

Oakwood City School District Forensic Science I Standards

One goal of science education is to help students become scientifically literate citizens able to use science as a way of knowing about the natural and material world. All students should have sufficient understanding of scientific knowledge and scientific processes to enable them to distinguish what is science from what is not science and to make informed decisions about career choices, health maintenance, quality of life, community and other decisions that impact both themselves and others.

Forensic Science is a high school level course, which satisfies the Ohio Core science graduation requirements of Ohio Revised Code Section 3313.603. This section of Ohio law requires three units of science. Each course should include inquiry-based laboratory experience that engages students in asking valid scientific questions and gathering and analyzing information.

Forensic Science is the application of science (chemistry, physics, and biology) to the criminal and civil laws that are enforced by police agencies in a criminal justice system. The focus of Forensic Science I is on the collection, identification, and analysis of crime scene evidence. Emphasis will be placed on the methods that link the suspect, victim, and crime scene. Major topics of study include entomology, fingerprinting, hair and fiber examination, blood spatter analysis, and crime scene investigation. Case studies and current events will also be explored.

Forensic Science I Standards

Introduction to Forensic Science

- A. Define forensic science.
- B. Discuss the various branches within the field of forensic science.
- C. Examine the history and development of forensic science, linking progress to improvements in technology and practice.
- D. Describe the role of a forensic scientist.
- E. Examine the structure and services provided by a crime laboratory.
- F. Discuss the various branches within the field of forensic science (pathology, anthropology, entomology, odontology).
- G. Examine the structure and function of a cow eye. Discuss how a medical examiner can use the vitreous humor of the eye to determine the time of death.

Introduction to Physical Evidence

- A. Define physical evidence and testimonial evidence.
- B. Explain the Locard Exchange Principle.
- C. Discuss the common types of physical evidence encountered at crime scenes.
- D. Explain the difference between the identification and comparison of physical evidence.
- E. Define and contrast individual and class characteristics of physical evidence.
- F. List and explain the function of national databases available to forensic scientists.

Impression Evidence: Fingerprints & Footwear Impressions

- A. Fingerprints
 - a. Discuss the three types of impressions (imprint, indentation, and striation).
 - b. Examine the progression of fingerprint methodology due to improvements in technologies.
 - c. Distinguish and recognize differences in fingerprint pattern types (arch, whorl, loop).
 - d. Discuss the classification and storage of fingerprints (ten-print card and AFIS).
 - e. Discuss the three types of fingerprints (patent, plastic, and latent).
 - f. Describe the techniques for developing latent fingerprints on porous and nonporous objects.

- g. Describe the various procedures for collecting and preserving fingerprint samples.
- B. Footwear Impressions
 - a. Examine the type of information that can be obtained from footwear impressions.
 - b. Distinguish between two-dimensional and three-dimensional footwear impressions.
 - c. Describe the methods used to recover footwear impressions from an incident scene and discuss how they may be subsequently compared with suspect footwear.
 - d. Learn the steps involved in making a cast of footwear impressions.

Trace Evidence: Hairs and Fibers

- A. Hairs
 - a. Recognize and understand the cuticle, cortex, and medulla areas of hair.
 - b. Describe the three phases of hair growth (anagen, catagen, and telogen).
 - c. Distinguish between human and animal hairs.
 - d. List hair features that are useful for the microscopic comparison of human hairs.
 - e. Explain the proper collection and preservation of forensic hair evidence.
- B. Fibers
 - a. Recognize different types of fibers.
 - b. List the properties of fibers that are most useful for forensic comparisons.
 - c. Describe the proper collection and preservation of fiber evidence.

Forensic Serology

- A. Identify the various components of blood.
- B. List the A-B-O antigens and antibodies found in the blood for each of the four blood types: A,B,AB, and O.
- C. Describe the presumptive tests used to determine whether fluid found at a crime scene is blood.
- D. Understand the importance of bloodstain pattern analysis in the investigation of scenes of violent crime.
- E. Describe the process of collecting and preserving blood and other physiological fluids for laboratory examination.

Forensic Entomology

- A. Discuss how forensic entomologists determine a victim's time of death.
- B. Distinguish between urban entomology, stored product entomology, and medicolegal entomology.
- C. Observe the action of maggots on a decomposing chicken.
- D. Become familiar with the first case in history in which flies were used to identify the killer.
- E. Discuss why insects are useful in determining the time of death.
- F. Draw and illustrate the life cycle of a fly.
- G. Describe the structure of a maggot.
- H. Using a dissecting microscope, differentiate between 1st, 2nd, and 3rd instars.
- I. List the stages of decomposition.
- J. Using maggots, calculate the post mortem interval of deceased victims.

Document Examination

- A. Understand the common individual characteristics that are associated with handwriting.
- B. List some important guidelines for the collection of known writings for comparison to a questioned document.
- C. List some of the techniques document examiners use to uncover alterations, erasures, obliterations, and variations in pen ink.

Firearms

- A. Recognize the class and individual characteristics of bullets and cartridge cases.
- B. Explain the procedure for determining how far a weapon was fired from a target.
- C. Identify the laboratory tests for determining whether an individual has fired a weapon.

Scientific Crime Scene Investigation

- A. Give a general description of a crime scene.
- B. Discuss the methods of processing a crime scene including: the roles of the first responders, securing the crime scene, crime scene security, searching the crime scene, and documenting the crime scene.
- C. Describe the proper techniques for packaging common types of physical evidence.
- D. Participate in a Mock Crime Scene.