



SPRINGFIELD PUBLIC SCHOOLS
ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Springfield Public Schools
Springfield, New Jersey 07081

Forensics
Grade 11 - 12

Curriculum Guide

2026

This curriculum may be modified through varying materials, techniques, and strategies as per an individual student's IEP.

Springfield Board of Education
Approved July 27, 2026

Springfield Public Schools

Cultivating compassionate and extraordinary learners!

EXTRACT OF THE MINUTES OF A MEETING OF
THE BOARD OF EDUCATION OF
THE TOWNSHIP OF SPRINGFIELD
COUNTY OF UNION, NEW JERSEY
AS RECORDED IN THE OFFICIAL MINUTE BOOK

Resolution: 21

Introduced By: Mrs. Gamarekian

Seconded By: Vice President Rinaldi

Adopted: July 27, 2026

Curriculum Adoption

To approve the following new and revised curriculum and courses for the 2026-2027 school year:

1. High School Courses

- a. AP Cybersecurity (new course)
- b. AP Business with Personal Finance (new course)
- c. AP Biology
- d. AP Chemistry
- e. AP Physics I
- f. PLTW Robotics and Automation
- g. PLTW Introduction to Engineering Design
- h. PLTW Principles of Engineering
- i. Biology
- j. Biology Honors
- k. Chemistry
- l. Chemistry Honors
- m. Conceptual Physics
- n. Physics
- o. Environmental Science
- p. Forensics
- q. Human Anatomy and Physiology
- r. Oceanography
- s. Science 8
- t. Molecular Biology Research Lab (new course)

2. Middle School Courses

- a. Science 6
- b. Science 7

3. Elementary School Courses

- a. Kindergarten Science
- b. Grade 1 Science
- c. Grade 2 Science

(continued)

I, Michelle Calas, School Business Administrator/ Board Secretary of the Springfield Board of Education, hereby certify that the extract from the minutes of a meeting of the Board of Education duly called and held on July 27, 2026 has been compared by me with the original minute book of said Board of Education, and is a true, complete and exact copy thereof, as far as the same relates to the subject matter to on said extract.

In WITNESS THEREOF, I have hercunto set my hand and seal of the Springfield Board of Education, this 28th day of July 2026.

SEAL



Michelle Calas
School Business Administrator/ Board Secretary



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**Springfield Public Schools
Springfield, New Jersey**

**Rachel Goldberg
Superintendent of Schools**

**Erica Scudero
Assistant Superintendent of Curriculum and Instruction**

Curriculum Developed By:

Dr. Norman Francis ~ Principal of Jonathan Dayton High School

Gregory Salmon ~ STEM Supervisor

Jennifer Mortensen ~ Biology Teacher



Unit Overview Template

Content Area:	Forensic Science	Grade Level:	12	Unit Title:	Evidence
Unit Summary: Students will learn that the roles of the forensic pathologist and entomologist are extremely important in the death investigations. Additionally, students will focus on the phases of an autopsy, common causes of death and the environmental factors and the physical and chemical changes that assist in determining time of death.					
Primary Interdisciplinary Connections: Chemistry					
21st Century Themes ☐ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy ☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy					
Unit Rationale: Forensic investigations rely on evidence collected at crime scenes. Evidence serves many roles in an investigation from identifying remains to reconstructing a crime scene. Understanding how the body decays and the manner in which the person died is just the beginning of evidence collection. This unit will demonstrate the importance of evidence as an important player in the testimony of any criminal case.					
Career Readiness, Life Literacies, and Key Skills (Standard 9): 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.					

Learning Targets

Standards: HS-PS1.B, HS-PS3.B, HS-PS3.D, HS-LS1.A, HS-LS1.B, HS-LS2.C, HHS-ETSC1.C, 8.2.12.A.3 and 8.2.12.A.5	
Content Statements: Matter and its interactions; Motion and stability: forces and interactions; From molecules to organisms: structures and processes; Ecosystems, interactions, energy, and dynamics; Engineering design	
CPI#:	Cumulative Progress Indicator (CPI):
HS-PS1-5	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
HHS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.



HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
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.
HS-LS2-6	Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
8.2.12.ETW.1	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product.
8.2.12.ETW.2	Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.
8.2.12.ETW.3	Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution.
8.2.12.EC.1	Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.

Science and Engineering Practices:

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific principles and evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. (HS-PS1-5)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS3-4), (HS-LS1-3)



Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)
- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-4)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)

Asking Questions and Defining Problems

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HS-ETS1-1)

Disciplinary Core Ideas (DCIs):

PS1.B: Chemical Reactions

- Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (HS-PS1-5)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1) Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-4)
- Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). (HS-PS3-4)

PS3.D: Energy in Chemical Processes



- Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. (HS-PS3-4)

LS1.A: Structure and Function

- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)

LS1.B: Growth and Development of Organisms

- In multicellular organisms, individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)

LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2), (HS-LS2-6)

ETS1.A: Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (HS-ETS1-1)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (HS-ETS1-1)

Crosscutting Concepts:



Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-5)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-PS3-4)
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2), (HS-LS1-4)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)
- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6)

Scale, Proportion, and Quantity

- Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)

Connections to Nature of Science Scientific

Investigations Use a Variety of Methods

- Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)

Scientific Knowledge is Open to Revision in Light of New Evidence

- Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-2)
- Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HS-LS2-6)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1)

Unit Essential Questions:

- How is death defined?



- How can an autopsy help to solve a crime?
- Why is time of death important?
- How can environmental factors influence the time estimate?

Unit Enduring Understandings:

- There are several definitions of death, including the cessation of the heartbeat and brain function.
- An autopsy is performed if a death is suspicious or unexplained.
- A forensic entomologist studies the development of insect larvae in a body to estimate the time of death.

Unit Learning Targets:

Students will be able to:

- Identify the stages of decomposition based upon visual tissue changes, suggested odor and biological presence.
- Observe the body for insect infestation and based on age and type of insect present calculations of approximate time of death are established.
- Analyze the body for markers, both physical and biological, to determine causes and mechanisms of death.



Evidence of Learning

Summative Assessment: 45 days

Equipment Needed: Laptops, projectors

Teacher Resources: Test banks, teacher resource package, prior experiments, internet, Textbook

Formative Assessments:

- HW assignments
- Lab activities & experiments
- Webquests
- Virtual lab activities
- Do Nows
- Question & answer sessions



Lesson Plans

Lesson	Time Frame
Lesson 1 Death & decomposition	5 days
Lesson 2 Entomology	5 days
Lesson 3 Autopsy	5 days

Teacher Notes: Because students are using iPads rather than traditional desktop monitors, optimize all evidence photographs for screen zooming. Ensure image files of bullet casings are high-resolution (300 dpi or greater) so that micro-striations do not become pixelated when students use pinch-to-zoom controls to find matches. Keep a clean document camera ready at the front desk to project physical inert samples onto the main screen during live modeling phases.

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

[Forensics Magazine](#)

[Forensics Science Simplified](#)

[Forensics Basics](#)

[The Science Spot: Forensics Science Lesson Plans](#)



Lesson Plan 1 Template

Content Area: Forensic Science	Lesson Title: Death & Decomposition	Time Frame: 5 days
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Lesson Components

21st Century Themes

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|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☐ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|---|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☐ Information Literacy |
| ☒ Life and Career Skills | ☐ Communication and Collaboration | ☒ Media Literacy ☒ ICT Literacy |

Interdisciplinary Connections: Biology, Chemistry

Integration of Technology:

- iPads running near-real-time digital forensics platforms (such as interactive Nearpod software modules) featuring collaborative sketch pads, 3D anatomical layout boards, and embedded video checkpoints.
- Cloud-based interactive review platforms (like Kahoot or Quizizz) configured for rapid structural diagnostic polling to verify student comprehension of post-mortem intervals.
- Digital data logging software interfaces to monitor simulated tissue chemical fluctuations and soil pH changes.

