

Fair Lawn Public Schools

Fair Lawn, NJ

**Forensic
Science**

August

2017

**Updated August 2017 to Address NJDOE Curriculum Requirements
Developed July 2000**

Forensic Science in a half year elective science course which must be taken with criminal law in the history department.

**Science
Department**

Fair Lawn School District

Committee Credits

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Forensic Science

Course Synopsis

Forensic science is a semester based course which is taught in conjunction with Criminal Law. Students will learn and apply science content to real-world forensic science techniques.

Philosophy & Rationale

This course has been aligned to and developed with the NJSL-S as its focus. Efforts have been made to integrate aspects of other science standards, particularly the earth and space science standards into this course to assure that students are provided an opportunity to form connections.

All NJSL-S aligned courses in the Fair Lawn Schools demonstrate a commitment preparing students to become [college and career ready](#) as well as the other guiding assumptions of the [Frameworks for Science Education](#) (NRC, 2011) and the [NJSL-S](#) including

- Students are born investigators;
- Science instruction should focus on core ideas and practices;
- An understanding of science develops over time;
- Science and engineering require both knowledge and practice;
- Science education must connect to students' interests and experiences; and
- Promoting equity for all students must be a focus of science education.

Additionally, all NJSL-S aligned courses in the Fair Law Schools integrate the three dimensions discussed in the [Frameworks for Science Education](#) and the NJSL-S, including

- [Science & Engineering Practices](#) which describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems; ([NJSL-S- PDF](#))

- [Cross Cutting Concepts](#) which link all domains of science and provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world; ([NJSL-S PDF](#)) and
- [Disciplinary Core Ideas](#) which focus and unite K-12 science, have a broad importance across multiple sciences or engineering disciplines or are a key organizing concept within a single discipline; provide a key tool for understanding or investigating more complex ideas and solving problems; relate to the interests and life experiences of students; are connected to societal or personal concerns that require scientific or technological knowledge; and are teachable and learnable over multiple grades at increasing depth and sophistication. ([NJSL-S PDF](#))

Since coherence is a main dimension of the NJLS-S, consider reviewing the “story line” for the middle school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and applications of science](#), as well as the high school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and application of science](#) for a full picture of the NJLS-S philosophy. For a full picture of how these programs are implemented in the Fair Lawn Schools, visit the [district curriculum website](#).

As described in the NJLS-S, technical writing and reading non-fiction is also a focus of our 6-12 science curricula as required by the [NJSL-ELA Companion Standards](#). Students are expected to think critically about data they collect or read about and then express their thoughts through text-based narratives, journal entries, short-constructed response, argument-based writing, and/or in-class discussion.

Differentiated instruction for students at different levels of achievement and specific learning needs (e.g. special education, English Language Learners (ELL), at-risk, and Gifted & Talented) is embedded in targeted scaffolding based on knowledge of each student’s interests, needs, and assessment data, including, but not limited to, in class formative and summative assessments.

When deemed appropriate, department teachers will engage students in purposeful paired discussions to share information more effectively, such as the “turn and talk” (Harvey & Daniels, 2009). “Text annotation” could be used, for example to optimize reading comprehension (Daniels & Steineke, 2010).

A particular focus will be made on the [cross cutting concepts](#) and the [science and engineering processes](#)

Scope & Sequence

Unit 1- Introduction to Forensic Science (1.5 weeks)

1. History (brief)- how forensics got started, examples of cases
2. General crime scene procedure: Who arrives first, what teams are involved, etc.)
3. Equipment
4. Education (degrees, fields, police training)
5. Court procedure/ expert witnesses/ Evidence description
6. Degrees of CSI and Specialists

Standards: Science & Engineering Practices

Unit 2-Finger Print Analysis (2 weeks)

1. Briefly discuss Integumentary system (dermis)
2. Ridges and patterns (loops, whorls)
3. Matching prints
4. Lifting fingerprints (off regular and irregular objects)
5. Taking fingerprints
6. Dusting for prints using various powders
7. Discuss AFIS
8. Altering prints using acid, slicing, gloves, etc

Labs- taking fingerprints, lifting prints, matching fingerprints to unknowns, classifying fingerprints

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Unit 3- Footwear Analysis (1 week)

1. Shoe patterns (company and wear)
2. Pressure patterns- heel to toe, depth, wearing different size shoes
3. Types of shoes
4. How to take a shoe print
5. Imperfections within a brand of shoe
6. Shoe size vs. Height

Lab- Shoe inventory, identifying shoe prints

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Unit 4- Hair and Fiber (1.5 weeks)

1. Layers of hair
2. DNA
3. How hair retains drugs
4. Alterations of hair (cutting, dying, chemicals)
5. Root of hair (pulled or not pulled)
6. Identification of hair (human vs. animal)
7. How to collect samples
8. Types of fibers
9. Comparison
10. Matching using microscopes

Labs- Matching known to unknown samples, Collection of hair samples, using microscope to observe and sketch samples

