Learning that works for Washington CTE™

Updated 8.2022

Nooksack Valley High School Forensics

Course: Forensic Science		**Total Framework Hours: 180**
CIP Code: 430106	☐**Exploratory** ☒**Preparatory**	**Date Last Modified: 5/08/23**
Career Cluster:	**Law & Public Safety Corrections & Security**	**Cluster Pathway:** **Skilled and Technical Sciences**

To duplicate this blank table (for additional units), select the table, select copy, place cursor below the first table, and select paste.

COMPONENTS AND ASSESSMENTS

Performance Assessments:
Students will:

- Describe the process of evidence collection.
- Understand the workings of the classroom, the process and procedures that are in place to facilitate a collaborative learning environment.
- Use deductive reasoning to synthesize a situation where only partial information is known.
- Create an argument for and against the use of eye witness testimony in crime scene investigation.

Leadership Alignment: Each of the four teams will take turns "searching" another group's scene for evidence. Each team will video their work and showcase to their classmates for a critique.

- 1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 7.B.2 Deal positively with praise, setbacks and criticism

Standards and Competencies

Unit: C-2 Crime Scene Investigation and Evidence Collection

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 20**

Students will articulate their understanding of physical evidence processing they have collected and processed

- C-2.3 The Team: Student will communicate, participate, and advocate effectively in pairs, groups, teams, etc. to reach common goals (Leadership 2.1)
- C-2.6 Crime Scene Reconstruction: Student will sketch and photograph the crime scene; interpret physical evidence.
- C-2.7 Staged Crime Scene: Student will identify, preserve, collect, analyze evidence (SP 13.05, 13.07,13.10, 13.11)

Aligned Washington State Learning Standards

Arts	1.1 Understand arts concepts and vocabulary
Computer Science	
Educational Technology	
English Language Arts	CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

	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. 1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities. 2.2.2 Apply understanding of complex organizational features of printed text and electronic sources. 2.3.2 Evaluate informational materials, including electronic sources, for effectiveness. 3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions. 3.2.2 Apply understanding of complex information, including functional documents, to perform a task. CC: College and Career Readiness Anchor Standards for Writing Text Types and Purposes 1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. 3.1.1 Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. 3.3.6 Uses complete sentences in writing
Environment & Sustainability	
Financial Education	
Health and Physical Education	
Mathematics	8.5.A Analyze a problem situation to determine the question(s) to be answered 8.5.B Identify relevant, missing, and extraneous information related to the solution to a problem. A1.1.A Select and justify functions and equations to model and solve problems. A1.8.A Analyze a problem situation and represent it mathematically. A1.8.G Synthesize information to draw conclusions and evaluate the arguments and conclusions of others
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints, research the problem, and generate several possible solutions.

	9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge.
Social Studies	

COMPONENTS AND ASSESSMENTS
Performance Assessments: Students will: ● Apply forensic skills in fingerprinting ● Ink fingers and make fingerprint impressions ● Dust for fingerprints and be able to differentiate fingerprints powders and their appropriate uses ● Utilize a variety of forensic tools to identify evidence; this can include crime lights and ultraviolet lights for visualizing and finding evidence of fingerprints; crime tape to "lift" or extract prints, as well as safety precautions of UV light and different goggles for eye protection ● Analyze "unknown" prints including partial fingerprints and be able to conduct "matches" to fingerprints on cards.
Leadership Alignment: Students will work through a Fingerprinting Lab Activity and refer to that throughout the unit. This lab activity allows students to gain a better understanding of what a fingerprint examiner does daily, as they will be identifying common minutiae patterns in a fingerprint as well as analyzing fingerprint types based on their classmates' data. ● 2.C.4 Interpret information and draw conclusions based on the best analysis ● 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways ● 4.A.2 Evaluate information critically and competently
Standards and Competencies
Unit: C-6 Fingerprints