Equipment Needed:

- Student iPads
- High-definition classroom display projector and audio integration system.
- Simulated decomposition soil test arrays (distilled water, soil sample core tubes, electronic pH/conductivity meters).
- Reusable multi-variable post-mortem interval slider reference wheels (correlating temperature, rigour, and lividity).
- Color-calibrated clinical crime scene photo portfolios displaying taphonomic changes across diverse environments.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Discuss the definition of death by evaluating the shift from clinical arrest to irreversible cellular and molecular degradation.	Lesson Sequence Phenomenon: Investigators processing an outdoor woodland crime scene locate a decedent whose skeletal muscle groups are rigidly locked in an unyielding	Written Scenario Evaluation Sheet: A comprehensive forensic diagnostic report where students analyze a hypothetical case file to accurately deduce the



• Identify the biological markers necessary for determining the process of death, utilizing algor mortis cooling slopes, rigor mortis chemical limits, and livor mortis pooling patterns. • Distinguish between four manners of death: natural, accidental, suicidal, and homicidal based on situational and physical scene geometry. • Distinguish between cause, manner, and mechanisms of death, establishing the precise legal and physiological chain of events leading to cessation of life. • Deduce manner of death based upon observation of crime scene photos, extracting physical evidence anomalies from complex environmental matrices. • Describe the responsibilities of the medical examiner, charting the legal jurisdiction, evidence recovery, and certification pathways of forensic pathologists. • Describe the stages of decomposition in a corpse, tracking structural transformations from fresh decay and bloating to active putrefaction and dry skeletal remains.	state of contraction, preventing joint articulation, while the downward-facing surfaces of the limbs display a deep, permanent purplish-blue coloration that does not blanch under pressure, contrasted against an adjacent localized patch of soil that exhibits an acute, massive surge in electrical conductivity and a toxic spike in nitrogen concentration that has completely defoliated the surrounding vegetation. 2. Crime Scene Mechanism Do Now: Students use their laptops to launch a targeted interactive Nearpod case slide showing a mock death scene. They complete an immediate visual analysis to differentiate the physical <i>cause</i> (e.g., exsanguination) from the <i>mechanism</i> (e.g., a lacerated femoral artery) and submit their preliminary post-mortem interval estimations to the class screen. 3. Core Background Lecture & Media Integration: The teacher utilizes a multimedia projector system to present structured, evidence-based taphonomy notes. The presentation pauses for	cause, manner, mechanism, and estimated post-mortem interval with zero foundational calculation errors. • Digital Pathology Nearpod & Kahoot Review Profiles: Real-time electronic data submissions capturing student accuracy across slide check-points and rapid matching metrics. • Soil Chemistry Data Matrix: A completed chemical charting sheet displaying accurate analysis of simulated putrefaction fluids and pH values. • Comprehensive Activity Notes Pack: A systematic vocabulary ledger and observation sheet verifying structural mastery of the five stages of human tissue decay. • Students will define algor mortis as the predictable post-mortem cooling pattern of a human body until it equilibrizes with ambient environmental temperatures. • Students will correctly isolate the permanent settling of red blood cells in dependent tissue regions as the mechanical event responsible for livor mortis on an exit ticket.
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- targeted video evaluations, streaming clips from "Estimating the Post Mortem Interval, part 1 - Stage One of Decay (Fresh Decay)" and "National Geographic: Secrets of the Body Farm" directly onto student laptops to show active chemical decomposition cycles.
4. Simulated Decomposition
Chemistry Lab: Moving into a hands-on chemical modeling activity, student groups test simulated soil core samples gathered from underneath a mock decomposition model. Using digital conductivity loops and pH probes, they map out the chemical footprint left behind during active putrefaction, recording structural soil data peaks that indicate volatile fatty acid leaks into the terrain.
 5. Analytical Scenario
Investigation & Group Workspace: Student forensic teams open an interactive digital document layout containing diverse case file summaries and medical examiner profiles. They work collaboratively to debate and resolve the cause, manner, and mechanism



- of death for each profile, using a physical multi-variable slider wheel to align temperature degradation variables with muscular rigidity timelines.
6. Interactive Diagnostic Synthesis: The lesson transitions into an active, high-speed Kahoot review module. Students use their laptops to answer rapid-fire forensic path questions, verifying their ability to identify markers like fixed post-mortem lividity versus temporary muscle stiffness before saving their scores directly to their digital performance logs.
 7. Lecture notes and [videos](#) to provide students with general background knowledge.
 8. Provide students with a worksheet of general questions and discussion topics. Working in groups, students will work together on answering questions.

