FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

FORENSICS

Date: January 2009 **Subject Area: Science**

Proposed Grade Level: 11th and 12th **Course Length: 1 Year**

Grading: A-F **Number of Credits: 5 per semester**
Subject Area Credit: Science

Prerequisites: Two years of high school level science with a grade of C or better and Algebra I with a grade of C or better.

COURSE DESCRIPTION:

Forensics is a third year of college-prep laboratory science for students that are college bound and/or interested in the field of forensics. This class will introduce students to the fields of forensic science and provide a general overview of the forensic sciences. Students will participate in many qualitative hands-on labs and simulations that develop the practical and theoretical aspects of forensics. This class will integrate previous science courses and demonstrate to the student the relevance of science education for practical use.

GENERAL GOALS/PURPOSES:

Students will have an understanding of:

- The history of forensic science
- The roles of different professionals in evaluating a crime scene and the evidence involved
- The role of senses in collecting data
- How to collect evidence without contaminating the evidence
- How to analyze evidence to come up with relevant data
- How to use data to formulate a conclusion
- The integration of previous science courses and provide relevance for practical use of science knowledge

STUDENT READING COMPONENT:

Students will be expected to read textbooks; read, interpret, and follow directions in laboratory assignments, conduct research from the internet and library, and read criminal law documents.

STUDENT WRITING COMPONENT:

Students will have opportunities to express their understanding of concepts in writing. Students will take notes, generate detailed reports about crime scenes, and write lab reports explaining the analysis of collected data.

STUDENT ORAL COMPONENT:

Students will have opportunities to express their understanding of concepts through oral presentations. Students will be working collaboratively in lab groups. Students will be expected to participate in class discussions.

STUDENT MATH COMPONENT:

Students will use basic mathematical calculations in the analysis of data.

DETAILED UNITS OF INSTRUCTION:

FORENSIC SCIENCE AND INVESTIGATION

- Introduction to Forensic Science
  - History
  - Careers
- Crime Scene Investigation
  - Crime scene procedures
  - Roles of specialists
- The Nature of Evidence
  - Identifying different types of evidence

TOOLS OF THE TRADE

- Separating Complex Mixtures
  - Soil Separation Lab: Students will use various physical separation methods to sort through soil to uncover evidence.
  - Centrifugation Lab: Students will use centrifugation as a means of separating mixtures based upon density.
  - Chromatography Lab: Students will employ liquid chromatography techniques to separate a mixture of chemicals as a means of identifying them based upon their mass, color and chemical affinities.
  - Chemical Separation Lab: Students will use solubility and pH as a means of identifying substances.
- Light and Matter
  - Materials will be examined and identified based upon their physical and chemical properties; melting point, boiling point, freezing point, solubility, plasticity, density and flammability.
- Microscopy
  - The use of microscopes to examine and identify materials, tissues and fluids will be practiced.

PATTERNS AND IMPRESSIONS

- Fingerprints
  - Students will learn fingerprinting techniques and the means to use fingerprint patterns to identify individuals.
- Impressions
  - The techniques for taking molded impressions from tire tracks, shoe prints, and other objects will be practiced
- Questioned Documents
  - Students will learn how to analyze and compare handwriting.
  - Students will analyze ink and paper using thin layer chromatography techniques.
- Firearms and Toolmarks.

FORENSIC BIOLOGY

- Forensic Pathology
  - Students will learn how autopsies are performed. A medical examiner would be invited as a guest speaker.
  - Students will learn techniques used to determine time of death.

- Anthropology and Odontology
  - Students will learn about the human skeleton.
  - Students will learn how to distinguish between human bones from other animal bone.
  - Students will determine approximate age of individual.

- Entomology
  - Students will explore decomposition rates and the roles of insects in the process.

- Serology
  - Students will learn how to confirm a sample is blood and how to locate blood samples at a crime scene.
  - Students will learn A/B/O blood typing using a simulated blood product.

- Blood Stain Patterns
  - Blood splatter lab: Students will analyze blood spatter and use this information to reconstruct an incident.

- DNA Typing
  - DNA Extraction Lab: Students will learn how to extract DNA from living tissues and crime scene samples.
  - Polymerase Chain Reaction (PCR) Lab: Students will learn how to process samples for PCR, a means of amplifying the amount of DNA available for analysis from small samples.
  - DNA Fingerprinting Lab: Students will learn how to perform DNA fingerprinting as a means of positively identifying individuals based upon their unique DNA sequences.

- Hairs
  - Hair Lab: Students will differentiate between human hair and nonhuman hair. Students will use hair samples to determine age, gender, and whether the sample has been colored.

FORENSIC CHEMISTRY

- Analysis and detection of the following chemical components:
  - Illicit Drugs
  - Toxic Compounds
  - Fibers, Paints, and Other Polymers
  - Glass and Soil
  - Fires and Explosions

LEGAL ASPECTS OF FORENSIC SCIENCE

- Research Project
  - Students will research a real-life legal case whose outcome depended heavily upon forensic science. The students will present the case in a mock-trial format.

SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:

Standards addressed will cover California Science Content Standards

Biology/Life Science
- Cell Biology: 1 d
- Genetics: 2 a, c, d, f, g, 4 a-f, 5 a-d
- Physiology: 9a-I, 10 a, b, d, f.

Chemistry/ Physical Science
- Gases and their Properties: 4 b, c.
- Acids and Bases: 5a, d

- Solutions: 6a-d
- Chemical Thermodynamics: 7b, c.

Investigation and Experimentation
- 1 a-d, f, g, j-n.

THIS COURSE WILL PREPARE STUDENTS FOR THE CAHSEE AND/OR CST'S:

Science

LAB FEE IF REQUIRED:

$10.00 (to cover the cost of laboratory notebooks and consumables the students will retain)

DISTRICT ESLRS TO BE ADDRESSED:
Students will be:

- **Self-Directed Learners:** Students will be expected to take responsibility for their learning by participating in class activities, labs, and discussions. Students will be expected to complete homework assignments and lab reports.

- **Constructive Thinkers:** Students will be expected to utilize problem solving, organization, logic and analytical skills. Students will participate in many hands-on activities and labs that require them to analyze their results critically and apply what they have learned to new situations.

- **Effective Communicators:** Students will be expected to actively participate in class discussions. Being part of a collaborative group, students will need to communicate their ideas and provide data to their fellow students

- **Collaborative Workers:** Students will participate in cooperative groups for lab assignments and crime scene investigation. Students will be expected to collaborate with one another on solving problems and crimes presented.

- **Quality Producers/Performers:** Students will be expected to produce quality reports demonstrating their organization, analysis, and understanding of the problem.

- **Responsible Citizens:** Students will be expected to conduct themselves in a manner conducive to a professional laboratory setting. Students will demonstrate respect for each other and the investigation being processed. Students will use their knowledge of forensics and scientific inquiry to make informed decisions about issues related to science, the environment, and their daily lives.