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 15**
Students will learn the essential properties of human fingerprint evidence to distinguish them apart and apply this information in the context of a criminal investigation; technologies and methods of fingerprint collection/analysis are used. ● C-6.1 Historical Development: Students will understand the evolution of fingerprinting systems as a criminal investigative tool ● C-6.2 Observing and Taking of Fingerprints: Students will learn methods to examine for the presence of fingerprint evidence then perform a variety of fingerprinting collection techniques. ● C-6.3 Anatomy of Fingerprints: Students will be able to identify the source of fingerprints through the recognition and analysis of patterns and minutia ● C-6.4 The Crime Scene: Students will interpret conditions found at a crime scene to locate and collect fingerprint evidence ● C-6.5 Physical Methods: Students will perform a variety of techniques (brush- powder, cyanoacrylate fuming etc.) to uncover, collect, and preserve different fingerprint evidence found at a crime scene. ● C-6.6 Chemical Methods: Students will learn methods applicable to using chemical testing to recover fingerprints from varying surfaces and apply several of these methods	

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Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB

	Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints, research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge
Social Studies	1.1.1 Applies a variety of listening strategies to accommodate the listening situation. 1.1.2 Applies a variety of listening and observation skills/strategies to recall and interpret information. 2.2.2 Applies skills and strategies to contribute responsibly in a group setting.

COMPONENTS AND ASSESSMENTS

Performance Assessments: Students will draw reasonable conclusions concerning the identification and source of trace (minute) particles of evidence based on a pre-determined set of conditions (mock crime scene).

Leadership Alignment: Students will participate in a case study analysis where they watch an informative video documentary about the famous Atlanta Child Murders and complete a *Video Analysis* worksheet, while using lecture information about forms of hair and fiber evidence.

- 1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 4.A.2 Evaluate information critically and competently
- Draw evidence from striation patterns, breech markings, and firing pin patterns and explain their significance in different scenarios.
- Explain how arson investigators determine if an arson crime has occurred.

Standards and Competencies

Unit: A-3 Trace Evidence

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 45**

- A-3.1 Trace Evidence at the Crime Scene
- A-3.4 Analysis of Powders
- A-3.5 Study of fingerprints and shoe prints
- C-3.1 History of Hair: Students will learn historical facts pertaining to the application of hair in the criminal investigative process.
- C-3.2 The Function of Hair: Students will learn why hair is important and applicable to the science of forensics
- C-3.3 Form and Structure of Hair: Students will understand the basic physiological properties of hair and differences among types of hair given their origin on the human body; physical properties are analyzed under microscopic conditions
- C-3.4 Hair as a Chemical Indicator: Students will understand that hair samples can be analyzed to establish the presence of drugs or toxins in the body
- C-3.5 Trace Evidence of Hair: Students will learn how hair found at a crime scene is/is not relevant to a criminal investigation
- C-4.1 Using Fibers as Evidence: Students will understand how the collection and preservation of fiber evidence will support a criminal investigation
- C-4.2 Collection and Observation: Students will apply procedures necessary to collect, preserve and examine fiber evidence from a crime scene.
- C-4.3 Sources of Fiber: Student will be able to explain the source and relevance of synthetic fibers found at a crime scene
- C-4.4 Types of Fiber: Students will be able to distinguish between plant, animal, and synthetic fiber types
- C-4.6 Chemical Structure of Fibers: Students will conduct flame testing of fibers to analyze specific properties
- A-4.5 Bullets, cartridges, and calibers
- A-4.7 Gunshot residues
- A-4.8 Firearm database
- Use of Arson evidence in solving criminal cases

Aligned Washington State Learning Standards

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Educational Technology	
English Language Arts	CC: Reading for Literacy in Science and Technical Subjects

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Environment & Sustainability	
Financial Education	
Health and Physical Education	
Mathematics	8.5.A Analyze a problem situation to determine the question(s) to be answered 8.5.B Identify relevant, missing, and extraneous information related to the solution to a problem. A1.1.A Select and justify functions and equations to model and solve problems. A1.8.C Evaluate a solution for reasonableness verify its accuracy A1.8.G Synthesize information to draw conclusions and evaluate the arguments and conclusions of others.
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the

	problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge.
Social Studies	

COMPONENTS AND ASSESSMENTS
Performance Assessments: Students will: ● Document Federal and Washington State laws concerning the possession, sale, use, and manufacturing of illicit drugs and controlled substances and alcohol ● Indicate the penalties for various types of related offenses including DUI and DWI ● Identify Schedule I-V drugs, particularly Schedules I, II, and III and 1st, 2nd, and 3rd offenses ● Differentiate between stimulants, depressants, hallucinogens, and narcotics ● Utilize "spot tests" to determine what drug or combination of drugs is present in a sample using "simulated" drugs made from over-the-counter substances
Leadership Alignment: The student will analyze a variety of mystery powders to determine their chemical composition. ● Students will evaluate case studies and compare results with their classmates and the results of each case. ● Working in teams, students will develop a laboratory procedure for determining the unknown substance
Standards and Competencies
Unit: C-9- Toxicology
Industry Standards and/or Competencies — **Total Learning Hours for Unit: 15**
● C-9.1 History of Drug Identification and Toxicology ● C-9.2 Drugs and Crime ● C-9.3 Spot Test ● C-9.5 Drug Analysis ● C-9.7 Drug Identification
Aligned Washington State Learning Standards