Differentiation:

- Structural Document Modifications: Pre-highlighted instructional packets, bulleted vocabulary guides, and key-term glossaries are provided directly on laptops to support teams navigating high-density parsing challenges.
- Flexible Learning Timelines: Students are granted a structured daily choice of specific analytical tasks paired with an individualized working completion schedule based on unique IEP and 504 specifications.



- Peer-Supported Investigation Tracks: Adaptive workspace options allow students to navigate complex photographic evidence arrays independently or with a designated lab partner to optimize processing speeds.
- Advanced students can use their laptops to calculate precise thermodynamic cooling curves using Newton's Law of Cooling to adjust post-mortem interval estimates against high or low ambient air currents.
- Structured sentence frames are built directly into the case report templates: The presence of fixed livor mortis on the anterior surface indicates the body was [blank] after death, while the total absence of ATP inside the sarcoplasmic reticulum causes the body to enter a rigid state of [blank] mortis that locks the skeletal joints.

Resources Provided:

- Interactive digital presentation media, curated access links to the "Body Farm" documentary files, and web-based video portals.
- Core Taphonomy Pack (Anatomical manner-of-death sorting grids, medical examiner jurisdiction sheets, case scenario files, and post-mortem sliding calculators).
- Digital pH indicators, simulated soil core kits, and high-resolution forensic photographic galleries.



Lesson Plan 2 Template

Content Area: Forensic Science Lesson Title: Entomology Time Frame: 5 days

Lesson Components

21st Century Themes

☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections: Chemistry

Integration of Technology:

- Student iPads running interactive Nearpod slide decks to access digital entomology identification keys, manipulate 3D larval structural models, and post observations to the shared digital collaboration board.
- Texas Instruments graphing calculators paired directly with thermal data probes to log real-time temperature fluctuations within active ecological matrices.
- Cloud-based interactive review applications (such as Kahoot) played via iPad to execute rapid diagnostic checks of insect succession timelines.

Equipment Needed:

- Student iPads for data tracking, digital sketching, and interactive media modules.
- Stereoscopic microscopes equipped with top-lighting illumination modules.
- Texas Instruments calculators accompanied by compatible digital temperature probes.
- Pinned, mounted exemplar insect collections alongside laminated species classification cards.
- Secure glass observation jars with fine-mesh ventilated caps.
- Fresh raw beef liver specimens (serving as the controlled decomposition tissue medium).
- Dial and digital lab thermometers, dissection forceps, and clear metric petri dishes.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Identify the developmental stages of arthropods, accurately distinguishing between eggs, first/second/third instar larvae, pupae, and emerging adults.	Lesson Sequence 1. Phenomenon: A body discovered in an unheated apartment building during a spring homicide investigation yields hundreds of active, writhing insect larvae	• Succession Mechanism Written Analysis: An analytical response detailing why specific arthropod waves are dependent upon changing chemical



