgglutinationAlleleAntibodyAntigenAntiserumAspermiaChromosomeBuccal CellsHuman GenomeHybridization | **Concepts/Topics**Antigens and AntibodiesBlood TypingVocabularyEnzymeErythrocyteGemeGenotypeHemoglobinHeterozygousSerologyChromosomesMitochondriaMultiplexing | **Concepts/Topics**Collection and Evaluation TechniquesVocabularyHomozygousHybridoma CellsLocusLuminolMonoclonal Anti..OligospermiaBase PairingDNANucleotidePCR | **Concepts/Topics**Color testsLuminol and BluestarMicrocrystallinePrecioitin TestGel DiffusionVocabularyPhenotypePlasmaPolyclonalPreciptinElectrophoresisPrimerProteins | **Concepts/Topics**Genes and ChromosomesPaternity TestingSemenRape EvidenceVocabularySerumSpermX-ChromosomeY-ChromosomeZygoteEpithelial CellsReplicationRestriction Enzymes | **Concepts/Topics**Understanding DNAReplication of DNAPCRDNA Tandem RepeatsPCRSTRsElectrophoresisSex IdentificationMitochondrial DNAVocabularyAmelogeninAmino AcidsRFLPs | **Concepts/Topics**CODISBiological EvidencePacking EvidenceDNA SpecimensContamination of DNAVocabularySequencingSTRsSubstrate ControlTandem RepeatTouch DNAY-STRs |

 **Objectives and Standards: Skills---The students will be able to . . .**  **Assessments/Evidence**

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| List the A\_B\_O antigens and antibodies found in the blood for the each of the four blood types (HS-LS1-1)Understand how whole blood is typed. (HS-LS1-1)List and describe forensic tests used to characterize a stain of blood (HS-LS1-1)Understand the concept of antigen-antibody interactions and how they are applied to species identification and drug identification (HS-LS1-3)Contrast chromosome and Genes. (HS-LS4-2)Learn how the Punnett square is used to determine the genotype and phenotypes of offspring. (HS-LS4-2)List the laboratory tests necessary to characterize seminal stains (HS-LS1-2)Explain how suspect blood and semen stains are properly preserved for laboratory examination (HS-LS1-2)Describe the proper collection of physical evidence in a rape investigation (Hs-LS1-3) | * Bell-Ringer
* Journal Activities
* Exit-Slips
* Exams
* Quizzes
* Small Group (Team Activities)
* Experiments
* Projects
* Presentations
* Case Studies
* Vocabulary
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**Instructional Resources/Materials**

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| * Forensic Science: An Introduction, Second Edition
* Forensic Science: From the Crime Scene to the Crime Lab, Third Edition
* Criminalistics: An Introduction to Forensic Science, Eleventh Edition
* Criminalistics; An Introduction to Forensic Science, Lab Manual (8th Edition)
* Crime Science; Methods of Forensic Detection
 | * Forensic Science: An Introduction, Second Edition
* Forensic Science: From the Crime Scene to the Crime Lab, Third Edition
* Criminalistics: An Introduction to Forensic Science, Eleventh Edition
* Criminalistics; An Introduction to Forensic Science, Lab Manual (8th Edition)
* Crime Science; Methods of Forensic Detection
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**Highlight or bold at least one Reading and one Writing standard for each unit of study. Other content areas can replace their content area title in the text.**

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| **Science and Technology Literacy Standards Grades 9-10** | **Science and Technology Literacy Standards Grades 11-12** | **Writing Standards** |
| RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. | RST.11-CCR.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. | WHST. 1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. |
| RST.9-10.2 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. | RST.11-CCR.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. | WHST. 2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content. |
| RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. | RST.11-CCR.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. | WHST. 3 Write narratives to develop real or imagined experiences or events using effective techniques, well-chosen details and well-structured event sequences. |
| RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. | RST.11-CCR.4Determine 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. | WHST. 4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. |
| RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). | RST.11-CCR.5Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. | WHST. 5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.  |
| RST.9-10.6 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. | RST.11-CCR.6Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. | WHST. 6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. |
| RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. | RST.11-CCR.7Integrate 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. | WHST. 7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation. |
| RST.9-10.8 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. | RST.11-CCR.8Evaluate 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. | WHST. 8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. |
| RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. | RST.11-CCR.9Synthesize 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. | WHST. 9 Draw evidence from literary or informational texts to support analysis, reflection, and research. |
| RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. | RST.11-CCR.10By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently. | WHST.10 11-CCR 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. |