

Curriculum Development
In the Fairfield Public Schools

Fairfield Public Schools
FAIRFIELD, CONNECTICUT

CRIME SCENE FORENSICS

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CRIME SCENE FORENSICS

Statement of Purpose

Science education promotes essential understandings of the natural world and nurtures students' abilities to apply scientific knowledge as seen through a lens from both a personal and societal perspective. As such, this education requires that the fundamental approach to science be a creative and logical process for investigating, reasoning, critiquing and communicating about ideas, not just a static body of facts to be memorized. Understanding the interconnections between science and technology and their shared impact on the environment and societal issues is essential for all students.

Audience

Grade 11 or 12 students

Prerequisites

Successful completion of 4 credits of science including Biology

Design and Description

Crime Scene Forensics, which is a laboratory-based course, will promote and cultivate the development of student's scientific inquiry and scientific method skills, which are important critical thinking skills. Crime Scene Forensics applies concepts and skills acquired in grades nine and ten to look at the criminal justice area. This course focuses on problem solving, with an emphasis on writing, using experimentation and evidence based conclusions. Students will write reports that record their results, conclusions and analyses of case studies and investigations. Students will participate in hands-on laboratory exercises that require lengthy laboratory procedures with many recently developed techniques for analyzing evidence, crime scenes, fingerprints, death and decomposition, blood/body fluids, trace evidence and forensic anthropology. The course is laboratory driven and requires students to use advanced tools and equipment in addition to excellent observation skills.

Course Objectives

Students will be able to:

- describe how the scientific method is used to solve forensic problems.
- describe the applications of forensics.
- describe the relationship of science, forensics and the law.
- explain forensics practices using specific court cases throughout the course.
- discuss the importance of the work of various forensics pioneers.
- discuss the careers that contribute to the field of forensics.
- discuss the "CSI effect" on the field of forensics and juries.
- explain the importance of Locard's "Exchange Principle" of evidence.
- describe the different types of evidence
 - material and probative
 - testimonial vs. physical
 - class vs. individual
 - circumstantial vs. exculpatory
 - prima facie
- contrast criminal vs. civil laws.
- explain the Federal rules of evidence including the Frye standard and the Daubert ruling.
- identify the different types of trace evidence.

- describe the parts of a hair.
- explain the lack of evidentiary value in hair comparisons.
- evaluate the basic types of fibers in use today.
- contrast natural and synthetic fibers.
- explain the reasons for isolating and protecting a crime scene from outside contamination.
- explain the importance of the “chain of evidence”.
- explain the steps for thoroughly recording the crime scene.
- describe the proper procedures for conducting a systematic search of a crime scene for physical evidence.
- differentiate between primary and secondary crime scenes.
- describe the rules of search and seizure (Mincey vs. Arizona, search warrants, Miranda rights).
- discuss the different types of prints that can be used to identify an individual (finger, lip, foot).
- trace the development of prints in a human.
- describe the types of fingerprints found (latent, plastic, visible).
- describe the reasons and importance of fingerprint databases.
- describe the various components of blood, and the evidence each part contains.
- outline methods used to identify an unknown substance as blood.
- explain the method of chemically identifying old, invisible blood stains.
- describe different blood stain patterns based on source, direction, and angle of trajectory.

Skill Objectives

Students will:

- evaluate different types of evidence and classify them as individual or class.
- evaluate different types of animal and human hair.
- categorize types of tool marks.
- secure a crime scene.
- search a crime scene.
- collect evidence and retain the “chain of evidence”.
- draw and use a crime scene sketch.
- identify the basic types of fingerprint classification (loop whorl, arch).
- process latent prints on a variety of surfaces using different methods.
- compare fingerprints found at the crime scene with known samples.
- determine blood type (using simulated blood and saliva).
- use blood stain patterns to identify direction, velocity and height of fall.

Core Standards

Scientific Inquiry

Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.