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Unit 5- Document Analysis (1week)

1. Handwriting patterns
2. Forgery
3. Angles of words and letters
4. Spacing
5. Ink
6. Typewriters and Computers
7. Photocopying

Labs- identifying an unknown sample, locating similar angles and spacing in paragraphs

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Unit 6- Firearms and Ballistics (1.5 weeks)

1. Types of firearms
2. Striations of bullets and barrels (Comparisons)
3. Test firing
4. Trajectory and angles
5. Spread (shotguns)
6. Burn patterns (distance of shooter)
7. Ricochet

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

**** Speaker****

Standards- 5.1 12 B 1, 5.1 12 B 2, 5.1 12 C 1, 5.1 12 C 2, 5.2 12 B 2

Unit 7- Blood Spatter (2 weeks)

1. Blood typing
2. Types of spray (arterial, blunt force)
3. Angle and direction of drop and blood trail
4. Blood pooling
5. Why you can't clean up blood
6. Human vs. animal blood

Labs- Blood patterns; Identify blood drop angles; Blood spatter patterns

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity, PS1: Matter & Its Interactions

Unit 8- Tool marks/Analysis (1 week)

1. Types of tools
2. Right vs. Left handed
3. Angle and pressure
4. Type of tool end (pointed, rounded, sharp, dull)
5. Length
6. Molding tool marks
7. Metals and woods
8. Lot numbers

Lab- identifying various tool marks

Standards- Science & Engineering Practices, PS1: Matter & Its Interactions

Unit 9- Crime Scene Analysis (2 weeks)

1. Photography (taken at different angles, close up, must be measure)
2. Documentation (evidence, who enters and leaves the scene)
3. Comparison
4. How to collect evidence

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Unit 10- Serial Killers and Profiling (1 week)

1. Serial Killer vs. Mass Murderer
2. Psychology
3. Patterns of serial killers
4. Sanity vs. Insanity
5. Famous cases

Research of a Notorious serial killer and make a PowerPoint presentation

Standards: Science & Engineering Practices, LS1: Molecules to Organisms, LS3: Heredity.

Course Materials

1. Court TV's Forensic Files
2. CSI: Crime Scene Investigators
3. A&E Special: Serial Killers, and Crime Stories Volume 1- Serial Killers

Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:

- **ELL/Special Education Students:**
 - Provide ELL students with short lists of essential academic vocabulary terms to assist with language development such as word walls;
 - Provide ELL students with opportunities for peer to peer interactions;
 - Explicitly teach ELL students academic language and link to main ideas;
 - Support ELL students through the use of graphic organizers, modeling, and visual aides.
 - Support special education students through the use of physical activity, modeling, role-play, dialogue, reading assignments based on ability, etc.
- **Gifted Students**

Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

Assessments

Each unit will have a variety of tests, quizzes, labs, projects, written homework assignments, presentations and class activities. These assessments will be geared toward the main learning objectives for each unit.

Cross Curricular Aspects

Science teachers will work with Algebra 1 teachers to enhance student understanding of graphing, equation calculations, and basic statistical analysis.

NJSLS Literacy: Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

NJSLS Math: Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

Interdisciplinary Connections and Alignment to Technology standards

Science classes in the Fair Lawn Public schools promote career-readiness skills related to Personal Financial Literacy (9.1) and Career Awareness, Exploration, and Presentation (9.2). Some course concepts from the Career and Technical Education Standards (9.3), but these are not directly correlated since our district is not a CTE program.

The Fair Lawn Public Schools District fosters an environment that promotes career-readiness skills in all content areas. Whereas [Career Ready Practices](#) are explored consistently, specific alignment to [Personal Finance Literacy \(9.1\)](#) and [Career Awareness, Exploration, and Presentation Standards \(9.2\)](#) are included in the district level document (below). When appropriate, the [Career and Technical Education Standards \(9.3\)](#) have been reviewed and aligned as well.

Examples: 9.2B: Career exploration in each unit of study.

In addition, every effort is made to integrate technology and engineering into our science classes. [Educational Technology \(8.1\)](#) and [Technology Education, Engineering, Design, and Computational Thinking – Programming \(8.2\)](#) standards are cross connected throughout our science programs.

Examples: 8.1A: Use spreadsheets to analyze & interpret data from laboratories, 6-12.
Use the internet to increase productivity and efficiency, 9-12.
8.1B,C: Use data to solve real-world problems, 6-12.
Use online platforms to collaborate & address global issues, 9-12.
8.1F: Collect and analyze data using internet and data simulations, 6-12.
8.2A: Become aware of the invention process, 3-5.
8.2B: Become aware of the global impacts on technology, 6-12.
8.2C: Apply the design process to pushes & pulls, K-2.
8.2D: Use tools to reduce work, K-2.

For additional detail on how these standards are integrated throughout the Fair Lawn Schools curriculum, review the Fair Lawn Public Schools District Alignment to Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix.