Science Georgia Standards of Excellence

SCIENCE – Forensic Science

The Science Georgia Standards of Excellence are designed to provide foundational knowledge and skills for all students to develop proficiency in science. The Project 2061's *Benchmarks for Science Literacy* and the follow up work, *A Framework for K-12 Science Education* were used as the core of the standards to determine appropriate content and process skills for students. The Science Georgia Standards of Excellence focus on a limited number of core disciplinary ideas and crosscutting concepts which build from Kindergarten to high school. The standards are written with the core knowledge to be mastered integrated with the science and engineering practices needed to engage in scientific inquiry and engineering design. Crosscutting concepts are used to make connections across different science disciplines.

The Science Georgia Standards of Excellence drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphasis of instruction. The standards are a required minimum set of expectations that show proficiency in science. However, instruction can extend beyond these minimum expectations to meet student needs.

Science consists of a way of thinking and investigating, as well a growing body of knowledge about the natural world. To become literate in science, students need to possess sufficient understanding of fundamental science content knowledge, the ability to engage in the science and engineering practices, and to use scientific and technological information correctly. Technology should be infused into the curriculum and the safety of the student should always be foremost in instruction.

The Forensic Science Georgia Standards of Excellence are designed to build upon science concepts from previous courses and apply science to the investigation of crime scenes. Students will learn the scientific protocols for analyzing a crime scene, chemical and physical separation methods to isolate and identify materials, how to analyze biological evidence, and the criminal use of tools, including impressions from firearms, tool marks, arson, and explosive evidence.

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SFS1. Obtain, evaluate, and communicate information to properly conduct a forensic investigation of a crime scene.

a. Construct an explanation of how scientific forensic techniques used in collecting and submitting evidence for admissibility in court have evolved over time.
(*Clarification statement:* Emphasis is on Locard's Exchange Principle, Frye standard, Daubert ruling)
b. Plan and carry out investigations using the scientific protocols for analyzing a crime scene (e.g., search, isolate, collect, and record).
c. Construct an argument from evidence explaining the relevance of possible evidence at the site of an investigation.
d. Develop models to analyze and communicate information obtained from the crime scene.
(*Clarification statement*: Properly document and sketch a crime scene.)

SFS2. Obtain, evaluate, and communicate information on various scientific techniques to analyze physical, trace, and digital evidence.

a. Plan and carryout an investigation to determine the value of physical and trace evidence.
b. Plan and carryout an investigation to analyze the morphology and types of hair, fibers, soil and glass evidence in order to make a physical match examination.
c. Use models for the evaluation of handwriting and document evidence.
d. Analyze and interpret data to evaluate digital sources of evidence.
e. Ask questions to determine the appropriate uses of chromatography and spectroscopy in evidence analysis.
(*Clarification statement:* Addressing spectroscopy at an analytical chemistry level is not required.)

SFS3. Obtain, evaluate, and communicate information relating to biological evidence in forensic investigations.

a. Ask questions to investigate types of toxins, poisons, and drugs and their effects on the body.
b. Analyze and interpret data to investigate the effects of blood alcohol content on the body.
c. Construct an explanation to distinguish the difference between human and animal blood.
d. Plan and carry out an investigation to analyze the physics of bloodstain patterns.
e. Plan and carry out an investigation involving DNA processing and analysis.

SFS4. **Obtain, evaluate, and communicate information to analyze the role of impression evidence in order to make a physical match examination.**

a. Construct an explanation for utilizing the appropriate technique to lift and evaluate identifiable, latent, plastic and patent fingerprints.
(*Clarification statement*: Classifying print and minutiae patterns are addressed in this element. Students should be able to explain why they are using a specific technique.)
b. Analyze and interpret data regarding impression evidence.
(*Clarification statement:* Impression evidence could include ballistics, tool marks, footwear, tire impressions, etc.).
c. Construct an explanation to support the significance of impression evidence in an investigation.

SFS5. Obtain, evaluate, and communicate information to Medicolegal Death Investigations.

a. Ask questions to identify various causes of death (blunt force trauma, heart attack, bleeding, etc.).
b. Construct an argument based on evidence that pertains to the manner of death (natural, homicide, suicide, accidental, or undetermined).
c. Use mathematics and computational thinking to explain post mortem changes used to determine post mortem interval (PMI):
    - Rigor mortis
    - Livor mortis
    - Algor mortis
    - Gastric contents

    (*Clarification statement:* Instruction should include the historical use of Algor Mortis as it is often not used by practicing forensic specialists.)
d. Analyze and interpret entomological data to evaluate the role insects play in decomposition and determining PMI.
e. Plan and carry out an investigation to analyze height, sex, age, and race to develop an anthropological profile of the victim and potential perpetrator.