Arts	1.1 Understand arts concepts and vocabulary
Computer Science	
Educational Technology	
English Language Arts	CC: College and Career Readiness Anchor Standards for Writing Text Types and Purposes 1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. 3.1.1 Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. 3.3.6 Uses complete sentences in writing. CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 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.

	1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities. 2.2.2 Apply understanding of complex organizational features of printed text and electronic sources. 2.3.2 Evaluate informational materials, including electronic sources, for effectiveness. 3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions. 3.2.2 Apply understanding of complex information, including functional documents, to perform a task.
Environment & Sustainability	
Financial Education	
Health and Physical Education	
Mathematics	8.5.A Analyze a problem situation to determine the question(s) to be answered 8.5.B Identify relevant, missing, and extraneous information related to the solution to a problem. A1.1.A Select and justify functions and equations to model and solve problems. A1.8.C Evaluate a solution for reasonableness verify its accuracy
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. Also, understanding interrelationships within natural systems provides perspective for examining human systems. The ability to independently initiate, design, and complete an experiment is key in employability. Keeping accurate records, creating a safe environment, and understanding basic laboratory procedures will increase marketability as a potential employee. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge.
Social Studies	

COMPONENTS AND ASSESSMENTS	
Performance Assessments: Students will: ● Practice synthesizing multiple forms of data to draw conclusions and have opportunities to develop professional communication skills. Identify different forms of evidence to evaluate for meaning and to resolve potential criminal cases. Utilize technology to bring resolution to forensic cases. ● Analyze information collected during an autopsy leading to the understanding of disease and/or case of death. ●	
Leadership Alignment: ● Plan a systematic course of action to answer a question. ● Analyze and interpret evidence to draw logical conclusions. ● Communicate information in a professional and organized manner. ● Demonstrate perseverance, honesty, and integrity while accomplishing a goal.	
Standards and Competencies	
Unit: Medical Investigation	
Industry Standards and/or Competencies	**Total Learning Hours for Unit: 15**
●	
Aligned Washington State Learning Standards	
Arts	1.1 Understand arts concepts and vocabulary
Computer Science	
Educational Technology	
English Language Arts	AS.R.1 - Reading Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. AS.R.2 - Reading Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. AS.R.7 - Reading Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. AS.W.4 - Writing Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. AS.W.6 - Writing Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. AS.W.8 - Writing Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. AS.SL.1 - Speaking and Listening Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. AS.SL.2 - Speaking and Listening Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. AS.SL.4 - Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. AS.SL.5 - Speaking and Listening Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. AS.L.1 - Language Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

	AS.L.4 - Language Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. AS.L.5 - Language Demonstrate understanding of word relationships and nuances in word meanings. AS.L.6 - Language Acquire and use accurately a range of 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.
Environment & Sustainability	
Financial Education	
Health and Physical Education	1.11 Foundation Standard 1: Academic Foundation: Understand human anatomy, physiology, common diseases and disorders, and medical math principles. Identify basic levels of organization of the human body a.Chemical b.Cellular c.Tissue d.Organs e.Systems f.Organism
Mathematics	F.IF.7 - Interpreting Functions Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. F.IF.7.a - Interpreting Functions Graph linear and quadratic functions and show intercepts, maxima, and minima. S.ID.1 - Interpreting Categorical and Quantitative Data Represent data with plots on the real number line (dot plots, histograms, and box plots). S.ID.6.a - Interpreting Categorical and Quantitative Data Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. S.ID.6.c - Interpreting Categorical and Quantitative Data Fit a linear function for a scatter plot that suggests a linear association. S.ID.7 - Interpreting Categorical and Quantitative Data Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
Science	DCI - LS1.A - From Molecules to Organisms: Structures and Processes - Structure and Function Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) DCI - LS1.A - From Molecules to Organisms: Structures and Processes - Structure and Function Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) Science and Engineering Practice - Asking questions and defining problems Ask questions - that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information. - that arise from examining models or a theory, to clarify and/or seek additional information and relationships. - to determine relationships, including quantitative relationships, between independent and dependent variables. - to clarify and refine a model, an explanation, or an engineering problem. Science and Engineering Practice - Asking questions and defining problems Ask and/or evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design. Science and Engineering Practice - Developing and Using Models Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system. Science and Engineering Practice - Developing and Using Models Develop and/or use multiple types of models to provide mechanistic accounts and/or predict phenomena, and move flexibly between model types based on merits and limitations.
Social Studies	

