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| **UNIT 9: Metals, Paints and Soil**  **Forensic Science / Grade 12** | **Estimated Unit Length**: 2 Week  **Date Created**: August, 2016 |

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

**Unit Components/Sub-Headings**

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| **Introduction** | **Forensic Analysis of Trace Elements** | **Forensic Examination of Paint** | **Forensic Analysis of Soil** |  |  |  |

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

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| Concepts/Topics  Introduction  Green River Killer  Vocabulary  Alpha Participles  Atomic Mass  Atomic Number  Beta Particle  Continuous Spectrum  Electron  Electron Orbital  Emission Spectrum | Concepts/Topics  JFK Assassination  Atomic Structure  Isotope and Radioactivity  Neutron Activation Analysis  Vocabulary  Excited State  Gamma Ray  Isotope  Line Spectrum  Mineral | Concepts/Topics  Composition of Paint  Microscopic Examination of Paint  Analytical Techniques of Paint  Paint Evidence  Collection and Preservation of Paint Evidence  Vocabulary  Neutron  Isotope  Line Spectrum | Concepts/Topics  Significance of Soil Evidence  Forensic Examination of Soil  Variations in Soil  Collection and Preservation of Soil Evidence  Vocabulary  Mineral  Neutron  Nucleus  Proton  Pyrolysis  Radioactivity | **Unit Vocabulary/ Concepts/Topics** | **Unit Vocabulary/ Concepts/Topics** | **Unit Vocabulary/ Concepts/Topics** |

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

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| Describe the usefulness of trace elements for Forensic comparison of various types of physical evidence. (HS-LS2-1)  Define and distinguish protons, neutrons, and electrons HS-LS2-1)  Define and distinguish atomic number and atomic mass number (HS-LS2-2)  Explain the concepts of isotopes (HS-LS2-2)  Understand how elements can be made radioactive. (HS-LS2-2)  List the most useful examination for preforming a Forensic Comparison of paint (HS-LS2-6)  Distinguish continuous and line emission spectra (HS-LS2-6)  Understand the parts of a simple emission spectrograph (HS-LS2-6)  Appreciate the phenomenon of how an atom absorbs and releases energy in the form of light (HS-LS2-7)  Describe proper collection and preservation of Forensic Paint Evidence (HS-LS2-7)  List the important Forensic Properties of soil. (HS-LS2-6)  Describe proper collection of soil evidence. (HS-LS$-6) | * Bell-Ringer * Journal Activities * Exit-Slips * Exams * Quizzes * Small Group (Team Activities) * Experiments * Projects * Presentations * Case Studies * Vocabulary |

**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 |

**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.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. | 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.5  Analyze 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.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. | 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.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. | 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.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. | 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.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. | 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.10  By 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. |