# Forensic Science Course Proposal:

**Campus High School Science**

## I. General Description

Forensic science is one of the fastest growing fields in the country and is a vital part of the criminal justice system. Forensic science is not only utilized in high profile cases, it is used every day from the beat officer with a Polaroid camera, to the scientist with a computer and an electron microscope. It is an ever-changing field that has spurred much interest among young adults. These young adults are the future Forensic Scientists of our country.

This course focuses on the skills and concepts behind crime scene investigation and forensic science. Whether one desires to be crime scene investigator, forensic pathologist, or some other medical scientist, this course will introduce the student to investigative skills and review a wide range of science concepts. The student will review physics, chemistry, anatomy, cell biology, environmental science and computer science in the process of learning about forensic science. The student will engage in lectures, labs, case studies, on-line activities, and crime scene scenarios as part of this course. This course should allow the student to understand how the application of science is used to answer questions rather than just learning science concepts.

## II. General Information

Prerequisites: Introduction and Technical Level Science within the Health Science Career Cluster.

Forensic Science is an Application course for the Health Science Career Cluster Pathway. This course is a one credit course and is also eligible for Regents Qualified Admissions in Natural Science.

Text book Costs:




**Student Edition**

**Price:** $23.97 isbn10: 0133627462 isbn13: 9780133627466 Classroom set of 30: $720

**Teachers Guide**

**Price**: $47.97 isbn10: 0133627470 isbn13: 9780133627473

**Teachers Handbook (Annotated Teachers Edition) price:** $12.47 isbn10: 0133627497

isbn13: 978013362749

**Student Handbook price:** $11.47 isbn10: 0133627489 isbn13: 9780133627480

Classroom set of 30 =$345

**Total = $1125.50**

**No additional staff required.**

**Supplemental Material is available on the internet.**

## III. Course Objectives:

| | | | |
|---|---|---|---|
| **:25 – Forensic Science** | 2 | 1 | 0 |
| **nprehensive (1 Credit)** 3 | | | |
| | **Introduction** | | |
| 1 | Discuss careers available in the field of forensic science and training required for each | | |
| 2 | Identify certifications and post-secondary programs for forensic science careers | | |
| 3 | Distinguish individual evidence from class evidence and discuss its relevance in a court of law | | |
| 4 | Justify use of observation skills and debate validity of eyewitness accounts of events | | |
| 5 | Practice HazMat and Bloodborne Pathogen safety | | |
| | **Crime Scene Investigation** | | |
| 1 | Differentiate procedures for securing & documenting a crime scene | | |
| 2 | Perform evidence collection and storage | | |
| | **Trace Evidence** | | |
| 1 | Develop, analyze and classify fingerprints | | |
| 2 | Identify & compare various types of shoe, tire, palm, lip, and bite prints | | |
| 3 | Analyze, identify, and compare various hair samples | | |
| 4 | Compare various types of fibers through physical and chemical analysis | | |
| | **Drugs & Toxicology** | | |
| 1 | Perform tests to identify various drugs and/or poisons | | |
| 2 | Research and examine how various drugs &/or poisons affect and/or move through the human body | | |
| | **Soil & Glass Analysis** | | |
| 1 | **Deduce, compare & contrast characteristics of various types of sand and soil** | | |
| 2 | **Use refractive index and density to determine differences in small particles of glass** | | |
| | **Serology** | | |
| 1 | **Distinguish between human and animal blood** | | |
| 2 | **Accurately type blood** | | |
| 3 | **Explore bloodstain patterns as a function of velocity, direction and height of fall** | | |
| | **DNA Analysis** | | |
| 1 | **Describe crime scene evidence collection and processing to obtain DNA** | | |
| 2 | **Isolate and extract DNA from cells** | | |
| 3 | **Justify use of DNA to determine family connections** | | |
| 4 | **Examine use of DNA in the legal process** | | |
| | **Forensic Entomology** | | |
| 1 | **Outline the succession of various types of insects found on a body as it decomposes** | | |
| 2 | **Deduce time of death using insect evidence** | | |
| | **Human Remains** | | |
| | **Use a human skeleton to determine gender, age range, height and race** | | |
| 2 | **Predict time of death using rigor mortis, algor mortis, liver mortis, and stages of decomposition** | | |
| 3 | **Distinguish between cause, manner, and mechanisms of death** | | |
| | **Handwriting/Document Analysis** | | |
| 1 | **Characterize facets of individual handwriting** | | |
| 2 | **Distinguish between different handwriting styles** | | |
| 3 | **Conduct an experiment using paper chromatography to determine the ink used** | | |

I4 Describe features of paper currency used to detect counterfeit bills
I Ballistics & Tool Marks
I1 Distinguish between types of firearms and ammunition
I2 Use bullet trajectory to determine position of shooter
I3 Design and conduct scientific investigations to match tool marks in a criminal investigation
I4 Distinguish between impressions with microscopic examinations

## Common Core/Pathway Standards:

**HS-LS1 from Molecules to Organisms: Structures and Processes**

Students who demonstrate understanding can:

**HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.** [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.]

**HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.** [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

**HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.** [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

**HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.** [Assessment Boundary: Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.]

**HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.** [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.] [Assessment Boundary: Assessment does not include the details of the specific chemical reactions or identification of macromolecules.]

**HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.** [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

ELA/Literacy –

**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS1-1),(HS-LS1-6)

**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1),(HS-LS1-6)

**WHST.9-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)

**WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)

**WHST.11-12.8** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)

**WHST.9-12.9** Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS-1-1),(HS-LS1-6)

**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2),(HS-LS1-4),(HS-LS1-5),(HS-LS1-7)

**HS-LS2 Ecosystems: Interactions, Energy, and Dynamics**

**HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.** [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.]

**HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.** [Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.] [Assessment Boundary: Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration.]

**HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.** [Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.]

**HS-LS3 Heredity: Inheritance and Variation of Traits**

**HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.** [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

**HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.** [Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.] [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

**HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.** [Clarification Statement: Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits.] [Assessment Boundary: Assessment does not include Hardy-Weinberg calculations.]

# HEALTH SCIENCE CAREER CLUSTER DESIGN

## Health Science Pathway – CIP Code 51.9999

**Approved Pathway:**

1) Includes minimum of three secondary-level credits.
2) Includes a work-based element.
3) Consists of a sequence: Introductory-level, Technical-level, and Application-level courses.
4) Supporting documentation include Articulation Agreement(s) and a Program of Study.
5) Technical-level and Application-level courses receive .5 state-weighted funding in an approved CTE pathway.

**Concentrator Requirement**

For a student to be a concentrator, at least 2 of 3 required secondary level credits taken must be a combination of technical and application levels.

### *INTRODUCTORY LEVEL*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Health Science IA | 14000 | .5 credit | OR | Health Science IB | 14001 | 1 credit | Biology ✓ | 03051/53051 | 1 credit |

### *TECHNICAL LEVEL*

| | | | | | | |
|---|---|---|---|---|---|---|
| **General:** | | | | | | |
| *Health Science II | 14002 | 1 credit | | Health Information | 14157 | 1 credit |
| *Human Body Systems ✓ | 14102 | 1 credit | OR | *Anatomy & Physiology ✓ | 03053 | 1 credit |
| Nutrition & Wellness A | 08057 | .5 credit | OR | Nutrition & Wellness B | 08067 | 1 credit |
| Special Health Science Topics A | 14254 | .5 credit | OR | Spec. Health Sci. Topics B | 36254 | 1 credit |
| Medical Terminology A | 14154 | .5 credit | OR | Medical Terminology B | 36154 | 1 credit |
| AP Biology ✓ | 03056 | 1 credit | | | | |
| **Sport Care & Rehabilitation:** | | | | | | |
| Care of Athletes | 14062 | .5 credit | | Physical Therapy | 14060 | .5 credit |
| Sports Medicine I | 14072 | 1 credit | | Sports Medicine II | 14073 | 1 credit |
| **Medical:** | | | | | | |
| Biotechnology A | 14252 | .5 credit | OR | Biotechnology B | 36252 | 1 credit |
| Medical Interventions | 14105 | 1 credit | | Prin. Of Biomed Science ✓ | 14151 | 1 credit |
| Emerg. Medical Technology A | 14055 | .5 credit | OR | Emer. Med. Technology B | 36055 | 1 credit |
| Medical Imaging A | 14103 | .5 credit | OR | Medical Imaging B | 14149 | 1 credit |
| Pharmacology ✓ | 14253 | 1 credit | | | | |
| **Health Care:** | | | | | | |
| Health & Nursing I | 14051 | .5 credit | | First AID/CPR/EMR | 44050 | .5 credit |
| Home Health Care | 14053 | .5 credit | | EMT | 44060 | 1 credit |

### *APPLICATION LEVEL*

| | | | | | | |
|---|---|---|---|---|---|---|
| Health Science III | 36991 | 1 credit | | Biomedical Innovation ✓ | 14255 | 1 credit |
| Health Science IV (Shadow/Work) | 36992 | 1 credit | | Certified Nursing Assistant | 14997 | .5 credit |
| Health Sci. V (Shadow/Work) | 36993 | 2 credit | | Certified Medication Aid | TBD | .5 credit |
| Health & Nursing II | 14052 | .5 credit | | Home Health Aid | 36053 | .5 credit |
| Biotechnology II | 14256 | 1 credit | | Phlebotomy Technician | 14104 | .5 credit |
| Forensic Science ✓ | 44224 | .5 credit | OR | Forensic Science Comp. ✓ | 44225 | 1 credit |
| Proj. Mgmt & Resource Sched. | 21205 | 1 credit | | | | |

*Select one for pathway approval. ✓Eligible for Regents Qualified Admissions – Natural Science

**Boldfaced courses offer professional certification and require specialized teacher certification.**

ALL ONE CREDIT COURSES MAY BE TAUGHT AS TWO .5 CREDIT COURSES.