



Forensic Science



Length of Course: Full Year

Elective/Required: Elective

Credit Value: 5 Credits

Date Approved:

Written: Hala Morcos



Forensic Science

Understanding By Design Unit Template

Title of Unit	INTRODUCTION TO FORENSIC SCIENCE	Grade Level	10 th to 12th grade
Curriculum Area	Unit 1	Time Frame	20 days
Developed By	Hala Morcos		
Identify Desired Results (Stage 1)			
Content Standards			
CPI			
<i>21st Century:</i>			
<ul style="list-style-type: none">• 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences• 9.1.4. D.1-Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience.• 9.1.4.A.2- Evaluate available resources that can assist in solving problems• 9.1.4.A.1-Recognize a problem and brainstorm ways to solve the problem individually or collaboratively			
Understandings		Essential Questions	
Overarching Understanding		Overarching	Topical



<ul style="list-style-type: none"> • Present a timeline of the development of forensic science. • Identify some key figures in the development of forensic science through an activity. • Discuss and present various organizations and universities associated with forensic science and career possibilities. • Examine the lives and contributions of important scientists who affected major breakthroughs in our understanding of the natural and designed world. • 	<ul style="list-style-type: none"> • <i>Where the benefits, and challenges of various careers in the field of forensic science? Explain in details.</i> • <i>Where can you find useful information about forensic science? And how it is being applied?</i> • <i>How can information be utilized to solve a crime?</i> 	<p><i>Which courses of study are required for this profession?</i></p> <ul style="list-style-type: none"> • <i>How has forensic (analyze) science developed and changed with advancement in technology?</i> • <i>Who are the key people in the development of forensic science?</i>
Related Misconceptions		
<ul style="list-style-type: none"> • Students misconception that Forensic science is only dealing with law enforcements, scientists who interested in such major deals with police or only law enforcements. 		
<p>Knowledge Students will know...</p>	<p>Skills Students will be able to...</p>	



<ul style="list-style-type: none">• Students will identify various specialty professions within the field of Forensic Science.• Students will explain the differences between the perceived and actual roles of a forensic scientist.• Describe the relationship of forensics and the law• Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.• State their own opinions as to the cause of death and give reasons for their decisions.	<ul style="list-style-type: none">• Analyze by Explaining using the relevance of specific court cases to current forensics practices, after discussing the role forensic science• Synthesize the typical courtroom proceedings• Explain the importance of the work of various forensics pioneers, using research of timeline.• Describe the development of technology important to forensics• Define <i>forensic science</i> and be able to list five types of forensic sciences currently allowed as evidence in our courts.• Observe the relevance of classroom study to real-life situation.
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Assessment Evidence (Stage 2)
Performance Task Description



<ul style="list-style-type: none">• Goal• Role• Audience• Situation• Product/ Performance• Standards	<p>Teacher will ask student Presentation on investigations , <i>(This is what your assessment section should look like based on the information you have provided)</i></p> <p>Writing sample on an investigation</p> <p>Presentations of investigations</p> <p>Class discussions on each objective and essential question after physical evidence unit</p> <p>Quiz on evidence and crime scene protocol unit 1 and 2 test</p> <p>OJ Simpson Performance Assessment</p> <ul style="list-style-type: none">• Student written article with their own investigations.• Students will present individually using their own investigations.• Students will have their own discussions of these cases.• Students will use the article or news clip where police used the Forensic, as part of investigation.<ul style="list-style-type: none">a. Analyze the article based on material investigationsb. Physical evidence, and how it is used as part of their evidence of conviction the defense• Using basic forensic aspect of evidence, to determine how to conduct an investigations.• Promoting and cross references with in any court cases where the forensic evidence collected was tainted or discredited due to improper investigative procedures (direct vs. indirect evidence) i.e. physical vs circumstances.• (The O.J. Simpson murder trial in which he was acquitted of criminal liability but found liable for the crime in a civil court.)
<p>Other Evidence</p>	



Quiz and unit tests

Card calling

Analyzing the objective.



Learning Plan (Stage 3)

- Where are your students headed? Where have they been? How will you make sure the students know where they are going?
- How will you hook students at the beginning of the unit?
- What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge?
- How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work?
- How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit?
- How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit?

How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students?