Students will use appropriate tools and techniques to make observations and gather data.

Scientific Numeracy

Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and understanding.

Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

Chemical Structures and Properties – Properties of Matter

Due to its unique chemical structure, carbon forms many organic and inorganic compounds.

Students will explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.

Chemical Structures and Properties - Science and Technology in Society

Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.

Students will explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.

Students will explain how the chemical structure of polymers affects their physical properties.

Cell Chemistry and Biotechnology – Structure and Function

Fundamental life processes depend on the physical structure and the chemical activities of the cell.

Students will describe the general role of enzymes in metabolic cell processes.

Biology Enrichment Standards

Physiology

Organisms have a variety of mechanisms to combat disease.

The skin provides nonspecific defenses against infection.

Physics Enrichment Standards

Motion and Forces

Newton's laws predict the motion of most objects

Applying a force to an object perpendicular to the direction of its motion causes the object to change direction.

Newton's laws are not exact but provide very good approximations unless an object is small enough that quantum effects become important.

Information and Technology Standards (to be added)

Essential Questions

- How is scientific knowledge created and communicated?
- How does the structure of matter affect the properties and uses of materials?
- How do science and technology affect the quality of our lives?
- How are organisms structured to ensure efficiency and survival?
- What is the role of energy in our world?

Focus Questions

- How has science impacted the legal system?
- What is the admissibility of different types of evidence in the courtroom?
- What chemical and physical tests are used in analyzing trace evidence?
- How should a crime scene be secured, assessed and studied?
- In what ways are human prints developed, stored and used in solving crimes?
- In what ways does serological evidence aid in solving crime?
- How is skeletal evidence used in the reconstruction of a person's life and death?

UNITS OF STUDY

Unit 1: Introduction to Forensics

Core Standards

Scientific Inquiry

Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.

Students will use appropriate tools and techniques to make observations and gather data.

Scientific Numeracy

Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and understanding.

Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

Essential Question

How is scientific knowledge created and communicated?

Focus Question

How has science impacted the legal system?

Core Topics

- Scientific method
- History of forensics
- Legal system

Unit Objectives

Students will be able to:

- describe how the scientific method is used to solve forensic problems.
- describe the applications of forensics.
- describe the relationship of science, forensics and the law.
- explain forensics practices using specific court cases throughout the course.
- discuss the importance of the work of various forensics pioneers.
- discuss the careers that contribute to the field of forensics.
- discuss the “CSI effect” on the field of forensics and juries.

Sample Assessment

Help Wanted Careers in Forensics Posters

Pacing

2 weeks

Unit 2: Evidence

Core Standards

Scientific Inquiry

Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.

Students will use appropriate tools and techniques to make observations and gather data.

Essential Question

How is scientific knowledge created and communicated?

Focus Question

What is the admissibility of different types of evidence in the courtroom?

Core Topics

- Locard's principle
- Types of evidence
- Admissibility of evidence

Unit Objectives

Students will be able to:

- explain the importance of Locard's "Exchange Principle" of evidence.
- describe the different types of evidence
 - material and probative
 - testimonial vs. physical
 - class vs. individual
 - circumstantial vs. exculpatory
 - prima facie
- contrast criminal vs. civil laws.
- explain the Federal rules of evidence including the Frye standard and the Daubert ruling.

Skill Objective

Students will:

- evaluate different types of evidence and classify them as individual or class.

Sample Assessment

Can Evidence Be Individualized Activity

Pacing

2 weeks

Unit 3: Trace Evidence

Core Standards

Chemical Structures and Properties – Properties of Matter

Due to its unique chemical structure, carbon forms many organic and inorganic compounds.

Students will explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.

Chemical Structures and Properties - Science and Technology in Society

Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.

Students will explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.

Students will explain how the chemical structure of polymers affects their physical properties.

Essential Questions

- How does the structure of matter affect the properties and uses of materials?
- How do science and technology affect the quality of our lives?

