Odysseyware®

CURRICULUM OVERVIEW

Forensics – Using Science to Solve a Mystery

Career and Technical Education Series

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Forensics: Using Science to Solve a Mystery Course Overview

This course is the overview of modern-day forensic science careers at work using science concepts to collect and analyze evidence and link evidence to the crime and suspects in order to present admissible evidence in courts of law. Modern-day forensic science practices have come into being thanks to the contribution of science and legal professions seeking ways to study crime scenes and criminal activities in an effort to stop crime. Of particular interest in this course are the various applications of medicine in the field of forensic science. This course identifies science concepts and critical thinking in the area of forensic science. Following the presentation of the concepts, students are encouraged to conduct online research exploring examples and applying the concepts just learned. Links to case studies and interactive learning tools are supplied along with high-quality research sites. Projects are assigned throughout the course that allow students to actively apply the information just learned. These projects include simulated crime-scene investigation, actual DNA separation, development of a cybersecurity plan, and the identification of specific forensic skills used during the course of a very large murder case. The focus of this course is to assist students in making career choices. Secondary school students who complete this course will have gained an awareness of the diversity of careers available in the forensic field. In addition, attention is drawn to many similar careers in medicine and computer science. Included in this overview of careers is the consideration of job descriptions and availability, educational and training requirements, licensing and certification, and typical annual salaries. Students who take this class will become equipped to make more informed career choices in regard to the forensic and medical science fields. At the same time, students will survey the history and scope of present-day forensic science work.

- **Unit 1: History of Forensic Science and DNA Analysis:** The history of forensic science considers the contributions of many medical, legal, and law-enforcement professionals. Many early convictions were based on very little physical evidence. During the 1800s, crime-scene investigation and physical-evidence collection methods began to be developed. Many physical-evidence analysis methods depended on scientific innovations such as microscopes and gas chromatography. The personal identification of suspects and victims was based strictly on eyewitness accounts prior to the discovery of the uniqueness of individual fingerprints. The forensic role of modern-day personal identification is the backbone of valid suspect identification. Fingerprinting techniques and databases of the twentieth century have now been replaced with DNA profiling and searchable databases used to screen and identify individuals. This unit also surveyed the many uses of DNA for identification in both forensic and mass-disaster applications.

- **Unit 2: Crime Scene Investigation and Forensic Medical and Dental Professionals:** You have been introduced to crime-scene investigation, which is the heart of forensic science. The emergency medical first responders care for the injured found at the scene. The first responding police officers care for the safety of not only those affected by the crime but also all the first responders at the scene. You now know that the first responding police officers are also responsible for the protection of the crime scene until the crime-scene investigator arrives and secures the scene. You have learned there are very specific rules of protocol the entire investigation must follow. This includes the collection and preservation of the evidence as well as documenting the evidence and anyone having contact with the evidence or the crime scene. Following the protocol determines whether or not the evidence will be admissible to the courts. You have been introduced about the importance of understanding the elements of this protocol. Up to this point in the course, you have been introduced to many career forensic scientists trained to assist with the crime-scene investigation and present the evidence to the court. During this unit you have also been introduced to other types of forensic scientists working with the crime-scene investigation team. Some evidence investigators do not come to the crime scene itself; they remain in the crime lab, analyzing the evidence brought to them. Should there be a death connected to the crime, it must be investigated by those who have the training and authority to do so: a coroner, medical examiner, odontologist, or pathologist. Any related mental or emotional issues of the victims or perpetrators must also be addressed by a medical doctor who has psychiatric training.

- **Unit 3: Forensic Biologist, Forensic Chemist, Physical Anthropologist:** All crimes and crime scenes are unique. In this unit you learned about biology, chemistry, and anthropology professionals who perform needed services and analysis of crime-scene evidence. Most of these professionals do not work full-time in forensic science, but they do have valuable skills and tools sometimes needed to study the evidence. Although they are not full-time forensic scientists, they must still abide by the protocols of admissible evidence. You have also learned that these professions are often called to testify in court as expert witnesses. During these chapters, you were introduced to some of the most unusual forensic careers and methods. Who would have known that a forensic entomologist studying the insects on a dead body could furnish needed evidence? The various branches of anthropology study the remains of bodies long dead to gather evidence for the case. You now know the importance of specific bones and the science of osteology as it pertains to teaching us more about individuals.