- Students will use a video for “Investigators should approach the crime scene investigation as if it will be their only opportunity to preserve and recover these physical clues,” according to the manual *Crime Scene Investigation: A Guide for Law Enforcement*.
- In this class, students should be introduced to the basic protocol for conducting forensic science investigations and the importance of following it. How to solve a scene of a crime, label every locations as an observer. Determine which one is physical evidence and which one can be circumstantial evidence

For example physical evidence two glasses on the table, circumstantial evidence that victim had or expecting another person.

Class discussion as teacher and students will understand and how the crime scene investigations is to answer some or all of the following questions:

- a. Who is the perpetrator, and who is the victim?



Understanding By Design Unit Template

Title of Unit	Observation skills	Grade Level	10 th -12 th
Curriculum Area	Unit 2	Time Frame	20 days
Developed By	Ms. Hala Morcos		
Identify Desired Results (Stage 1)			
Content Standards			



CPI

21st Century:

- 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences
- 9.1.4. D.1-Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience.
- 9.1.4.A.2- Evaluate available resources that can assist in solving problems
- 9.1.4.A.1-Recognize a problem and brainstorm ways to solve the problem individually or collaboratively

Understandings		Essential Questions	
Overarching Understanding		Overarching	Topical
<ul style="list-style-type: none"> • Students will define Observations and what changes occur in the brain • Students will describe examples of factors influencing eyewitness accounts • Compare the reliability of eyewitness testimony to what actually happened • Cooperatively create and perform a crime scene. • Reconstruct a crime scene. 		<p>How evidence is being present at a crime scene and how can it be analyzed?</p> <p>Which is the order should evidence be analyzed?</p>	<p>Why is eyewitness testimony not reliable in a court of law?</p> <p>How to analyze and factor some of the evidence from the crime scenes</p>
Related Misconceptions			
<ul style="list-style-type: none"> • Most students will probably link forensics with crime due to popular TV shows Forensic science is any science used in the courts. 		<p>How evidence is admissible in court?</p>	
Knowledge		Skills	
Students will know...		Students will be able to...	



<ul style="list-style-type: none">• Types and significance of evidence in evaluating a crime scene.• Students will know safety within a crime scene laboratory.• Student will know class and individual characteristics of evidence• Student will develop quality controls to examine evidence.• Students will know the components of the crime scenes.	<ul style="list-style-type: none">• Research careers in forensic science.• Describe the development and services of a crime scene laboratory.• Compare and contrast class and individual characteristics• Discuss safety within a crime scene laboratory• Students will, evaluate conclusions, weigh evidence, and recognize that arguments may not have the observation skills and make inferences through completing a lab of crime scene evaluation t.• Observed and draw a crime scene, labeling the evidence.
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Assessment Evidence (Stage 2)

Performance Task Description



<ul style="list-style-type: none"> • Goal • Role • Audience • Situation • Product / Performance • Standards 	<p>Group Work Assessments:</p> <p>Document “Crime-Scene Search” from the FBI’s Handbook of Forensic Sciences at http://www.fbi.gov/hq/lab/handbook/forensics.pdf. Each student group will include a</p> <ul style="list-style-type: none"> • Person in charge (team leader) • Photographer • Sketch preparer • Evidence recorder <p>Using the “FBI Crime-Scene Search” information as a reference, each student should write a one-half to one-page summary of the duties they would perform in their assigned role at a crime scene investigation.</p> <ul style="list-style-type: none"> • Students should also describe how their duties combined with those of other students in their group would contribute to the overall quality and effectiveness <p>One-paragraph report on the logical fallacies in the story.</p>
<p>Other Evidence</p>	
<p>Projects</p> <p>Chapter Test</p> <p>Quizzes</p> <p>Written Assignments</p> <p>Research Assignments</p> <p>Lab conclusions</p> <p>Essay response questions</p>	
<p>Learning Plan (Stage 3)</p>	



- Where are your students headed? Where have they been? How will you make sure the students know where they are going?
- How will you hook students at the beginning of the unit?
- What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge?
- How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work?
- How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit?
- How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit?
- How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students?