COMPONENTS AND ASSESSMENTS

Performance Assessments: Students will:
• Identify the different components of blood and their functions.
• Differentiate between blood types and Rh factors by describing how blood is typed.
• List and describe the tests used to characterize a stain as blood.
• Interpret and reconstruct events that produce a bleed pattern based on the appearance of bloodstains and spatters
• Determine the direction, dropping distance, and angle of impact of a bloodstain

Leadership Alignment: Students will investigate blood types and blood stains to investigate a fake murder. These labs are both an inquiry lab - this means that teacher will pose a question to the students, and they will create their own experiment (using specific materials) to discover the answer.

- 1.A.1 Use a wide range of idea creation techniques (such as brainstorming)
- 1.B.1 Develop, implement and communicate new ideas to others effectively
- 1.C.1 Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member
- 4.A.2 Evaluate information critically and competently
- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 8.A.3 Utilize time and manage workload efficiently
- 10.B.1.f Collaborate and cooperate effectively with teams

Standards and Competencies

Unit: C-7 Blood and Blood Spatter

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 15**

- C-7.1 Blood History: Students will learn important historical benchmarks associated with society's knowledge of blood.
- C-7.3 Detection of Blood: Students will perform the Kastle-Meyer Presumptive Blood test to establish the presence of human blood properties
- C-7.5 ABO/Rh Blood Typing: Students will analyze different blood samples to determine if an individual is linked to a crime scene
- C-7.6 Blood Spatter: Students will understand the cause-effect relationship of blood subjected to force/trauma
- C-7.7 Crime Scene Investigation of Blood: Students will interpret blood evidence at a crime scene to form a hypothesis of the sequence of events and related outcomes

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Financial Education	
Health and Physical Education	
Mathematics	8.5.A Analyze a problem situation to determine the question(s) to be answered 8.5.B Identify relevant, missing, and extraneous information related to the solution to a problem. A1.1.A Select and justify functions and equations to model and solve problems. A1.8.G Synthesize information to draw conclusions and evaluate the arguments and conclusions of others
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge
Social Studies	2.1 Understands that people have to make choices between wants and needs and evaluate the outcomes of those choices.

COMPONENTS AND ASSESSMENTS

Performance Assessments: Students will:
• Differentiate between nuclear and mitochondrial DNA
• Practice micro pipetting techniques, making buffer solutions, agarose gels, loading
• Identify the function and use of restriction enzymes
• Extract and use RFLP, PCR, STRs to characterize DNA
• Use math to calculate the probabilities of STRs to identify a suspect
• Perform gel electrophoresis, first on simulated DNA and then on human DNA

Leadership Alignment: Students will work in lab groups, where they will role play crime lab investigators, who will prepare the DNA profiles used in a mock case. They will be tested on information provided about DNA extracted from the skeletal remains and missing persons.

- 1.A.1 Use a wide range of idea creation techniques (such as brainstorming)
- 1.C.1 Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member INFORM
- 4.A.2 Evaluate information critically and competently
- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 7.A.1 Adapt to varied roles, jobs responsibilities, schedules and contexts
- 7.A.2 Work effectively in a climate of ambiguity and changing priorities
- 8.A.3 Utilize time and manage workload efficiently
- 11.A.1 Use interpersonal and problem-solving skills to influence and guide others toward a goal
- 10.B.1.f Collaborate and cooperate effectively with teams

Standards and Competencies

Unit: C-8 DNA Analysis and Fingerprinting

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 20**

- C-8.2 Function and structure of DNA: Students will understand the basic genetic structure of cells and the relevance of DNA to the criminal forensics process
- C-8.3 DNA Identification: Students will learn the essential properties of DNA in the form of repeating sequences
- C-8.6 Analysis of DNA Fingerprints: Students will perform electrophoresis testing to establish culprit/victim identity