- **Unit 4: Forensic Toxicologist, Computer Forensics, and Forensic Engineering:** Once again, you compared the careers and forensic job descriptions of these professionals, many of whom are not full-time forensic investigators. These fields all demand many years of training and experience. The toxicologist studies the poisons and toxins related to the crime. As you know, drugs and alcohol are toxic to the body. Toxicologists are involved in processing crime-related samples of these substances using specially designed equipment, and you reviewed their specific testing methods in this unit. The effects of drugs and alcohol on the body were also covered in these chapters. Forensic engineers and computer examiners, unlike most of the rest of the forensic careers, work with machines related to crimes. In this section, you have identified the specific methods and protocol related to these investigations. During the computer-related lessons, you studied and developed security plans for both personal and business computers. You now know that information assurance is a vital part of computer forensics.

- **Unit 5: Developing Careers in Forensic Science:** This unit studies some little-known forensic careers in nursing, linguistics, art, photography, and animation. All of these careers are rapidly developing and changing, pioneering new forensic applications. Forensic nursing, linguistics, and animation are very new careers. The incorporation of these professions in the fight against crime has begun within the last twenty years. Crime-scene photography and forensic applications of art are not new, but with the advent of digital technology, individuals trained in these skills are pioneering fields such as videography and digital facial reconstruction. The fields of forensic linguistics and animations are empowered by advancing technology. Forensic nursing developed in response to the trend of increased sexual and domestic violence. These nurses are specially trained to care for the victims of sexual and domestic violence.

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Unit 1: History of Forensics Science and DNA Analysis

Assignments

1. Course Overview
2. Science Goes to Court
3. History of Physical Evidence Investigation Methods
4. Project: Creating a Timeline, Part One
5. Identity Is Key
6. Project: Creating a Timeline, Part Two
7. Quiz 1: The History and Development of Forensic Science
8. History of DNA Analysis and Forensics
9. Project: Investigating Careers in Genomics
10. DNA at Work in Forensics
11. Project: Creating a DNA Digital Gallery
12. DNA Ethics and Legalities
13. Quiz 2: DNA Analysis and Forensics
14. Special Project*
15. Test
16. Course Project: The Biography of a Crook Turned Spy*
17. Glossary and Credits

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Unit 2: CSI and Forensic Medical and Dental Professionals

Assignments

1. Role of CSI Crime Scene Investigation
2. Project: Processing the Scene
3. Evidence Collection and Processing
4. Project: Protecting the Crime Scene and Evidence
5. Documenting a Crime
6. Quiz 1: Crime Scene Investigator
7. Medical Examiner and Forensic Pathologist
8. Project: Forensic Pathology
9. Odontology
10. Project: Teeth as Evidence
11. Forensic Psychiatry
12. Quiz 2: Medical and Dental Professionals in Forensics
13. Special Project*
14. Test
15. Course Project: The Canine Caper*
16. Glossary and Credits

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Unit 3: Forensic Biologist, Forensic Chemist, Physical Anthropologist

Assignments

1. Forensic Biology
2. Project: Forensic Genetics Using Technology
3. Entomology
4. Project: Using Insects to Solve a Case
5. Chemistry
6. Quiz 1: Forensic Biologist and Forensic Chemist
7. Anthropology
8. Project: An Anthropologist's Field Trip
9. Osteology and Archeology
10. Project: The Secret in the Cellar
11. Taphonomy
12. Quiz 2: Forensic (Physical) Anthropologist
13. Special Project*
14. Test
15. Course Project: The Burning Star*
16. Glossary and Credits

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Unit 4: Forensic Toxicologist, Computer Forensics and Forensic Engineering

Assignments

1. Toxicology
2. Project: The Uncommon Scents Incident
3. Alcohol
4. Project: Solve an Alcohol Case
5. Drugs
6. Quiz 1: Forensic toxicologist
7. Computer Forensics
8. Project: Online Crime and Establishing Personal Security
9. Legal and Ethical Issues of Computer Forensics
10. Project: Solving a Real Crime with a Real Computer Forensic Investigator
11. Forensic Engineer
12. Quiz 2: Computer Forensics and Forensic Engineering
13. Special Project*
14. Test
15. Course Project: Developing a Cyber-security Plan for a Medical Clinic*
16. Glossary and Credits

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Unit 5: Additional Careers in Forensics

Assignments

1. What is Forensic Nursing?
2. Project: Forensic Intake Forms
3. History of Forensic Nursing
4. Human Trafficking
5. Project: Violence Against Women Act
6. Quiz 1: Forensic Nursing
7. Linguistics
8. Project: Communications Training
9. Forensic Animation, Art, Photography
10. Project: Decision Making
11. Career Opportunities in Forensic Science
12. Project: What I Have Learned About Career Paths
13. Quiz 2: Forensic Linguistics, Animation, Art, and Photography, and Choosing a Career
14. Special Project*
15. Test
16. Course Project: Count the Forensic Careers*
17. Glossary and Credits

Forensics

Unit 6: Course Review and Exam

Assignments

1. Project: Choosing A Career*
2. Review
3. Exam

(*) Indicates alternative assignment