• Determine the local species of arthropods which would be found on decomposed material, identifying structural features like spiracle patterns under stereoscopic magnification. • Calculate the PMI (post mortem interval) in accordance to the presence of arthropods present on decaying tissue by converting localized ambient heat logs into Accumulated Degree-Hours (ADH).	foraging within the neck tissue; despite freezing nighttime temperatures, the internal temperature of this localized larval mass registers an astonishing 102°F (39°C), driving an accelerated metabolic growth rate that can completely throw off basic post-mortem interval calculations if the ambient room climate is the only variable measured. 2. Entomological First-Responder Do Now: Students use their iPads to read a brief forensic brief detailing insect colonization vectors. They immediately research which specific pioneer species (e.g., <i>Calliphoridae</i> or blowflies) are drawn to open wounds within minutes of expiration, posting their structural justifications to the Nearpod screen. 3. Media-Infused Succession Analysis: The teacher uses the main projector to display the video file "Estimating Post Mortem Interval, part 5 - Forensic	decomposition stages, using specific species names to back up the explanation. • iPad Entomology Lab Worksheet & Digital Portfolio: A comprehensive lab document complete with stereoscopic sketches, clear data grids, and identified instar phases matching the experimental tissue metrics. • Experimental Data Presentation: A structured team presentation using shared files to explain their experimental setup, show their data plots, and provide a verified PMI calculation. • Post-Mortem Interval Kahoot Profile: Electronic data readouts mapping individual student accuracy when solving multi-step ADH mathematical problems. • Students will define the term "instar" as an intermediate developmental phase of an insect larva between successive molting events.
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| | <p>Entomology." Students use their iPads to trace successive waves of colonization—mapping how pioneer blowflies hand off the decomposition matrix to flesh flies, skin beetles, and predatory wasps over time.</p> <p>4. Stereoscopic Morphological Audit: Working in investigative pairs, students align pinned, mounted adult insect specimens and preserved larvae under stereoscopic microscopes. Using their exemplar cards, they analyze the respiratory spiracle slits located on the posterior ends of the larvae, sketching these structural configurations directly onto their digital iPad lab sheets to determine the exact instar stage.</p> <p>5. Ecological Colonization Controlled Experiment: Teams execute a tactile forensic lab tracking insect behavior. They place raw liver inside ventilated glass jars, expose them to localized environmental variables, and use their Texas Instruments probes to</p> | <ul style="list-style-type: none">• Students will correctly identify the blowfly as the primary pioneer arthropod family used to establish the minimum post-mortem interval during early decomposition on an exit ticket. |
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capture temperature readouts, recording how metabolic activity inside larval clusters differs from baseline room temperatures.

6. Accumulated Degree-Hour (ADH) Mathematical Simulation: Using empirical data sets pulled from their laboratory sheets or interactive websites, students use their calculators to execute advanced PMI math. They calculate the product of time and ambient temperature ($ADH = \text{Time} \times \text{Temperature} - \text{Base Temperature}$) to trace back the exact hour the pioneer eggs were deposited on the tissue, verifying their calculations via a competitive class Kahoot session.

Differentiation:

- Experimental Track Customization: Students are given the structural choice to design their own unique environmental testing protocol or execute a pre-established, heavily scaffolded step-by-step laboratory procedure depending on unique IEP and 504 profile needs.
- Graphic and Text Accommodations: Bulleted note packets, highlighted identification keys, and simplified graphic organizers tracking the fly lifecycle are pre-loaded onto student iPads to reduce visual tracking friction.
- Flexible Evaluation Benchmarks: Teams work alongside the instructor to establish customized milestone goals and clear completion timelines, selecting individual or paired investigation configurations.



- Advanced students can model fluctuating diurnal temperature patterns, calculating how sudden drops in wind speed alter the oviposition (egg-laying) behavior of local blowflies.
- Structured sentence frames are embedded within the laboratory logs: The presence of third-instar larvae inside the raw liver indicates that a minimum of [blank] hours have elapsed since exposure, because the insects had to accumulate enough [blank] hours to complete their first and second molts under current temperature trends.

Resources Provided:

- Laptop/projector for viewing [video clip](#) of “Estimating Post Mortem Interval, part 5 - Forensic Entomology”
- Laptop for viewing and recording notes
- Laptop for designing experiment, collecting and compiling data and for creating presentation of results (can use website or create own design)
- Exemplar pinned/mounted arthropod
- Exemplar arthropod cards
- Use of website [activity](#) to design experiments.
- Incorporate [worksheet](#) into design plan to organize data for presentation to class.
- Raw liver
- Thermometer or Texas Instrument Probes & calculators
- Stereoscopes
- Textbook
- Specialized digital forensic entomology handbooks and access codes to online experimental modeling tools.
- Core Entomology Pack (Accumulated Degree-Hour math sheets, larval spiracle identification keys, experimental outline frames, and presentation rubrics).
- Stereoscopic units, Texas Instruments hardware linkages, fresh biological tissue samples, and physical insect reference trays.



Lesson Plan 3 Template

Content Area: Forensic Science Lesson Title: Autopsy Time Frame: 5 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections: Chemistry

Integration of Technology:

- Student iPads running interactive Nearpod modules to analyze digitized, redacted historical autopsy reports and annotated internal anatomical structural abnormalities.
- Web-based interactive virtual autopsy simulations allowing students to execute digital Y-incisions, weigh internal organs, and extract toxicological fluid profiles.
- Cloud-based interactive review platforms (such as Kahoot) optimized for rapid diagnostic checks of internal pathology techniques.