Small Group Work

- Sherlock Homeless analyzations.
 - Discussion on concepts of analyzing the facts to determine the stages of the crime scene.
1. *Class Discussion*
 2. Ask the teams to report back to class, list the errors the detective has committed, and, if time permits, explain why they believe he is mistaken.
 3. Student s completion of objective based on the detective story
 4. 1. PPT puzzle 1-3 on observations and memory recall Forensic Science Fundamentals and Investigations

Understanding By Design Unit Template



Title of Unit	TYPES AND PROPERTIES OF PHYSICAL EVIDENCE(Crime Scene Investigation and Evidence Collection)	Grade Level	10 th -12 th grade
Curriculum Area	Unit 3	Time Frame	30 days
Developed By	Ms. Hala Morcos		
Identify Desired Results (Stage 1)			
Content Standards			
<p>21st Century:.,</p> <ul style="list-style-type: none"> • 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences • 9.1.4. D.1-Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • 9.1.4.A.2- Evaluate available resources that can assist in solving problems • 9.1.4.A.1-Recognize a problem and brainstorm ways to solve the problem individually or collaboratively 			
Understandings		Essential Questions	
Overarching Understanding		Overarching	Topical
<ul style="list-style-type: none"> • Why is proper evidence collection important when trying to solve a crime? • How is evidence used to determine whether a crime has been committed 		<ul style="list-style-type: none"> • <i>How is trace evidence discovered at a crime scene?</i> • <i>How is trace evidence</i> 	<ul style="list-style-type: none"> • <i>What are some types of physical properties?</i> • <i>What are some types of chemical</i>
Related Misconceptions			



<ul style="list-style-type: none"> Students may believe that all short stories conform to the same format. However, some genres such as detective fiction emphasize plot instead of character, denouement instead of climax, and present “evidence” that is as available to the reader as it is to the narrator or any of the characters. 	<p>evidence analyzed?</p> <ul style="list-style-type: none"> Why is proper evidence collection important when trying to solve a crime? How is evidence used to determine whether a crime has been committed? 	<p>of chemical properties?</p> <ul style="list-style-type: none"> Explain the procedures used to process a crime scene.
<p>Knowledge</p> <p>Students will know...</p>	<p>Skills</p> <p>Students will be able to...</p>	
<ul style="list-style-type: none"> Procedures used to process a crime scene. Students will know the proper way to classify and process evidence Be able to secure a crime scene search a crime scene Collect evidence and retain the “chain of evidence” Draw and use a crime scene sketch 	<ul style="list-style-type: none"> Discuss and assess the impact of current and emerging technologies on our understanding of inherited human characteristics. Describe the various features of human hair, as part of research how critical this evidence in a crime scene. Compare and contrast animal hair and human hair. Describe the characteristics of various types of fibers. Sketch and label the various parts of a hair Explain the procedure used to process a crime scene. Students will explain the process way to classify and process evidence 	



Assessment Evidence (Stage 2)

Performance Task Description

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|---|--|
| <ul style="list-style-type: none"> • Goal • Role • Audience • Situation • Product/ Performance • Standards | <ul style="list-style-type: none"> • Close and active reading. ! • Faulty reasoning and analyzations. • Group discussions on daily objectives • Groups reasoning to solve the case by various techniques and its methods |
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Other Evidence

- Student reports on the objectives using logical fallacies can be extended to include *all* the errors they find.
 - Tests
 - Quizzes
 - Discussion of objective
 - Card calling
- Written Assignments
- Lab conclusions
- Deductive reasoning
- Solve famous cases
- Open Essay response questions

Learning Plan (Stage 3)



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| <ul style="list-style-type: none">• Where are your students headed? Where have they been? How will you make sure the students know where they are going?• How will you hook students at the beginning of the unit?• What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge?• How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work?• How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit?• How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit?• How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students? | <ul style="list-style-type: none">• class discussion on class objectives:• Crime scene investigation project.• Hands-on lab activities and cooperative group work such as:•• Create a crime scene for students to process; (indoor and/or outdoor) including take• notes/description of scene, search/locate evidence, evidence marking, measurements, drawings,• Photography, sketches 2.• Lockard principal Lab 2-1 : Forensic Science Fundamentals and Investigations• Crime scene investigation lab 2-2: Forensic Science Fundamentals and Investigations |
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Understanding By Design Unit Template

