|  |  |
| --- | --- |
| **UNIT 3: Properties of Matter and The Analysis of Glass**  **Forensic Science / Grade 12** | **Estimated Unit Length**: 3 Week  **Date Created**: August, 2016 |

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

**Unit Components/Sub-Headings**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Introduction** | **Properties of Matter** | **Nature of Matter** | **Theory of Light** | **Physical Properties** | **Forensic Analysis of Glass** |  |

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Unit Vocabulary/ Concepts/Topics**  Introduction  The Lindbergh Baby  Vocabulary  Mass  Matter  Periodic Table  Phase  Photon  Physical Property  Physical State  Refraction  Wavelength | **Unit Vocabulary/ Concepts/Topics**  Properties of Matter  Vocabulary  Amorphous Solid  Atom  Becke Line  Birefringence  Celcius Scale  Chemical Property  Compound  Concentric Fracture  Refractive Index  Weight | **Unit Vocabulary/ Concepts/Topics**  The Nature of Matter  Elements and Compounds  States of Matter  Vocabulary  Crystalline Solid  Density  Dispersion  EM Spectrum  Solid  X-ray | **Unit Vocabulary/ Concepts/Topics**  Theory of Light  Light as a Wave  Light as a Particle  Vocabulary  Element  Fahrenheit Scale  Frequency  Gas  Intensive Properties  Laminated Glass | **Unit Vocabulary/ Concepts/Topics**  Physical Properties of Matter  Temperature  Weight and Mass  Density  Refractive Index  Vocabulary  Laser  Liquid  Radial Fracture  Sublimation | **Unit Vocabulary/ Concepts/Topics**  Forensic Analysis of Glass  Composition of Glass  Comparing Glass Fragments  Measuring and Comparing Density  Determining and Comparing Refractive Index  Classification of Glass Samples  Glass Fractures  Collection and Preservation of Glass Evidence |  |

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

|  |  |
| --- | --- |
| Define and distinguish the physical and chemical properties of matter. (HS\_LS1-6)  Understand how to use the basic unit of the metric system. (HS-LS!-6)  Define and distinguish elements and compounds. (HS-LS!-6)  Contrast the differences between solid, liquid and gas. (HS-LS1-6)  Understand the difference between the wave and particle theories of light. (HS LS2-3)  Understand and explain the dispersion of light through a prism. (HS-LS2-3)  Describe the electromagnetic spectrum. (HS-LS2-3)  Define and understanding the properties of density and refractive index. (HS-L2-3)  List and explain forensic methods for comparing glass fragments (HS-LS1-1)  Understand how to examine glass fractures to determine the direction of impact for a projectile. (HS-LS1-7) | * Bell-Ringer * Journal Activities * Exit-Slips * Exams * Quizzes * Small Group (Team Activities) * Experiments * Projects * Presentations * Case Studies * Vocabulary |

**Instructional Resources/Materials**

|  |  |
| --- | --- |
| * 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.**

|  |  |  |
| --- | --- | --- |
| **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. |