

SCIENCE DEPARTMENT

FORENSICS COURSE #457

Contact Information

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The Department's Educational Philosophy

We believe that students should be exposed to the process of scientific inquiry so they can acquire and interpret scientific knowledge, and begin to realize the wider applicability of scientific problem-solving methods. By making the laboratory the focal point of learning, we seek to foster students' appreciation for the experience of doing science.

Guiding Principles

- Students must be able to collect and analyze data and formulate hypotheses.
- Inductive and deductive problem-solving skills are central to science education.
- An effective program in science addresses the limitations of data and conclusions.
- Students should be able to use or design a strategy for testing scientific concepts.
- A comprehensive science program will emphasize the delicate checks and balances in man's abiotic and biotic environments and the stresses upon these ecosystems, which could affect the destiny of the world.
- Science is integrally related to mathematics.
- An effective science program builds students' ability to communicate accurately and precisely.
- An effective science program stresses both cooperative and independent learning.

FORENSICS: COURSE #457

Course Frequency: Semester course, 6 times per 6-day cycle

Credits Offered: Two and a half

Prerequisites: Biology, Chemistry, and/or Department Recommendation

Background to the Curriculum

This course was developed to teach students the basic scientific principles involved in solving crimes. Over the past decade, fueled by shows such as Bones, Criminal Minds, and the multiple C.S.I. series, student interest in forensics has grown dramatically. The course will cover the historical use of forensics to solve crimes, famous cases, famous forensic scientists, and how the fields of forensics differ from the way they are presented in the media. Critical thinking, application of scientific evidence, and using the scientific method will be central themes that run throughout the course.

Core Topics/Questions/Concepts/Skills

History of Forensics, The Criminal Justice System, Types of Evidence, Fingerprinting, Biometrics, Hair and Fiber Evidence, Drug and Toxin Evidence, Trace Evidence, Applications of Analytical Chemistry, Blood Properties, DNA Analysis, Ballistics, Human Remains, and Forensic Entomology.

Student research topics (some examples): The O.J. Simpson Trial, The Case Against Dr. Sam Sheppard, Dr. Henry Lee, Edmond Locard, Dr. Michael Baden

Course-End Learning Objectives

Forensics is an elective course intended for qualified juniors and seniors; therefore, the intent is not to address the State science frameworks. It is assumed that the student participants have met the State standards in biology, chemistry or earth science. Forensics addresses some benchmarks in biology and chemistry but mainly focuses on the concepts in the State Science Framework (Appendix III) entitled: “The Historical and Social Context for Science and Technology/Engineering: Topics for Study.”

<u>Learning objectives</u>	<u>Corresponding state standards, where applicable</u>
<u>Introduction to Forensics</u>	
1] Explain how the field of forensics developed through the application of scientific method to criminal case.	Appendix III
2] Describe how probability and statistics determines the probative value of evidence.	Appendix III
<u>Fingerprinting</u>	
1] Be able to isolate and analyze fingerprints based on pattern and minutia.	Appendix III
2] Explain how technology has changed fingerprint analysis.	Appendix III
<u>Hair and Fiber Evidence</u>	
1] Describe how some hair and fiber evidence can be individualized while other evidence is only class evidence with some probative value.	Biology 2.1 & 3.2, Appendix III
<u>Drugs, Toxins, and Trace Evidence</u>	
1] Describe how unknown substances can be analyzed to determine their chemical composition as compared to a control.	Chemistry 1.1, 1.2, 1.3
2] Explain how toxic substances are processed by the body.	Biology 4.1, 4.2, 4.8
<u>Blood and DNA Evidence</u>	
1] Explain how analysis of body fluids has changed over the past century.	Appendix III
2] Describe how DNA evidence is analyzed using PCR, RFLP, and STR techniques.	Biology 3.1, 3.2, Appendix III
<u>Ballistics</u>	
1] Explain how ballistic evidence is used for crime scene reconstruction.	Appendix III
<u>Entomology and Human Remains</u>	
1] Describe how insect populations on a corpse are used for crime scene reconstruction.	Biology 6.1, 6.2, 6.3, Appendix III
2] Explain how skeletal remains are used for identifying a victim.	Biology 4.5, Appendix III

Assessment

- Labs and Lab Practicals
- Content Quizzes
- “Forensics in the News” Assignment: Making Connections between the curriculum and current criminal investigations

Technology and Health Learning Objectives Addressed in This Course

(This section is for faculty and administrative reference; students and parents may disregard.)

<u>Course activity: skills and/or topics taught</u>	<u>Standard(s) addressed through this activity</u>
Word processing, power point presentations, internet-based activities, internet research, computer probes, databases, spread sheets, computer simulations, microscope skills	

Materials and Resources

- Deslich, Barbara and John Funkhouser. “Top Shelf Forensics.” J. Weston Walch (2003).
- Deslich, Barbara and John Funkhouser. “Forensic Science for High School.” Kendall/Hunt Publishing Co. (2006).
- Evans, Colin. “The Casebook of Forensic Detection.” John Wiley & Sons, Inc (1996).
- Genge, N.E. “The Forensic Casebook.” Ballantine Books (2002).
- Ramsland, Katherine. “The Forensic Science of CSI.” Berkley Boulevard Books (2001).

Numerous audio-visual, web sites, and lab materials to supplement the material taught in this course.