Title of Unit	Trace evidence-: Fingerprints: Prints, Tracks and Tool marks,	Grade Level	10 TH -12 TH Grade
Curriculum Area	Unit 4	Time Frame	60 days
Developed By	Ms. Hala Morcos		
Identify Desired Results (Stage 1)			
Content Standards			
<ul style="list-style-type: none"> • <i>21st Century:</i> • 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences • 9.1.4. D.1-Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • 9.1.4.A.2- Evaluate available resources that can assist in solving problems • 9.1.4.A.1-Recognize a problem and brainstorm ways to solve the problem individually or collaboratively 			
<i>Understandings</i>		<i>Essential Questions</i>	
<i>Overarching Understanding</i>		<i>Overarching</i>	<i>Topical</i>



<ul style="list-style-type: none"> • Describe the history of fingerprinting. • Explain the three principles of fingerprinting. • Describe and give examples of the primary classification of fingerprints. • Compare and contrast the methods of fingerprinting. • Label various characteristics of fingerprints. • Determine different types of tool-marks and identify the tool that made the marks. • Evaluate types of tire and foot tracks as evidence to solve a crime. <ul style="list-style-type: none"> • Evaluate the DNA used to help solve crimes, and determine the suspect. 	<ul style="list-style-type: none"> • How are fingerprints collected? • What are the distinguishing features of fingerprints? • How can shoeprints and other impressions found at a crime scene be useful? • How can investigators use hair evidence to help solve a crime? • What are the distinguishable properties of fibers? • What is the difference between warp and weft in fabric samples • Why can we use DNA to exonerate or convict suspect 	<ul style="list-style-type: none"> • Why we are using tool and what marks it is used for? • How can we identify the lip impressions? • How to determine the five common patterns of foot prints? • How to analyze the parts of hair structure? • How can you differentiate between animal hair and human hair? • How is DNA used to help solve crimes
Related Misconceptions		
<ul style="list-style-type: none"> • Students will compare how the DNA with a database are important in both convicting and exonerating suspects • Students will think all finger print will have the same pattern or common traces. • Students will think all hair follicle: cuticle, cortex, medulla, cortical fusi, are identical based on evidence 		
<p>Knowledge</p> <p>Students will know...</p>	<p>Skills</p> <p>Students will be able to...</p>	



<ul style="list-style-type: none">• Understand the morphology of a foot print: cuticle, cortex, medulla, cortical fusi, ovoid bodies, root, follicle, pigment granules, follicular• Differentiate between human versus animal hair samples• Demonstrate the proper procedures in collecting and analyzing trace evidence• Students will be able to know the difference between animal hair and human hair.• Describe the characteristics of various types of fibers.• Sketch and label the various parts of a foot print• Determine the multiple steps in producing a DNA fingerprint	<ul style="list-style-type: none">• Compare hair samples using a collection of controls• Compare synthetic versus natural fibers• Test methods used for foot print identification• Discuss and assess the impact of current and emerging technologies on our understanding of inherited human characteristics.• Describe the various features of human hair.• Solve a crime scene using the foot print identification• Compare and contrast between human hair vs. human hair
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Assessment Evidence (Stage 2)

Performance Task Description

<ul style="list-style-type: none">• Goal• Role• Audience• Situation• Product/ Performance• Standards	<ul style="list-style-type: none">• One-paragraph report on the logical fallacies in the story.• Collect samples between foot print to determine the height and weight of the suspect• Write a report on various evidence can help to quit or evict a suspect, using a story or head line article that was been investigated - using Amanda Knox case of Murder as an idea
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Other Evidence



- Tests
- Quizzes
- Discussion of objective
- Card calling
- Hands-on lab activities and cooperative group work such as:
- Famous Case Study to research such as: The Green River Killer (Gary Rideway
- . Links to several simulations of DNA fingerprinting of varying levels of complexity can be found at *Visible Proofs: Forensic Views of the Body* (<http://www.nlm.nih.gov/visibleproofs/resources/weblinks.html>).
- A list of individuals who have been cleared of criminal wrongdoing on the basis of DNA evidence can be found at NOVA (<http://www.pbs.org/wgbh/nova/sheppard/cleared.html>).