Equipment Needed:

- Student iPads with internet connectivity for interactive simulations and collaborative documentation.
- Classroom display projector and dry-erase whiteboard for real-time case data mapping.
- High-resolution medical examiner reference packs (including sample Y-incision layout schematics and organ weight baseline sheets).
- Centimeter rulers and structural grid graph paper for manual time-of-death plotting matrices.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Explain how the development of rigor, algor, and livor mortis occur, linking them directly to the post-mortem cessation of ATP production, vascular breakdown, and thermodynamic heat loss.	Lesson Sequence 1. Phenomenon: During a high-profile criminal trial, a forensic pathologist successfully disproves a defendant's ironclad alibi by analyzing the vitreous humor fluid drawn from the decedent's eye,	• Autopsy Report Case Brief & Interpretation Sheet: A collaborative analytical report detailing the evidence extracted from the Goldman or Ramsey files, defending a definitive conclusion on time of death.



• Perform a virtual autopsy, systematically replicating the external inspection, internal evisceration, and organ weight analysis of a forensic pathologist. • Review an autopsy report regarding physical and biological changes to estimate the time of death, extracting and defending critical timeline clues from authentic case files. • Indicate how biochemistry changes in the body determine time of death, mapping post-mortem chemical shifts like vitreous potassium accumulation over elapsed hours.	revealing a precise potassium concentration spike that places the time of death hours earlier than witness statements implied, completely bypassing the deceptive environmental heating intended to mask the body's natural cooling rate. 2. Pathologist Skillset Whiteboard Do Now: Students use their iPads to post characteristics and specific technical skills that every board-certified medical examiner must possess directly onto the interactive classroom whiteboard, initiating a student-driven debate regarding clinical objectivity versus investigative bias. 3. Autopsy Report Cross-Examination: Students break into forensic partner pairs and utilize their iPads to download a redacted historical autopsy report (such as the Ron Goldman or JonBenet Ramsey files). Partners map out the structural writing style, isolate critical physical evidence markers, and then regroup with other teams analyzing the same file to debate which internal pathology findings are most vital to the case.	• "When Did She Die?" Volumetric Analysis Matrix: A completed data tracking grid and matching line graph plotting vitreous potassium values against elapsed hours to isolate a precise post-mortem timeline. • Virtual Autopsy Diagnostic Diagnostic Log: Individual or paired lab submissions documenting a blind virtual case file, correctly identifying the internal cause of death and classifying the manner of death (natural, accidental, suicide, or homicide). • Biochemical Marker Post-Mortem Proposal: A brief, structured technical voucher detailing a measurable chemical change in decomposing tissue that could serve as an alternative forensic biological clock. • Students will define the term "cause of death" as the specific injury, disease, or physical trauma that initiates the physiological chain of events resulting in a person's life ending. • Students will correctly identify the surgical "Y-incision" as the primary structural method used by medical examiners to open the
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4. Historical Case Evolution Challenge: Students read a digital overview detailing the historical 1865 autopsy of Abraham Lincoln. Working in their teams, they critique the limitations of 19th-century medicine and draft a list suggesting modern post-mortem procedures (such as post-mortem CT scans or advanced toxicology screens) that would provide more accurate forensic tracking today.
5. Pathology Modality Differentiated Exploration: Students choose one of three digital exploration tracks on their iPads to deepen their understanding of internal examination mechanics:
 - a. Complete a comprehensive web-based interactive virtual autopsy module.
 - b. Watch a documentary detailing the systematic physical steps of an internal organ evisceration.
 - c. Listen to a forensic path podcast breaking down how a medical examiner isolates unexpected lethal trauma.

thoracic and abdominal cavities during an internal inspection on an exit ticket.