Aligned Washington State Learning Standards

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Educational Technology	
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Health and Physical Education	
Mathematics	
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge. 9-11 LS1E The genetic information responsible for inherited characteristics is encoded in the DNA molecules in chromosomes 9-11 LS1H Genes are carried on chromosomes. 9-11 LS1G Cells use the DNA that forms their genes to encode enzymes and other proteins that allow a cell to grow and divide to produce more cells.
Social Studies	2.1 Understands that people have to make choices between wants and needs and evaluate the outcomes of those choices

COMPONENTS AND ASSESSMENTS

Performance Assessments: Students must use established formulas of time and temperature to calculate approximate time of death based on fictitious human "death" scenarios.

Leadership Alignment: Students will construct an argument for the definition of death and defend their position using a real life case study. During the argument, they must explain the stages of decomposition and how characteristics of the body at each stage can assist investigators in determining time of death.

- 1.A.1 Use a wide range of idea creation techniques (such as brainstorming)
- 1.B.1 Develop, implement and communicate new ideas to others effectively
- 1.C.1 Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur
- 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
- 2.C.1 Effectively analyze and evaluate evidence, arguments, claims and beliefs
- 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member
- 4.A.2 Evaluate information critically and competently
- 5.A.2 Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors
- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 8.A.3 Utilize time and manage workload efficiently
- 4.B.3 Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information
- 10.B.1.f Collaborate and cooperate effectively with teams
- 8.C.1 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise

Standards and Competencies

Unit: C12 Death: Manner, Mechanism, Cause, and Time

Industry Standards and/or Competencies	**Total Learning Hours for Unit: 15**

- C-12.1 Manner of Death: Students will be able to distinguish between four manners of death: neutral. Accidental, suicidal, and homicidal
- C-12.2 Cause and Mechanism of Death: Students will be able to distinguish between cause, manner, and mechanism of death
- C-12.3 Calculating of Time of Death Using Rigor Mortis: Students will be able to use evidence of rigor mortis to calculate approximate time of death
- C-12.4 Calculating of Time of Death Using Algor Mortis: Students will be able to use evidence of algor mortis to calculate approximate time of death
- C-12.5 Calculating of Time of Death Using Livor Mortis: Students will be able to use evidence of livor mortis to calculate approximate time of death

Aligned Washington State Learning Standards

Arts	
Computer Science	
Educational Technology	
English Language Arts	CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 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. 1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities. 2.2.2 Apply understanding of complex organizational features of printed text and electronic sources. 2.2.4 Apply understanding of text organizational structures. 2.3.2 Evaluate informational materials, including electronic sources, for effectiveness. 3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions. 3.2.2 Apply understanding of complex information, including functional documents, to perform a task CC: College and Career Readiness Anchor Standards for Writing Text Types and Purposes 1 - Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. 3.1.1 Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. 3.3.6 Uses complete sentences in writing
Environment & Sustainability	
Financial Education	
Health and Physical Education	
Mathematics	8.5.A Analyze a problem situation to determine the question(s) to be answered 8.5.B Identify relevant, missing, and extraneous information related to the solution to a problem. A1.1.A Select and justify functions and equations to model and solve problems. A1.8.C Evaluate a solution for reasonableness verify its accuracy A1.7.D Solve an equation involving several variables by expressing one variable in terms of the other
Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB

	Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge
Social Studies	2.1 Understands that people have to make choices between wants and needs and evaluate the outcomes of those choices