Focus Question

What chemical and physical tests are used in analyzing trace evidence?

Core Topics

- Components of hair
- Fiber identification
- Tool marks

Unit Objectives

Students will be able to:

- identify the different types of trace evidence.
- describe the parts of a hair.
- explain the lack of evidentiary value in hair comparisons.
- evaluate the basic types of fibers in use today.
- contrast natural and synthetic fibers.

Skill Objectives

Students will:

- evaluate different types of animal and human hair.
- categorize types of tool marks.

Sample Assessment

Hairs the Hair Crime Scene Analysis

Pacing

3 weeks

Unit 4: Crime Scene

Core Standards

Scientific Inquiry

Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.

Students will use appropriate tools and techniques to make observations and gather data.

Scientific Numeracy

Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and understanding.

Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

Essential Question

How is scientific knowledge created and communicated?

Focus Question

How should a crime scene be secured, assessed and studied?

Core Topics

- Chain of evidence
- Crime scene procedures

Unit Objectives

Students will be able to:

- explain the reasons for isolating and protecting a crime scene from outside contamination.
- explain the importance of the “chain of evidence”.
- explain the steps for thoroughly recording the crime scene.
- describe the proper procedures for conducting a systematic search of a crime scene for physical evidence.
- differentiate between primary and secondary crime scenes.

Skill Objectives

Students will:

- secure a crime scene.
- search a crime scene.
- collect evidence and retain the “chain of evidence”.
- draw and use a crime scene sketch.

Sample Assessment

Crime Scene – Sketching and Documenting Evidence

Pacing

3 weeks

Unit 5: Human Prints

Biology Enrichment Standards

Physiology

Organisms have a variety of mechanisms to combat disease.

The skin provides nonspecific defenses against infection.

Essential Question

How are organisms structured to ensure efficiency and survival?

Focus Question

In what ways are human prints developed, stored and used in solving crimes?

Core Topics

- Search and seizure laws
- Types of prints
- Print collection procedures

Unit Objectives

Students will be able to:

- describe the rules of search and seizure (Mincey vs. Arizona, search warrants, Miranda rights).
- discuss the different types of prints that can be used to identify an individual (finger, lip, foot).
- trace the development of prints in a human.
- describe the types of fingerprints found (latent, plastic, visible).
- describe the reasons and importance of fingerprint databases.

Skill Objectives

Students will:

- identify the basic types of fingerprint classification (loop whorl, arch).
- process latent prints on a variety of surfaces using different methods.
- compare fingerprints found at the crime scene with known samples.

Sample Assessment

Analysis of Fingerprints Using 5 Different Techniques

Pacing

3 weeks

Unit 6: Blood

Core Standards

Cell Chemistry and Biotechnology – Structure and Function

Fundamental life processes depend on the physical structure and the chemical activities of the cell.

Students will describe the general role of enzymes in metabolic cell processes.

Physics Enrichment Standards

Motion and Forces

Newton's laws predict the motion of most objects

Applying a force to an object perpendicular to the direction of its motion causes the object to change direction.

Newton's laws are not exact but provide very good approximations unless an object is small enough that quantum effects become important.

Essential Questions

- How are organisms structured to ensure efficiency and survival?
- What is the role of energy in our world?

Focus Question

In what ways does serological evidence aid in solving crime?

Core Topics

- Blood typing
- Blood stain patterns
- Blood components

Unit Objectives

Students will be able to:

- describe the various components of blood, and the evidence each part contains.
- outline methods used to identify an unknown substance as blood.
- explain the method of chemically identifying old, invisible blood stains.
- describe different blood stain patterns based on source, direction, and angle of trajectory.

Skill Objectives

Students will:

- determine blood type (using simulated blood and saliva).
- use blood stain patterns to identify direction, velocity and height of fall.

Sample Assessment

Blood Spatter Lab

Pacing

3 weeks