Learning Plan (Stage 3)



<ul style="list-style-type: none"> • Where are your students headed? Where have they been? How will you make sure the students know where they are going? • How will you hook students at the beginning of the unit? • What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge? • How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work? • How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit? • How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit? • How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students? 	<ul style="list-style-type: none"> • Crime Scene investigation, students have the option of collecting several different types of evidence. • Use measurements, as an observation tools to determine the footprint evidence allows students to estimate the height of the perpetrator and should reflect the actual stride of the guilty teacher. • Body temperature Activity to determine the crime. • Guilty Teacher Activity: Analyze the guilty teacher’s classroom because students will use the length of passing time and average stride to determine the radius the perpetrator could have traveled without drawing attention by running. • Students will create and use forensic science to investigate a staged murder • Identify the characteristics of DNA that is most useful in forensic comparisons. • Demonstrate procedures used by the forensic scientist when processing DNA evidence. • Explain the importance of DNA databases available to forensic scientists
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Understanding by Design Unit Template

Title of Unit	Blood Analysis and Trial	Grade Level	10 th -12 th grade
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Curriculum Area	Unit 5	Time Frame	30 days
Developed By	Ms. Hala Morcos		
Identify Desired Results (Stage 1)			
Content Standards			
<ul style="list-style-type: none"> • <i>21st Century:</i> • 9.1.12.A.1-Apply critical thinking and problem-solving strategies during structured learning experiences • 9.1.4. D.1-Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • 9.1.4.A.2- Evaluate available resources that can assist in solving problems • 9.1.4.A.1-Recognize a problem and brainstorm ways to solve the problem individually or collaboratively 			
Understandings		Essential Questions	
Overarching Understanding		Overarching	Topical
<ul style="list-style-type: none"> • Investigate and assign the appropriate roles for scientific technology and human judgment in bringing criminal charges against a defendant? • <i>Compare between the four major blood types?</i> 		<ul style="list-style-type: none"> • <i>How can blood splatter information be used as evidence?</i> • <i>What information can be concluded from analyzing a blood splatter?</i> 	<ul style="list-style-type: none"> • <i>Distinguish the three types of blood cells?</i> • <i>Compare between the differences between animal and human blood?</i> • <i>Compare between bloodstains and blood spillers</i>
Related Misconceptions			
<ul style="list-style-type: none"> • Students should understand that crime scene investigations of this type usually require a team of forensic scientists who perform a majority of their work in laboratories because different disciplines of science are required: often a single investigator lacks the necessary educational background and expertise to conduct the entire investigation. 			



Knowledge Students will know...	Skills Students will be able to...
<ul style="list-style-type: none"> • Apply forensic science techniques and procedures. <ul style="list-style-type: none"> • Observe and identify scientific evidence. • Perform detailed observations. • Difference between various pistols or gun makers • The locations of shooters based on the bullet • Know the angle of the bullet to allocate the position of the shooter. 	<ul style="list-style-type: none"> • Students will identify the characteristics of questioned documents that are most useful in forensic comparisons. • Students will demonstrate procedures used by forensic scientists to process questioned documents. • Students will explain the importance of evidence databases available to forensic scientists. <ul style="list-style-type: none"> • Students will describe the 9th amendment and defend their opinion on it • Students will discuss the differences between types of guns • Students will describe how shells and casing help solve crimes
Assessment Evidence (Stage 2)	
Performance Task Description	
<ul style="list-style-type: none"> • Goal • Role • Audience • Situation • Product/ Performance • Standards 	<ul style="list-style-type: none"> • Mock murder where should be asked how they felt about this assignment. • Mock Murder arrangement based on the advantage and disadvantage of the 9th amendment and defend their opinion on it • Mock trial arrangements between the types of the pistol shells vs. the types of guns using as evidence • Discoveries of the role of ballistic and glass recovery at a crime scene • show based on evidence who is the murder based on the blood types
<ul style="list-style-type: none"> • Other Evidence 	



Projects

Chapter Test

Quizzes

Written Assignments

Lab conclusions

Deductive reasoning

Solve famous cases

- Essay response questions Card calling

Learning Plan (Stage 3)



<ul style="list-style-type: none">• Where are your students headed? Where have they been? How will you make sure the students know where they are going? How will you hook students at the beginning of the unit?• What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge?• How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work?• How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit?• How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit?• How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students?	<ul style="list-style-type: none">• Mock murder trials• Develop a case for trial• Investigate and develop the components of a trial• Watch clips of Philadelphia : identify and defend the characteristics of juror selection and court processes• Investigate the blood scattered based on the angel to determine the death of the victim cause.• Analyze blood spatter to help solve crimes, based on the composition of the blood and identify the type of blood.• Analyze the composition of amount of blood lose as part of self-inflection or someone sapping to determine the cause of death.• Solve and determine the blood lose , and body temperature to determine the time of death