COMPONENTS AND ASSESSMENTS	
Performance Assessments: Students must be able to visually recognize and identify specific human bones and properly "rearrange" sections of the human skeleton. Students will use measures and calculations to establish height, age, and gender of skeletal remains.	
Leadership Alignment: ● Lab work Is completed in teams. Each team member contributes to the understanding of the collected evidence, students collaborate their findings and corroborate to infer meaning of evidence. ● Anthropology professor from WWU- guest speaker- talks about human remains and show actual artifacts to class.- career exploration	
Standards and Competencies	
Unit: C12 Death: Manner, Mechanism, Cause, and Time	
Industry Standards and/or Competencies	**Total Learning Hours for Unit: 10**
C-13.1 Investigating Remains C-13.2 Human versus Animal Bones C-13.3 The Skeleton C-13.4 Identifying Bones C-13.5 Estimating Height C-13.6 Sex Determination C-13.7 Determining Age C-13.8 Determining Race	
Aligned Washington State Learning Standards	
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Computer Science	
Educational Technology	
English Language Arts	CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 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. 1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities. 2.2.2 Apply understanding of complex organizational features of printed text and electronic sources. 2.3.2 Evaluate informational materials, including electronic sources, for effectiveness. 3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions. 3.2.2 Apply understanding of complex information, including functional documents, to perform a task. 3.1.1 Analyzes ideas, selects a manageable topic, and elaborates using specific, relevant details and/or examples. 3.3.6 Uses complete sentences in writing.
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Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge
Social Studies	1.1.1 Applies a variety of listening strategies to accommodate the listening situation. 1.1.2 Applies a variety of listening and observation skills/strategies to recall and interpret information. 2.2.2 Applies skills and strategies to contribute responsibly in a group setting.

COMPONENTS AND ASSESSMENTS
Performance Assessments: Students will apply the rules of physical evidence collection and courtroom procedure and present evidence to support their theory of a crime and the evidence found at the crime scene. Students must verbally explain/defend their methods and outcomes without use of notes or props.
Leadership Alignment: Students will individually research the Frye Standard and Daubert Ruling to complete a Venn diagram. Students will then work in a group and use their Venn diagram to describe the outcome of an example case. ● 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information ● 4.A.2 Evaluate information critically and competently ● 1.B.1 Develop, implement and communicate new ideas to others effectively ● 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems ● 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member ● 2.C.3 Synthesize and make connections between information and arguments

Standards and Competencies	
Unit: Trial Evidence	
Industry Standards and/or Competencies	**Total Learning Hours for Unit: 10**
● Flawed Forensics: Students will analyze case examples of improperly collected/processed crime scene evidence ● Eyewitness Identification: Students will understand how human memory can impair eyewitness evidence ● Courtroom Testimony: Students will present evidence and explain its properties under direct and cross- examination in a mock trial setting	

Aligned Washington State Learning Standards	
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English Language Arts	CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 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. 1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities. 2.2.2 Apply understanding of complex organizational features of printed text and electronic sources. 2.3.2 Evaluate informational materials, including electronic sources, for effectiveness. 3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions. 3.2.2 Apply understanding of complex information, including functional documents, to perform a task.

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Science	9-11 SYS A Feedback is a process in which the output of a system provides information used to regulate the operation of the system. Positive feedback reduces the disturbance to a system. Negative feedback increases the disturbance to a system. 9-11 SYS B Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. 9-12 APPB Work collaboratively with other students to generate ideas for solving a problem. Identify criteria and constraints , research the problem, and generate several possible solutions. 9-12 INQC Conclusions must be logical, based on evidence, and consistent with prior established knowledge
Social Studies	

The 21st Century Skills should be taught and assessed throughout the course. This table should be included at the end of this document.

21st Century Skills		
Check those that students will demonstrate in this course:		
LEARNING & INNOVATION **Creativity and Innovation** ☒Think Creatively ☒Work Creatively with Others ☐Implement Innovations **Critical Thinking and Problem Solving** ☒Reason Effectively ☒**U**se Systems Thinking ☒Make Judgments and Decisions ☒Solve Problems **Communication and Collaboration** ☒Communicate Clearly ☒Collaborate with Others	**INFORMATION, MEDIA & TECHNOLOGY SKILLS** **Information Literacy** ☒Access and /evaluate Information ☐Use and Manage Information **Media Literacy** ☒Analyze Media ☒Create Media Products **Information, Communications and Technology (ICT Literacy)** ☒Apply Technology Effectively	**LIFE & CAREER SKILLS** **Flexibility and Adaptability** ☒Adapt to Change ☒Be Flexible **Initiative and Self-Direction** ☒Manage Goals and Time ☒Work Independently ☒Be Self-Directed Learners **Social and Cross-Cultural** ☒Interact Effectively with Others ☒Work Effectively in Diverse Teams **Productivity and Accountability** ☒Manage Projects ☒Produce Results **Leadership and Responsibility** ☒Guide and Lead Others ☒Be Responsible to Others