6. Biochemical Marker Innovation Lab: Pairs analyze case profiles detailing measurable post-mortem biochemical shifts, focusing on the predictable leakage of potassium ions into the vitreous humor of the eye after cellular pumps fail. Using graph paper and rulers, they plot out a linear calibration slope to calculate an estimated post-mortem interval, then brainstorm and write a brief proposal for a different cellular marker that could track tissue degradation timelines.

Differentiation:

- Modality Task Selection: Students are given the explicit choice to complete an interactive digital simulation, evaluate video media, or analyze acoustic podcast narratives to accommodate varying learning strengths while meeting core pathology targets.
- Structural Document Adjustments: High-contrast pre-highlighted text files, bulleted vocabulary guides, and simplified case summary cards are provided directly on iPads to support unique IEP and 504 profile pathways.
- Individual and Collaborative Options: Students can independently process their virtual autopsy case files or work with a designated lab partner, utilizing a flexible timeline model with custom milestone check-ins.
- Advanced students can analyze complex drug-interaction ratios within post-mortem blood samples, modeling how liver enzyme degradation alters toxicology interpretations after death.
- Structured sentence frames are built directly into the pathology logs: The presence of food contents inside the stomach indicates the post-mortem interval is brief because digestion halts at death, while a high concentration of potassium ions inside the vitreous humor confirms that cellular membranes have broken down over an estimated window of [blank] hours.

Resources Provided:

- Comprehensive digital forensic pathology textbooks, interactive virtual autopsy links, and curated true-crime case files.
- Core Pathology Pack (Redacted historical autopsy sets, vitreous humor graphing sheets, anatomical incision diagrams, and medical examiner classification rubrics).
- Graph paper, metric measurement tools, and digital case-study profiles.



Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson **Strongly**, **Moderately** or **Weakly** meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	X		
Allow for student choice	X		
Provide scaffolding for acquiring targeted knowledge/skills	X		
Integrate global perspectives		X	
Integrate 21st century skills	X		
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills		X	
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills		X	
Are varied to address different student learning styles and preferences		X	
Are differentiated based on student needs		X	
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	X		
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	X		
Provide opportunities for student reflection and self- assessment		X	
Provide data to inform and adjust instruction to better meet the varying needs of learners		X	

Curriculum Design Template

Content Area: Science	Grade Level: 11-12	Unit Title: Evidence
Created: 2026	Board Approved on:	Type Here



Unit Overview Template

Content Area: Forensic Science **Grade Level:** 12 **Unit Title:** Trace Evidence

Unit Summary: Students will learn the importance of trace evidence in crime scene evaluation including the collection of Fingerprints, Ballistics, and Hair and Fiber analysis. Students will identify types of fingerprints and minutia as well as learn how to develop and dust for fingerprints. Students will categorize hair and fibers samples to determine if they are animal or human, synthetic, or natural. Students will learn and discuss the parts of bullets, firearms and other projectiles and determine how ballistic fragments can be used to identify a suspect in a criminal investigation.

Primary Interdisciplinary Connections: Biology, Chemistry

21st Century Themes ☐ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ ICT Literacy
☐ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy

Unit Rationale: Forensic investigations also rely on trace evidence collected at crime scenes. Trace evidence can be very small and needs to be carefully collected and observed. Trace evidence can provide important information in linking a suspect or individual to a crime scene. Fingerprints, hair samples, and ballistics found at the scene of a crime can play an important role in corroborating testimony. In this unit, students will observe, collect data, and understand the probative value of trace evidence as it pertains to any criminal investigation.

Career Readiness, Life Literacies, and Key Skills (Standard 9):

9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth.
9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions

Learning Targets

Standards: HS-PS1; HS-PS3; HS-LS1; HS-LS2; HS-ETS1

Content Statements: Matter and its interactions; Motion and stability: forces and interactions; From molecules to organisms: structures and processes; Ecosystems, interactions, energy, and dynamics; Engineering design

CPI#:	Cumulative Progress Indicator (CPI):
HS-PS1-5	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.



HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
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.
HS-LS2-6	Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
8.2.12.ETW.1	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product.
8.2.12.ETW.2	Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.
8.2.12.ETW.3	Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution.
8.2.12.EC.1	Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.
8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.

Science and Engineering Practices:

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific principles and evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. (HS-PS1-5)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS3-4), (HS-LS1-3)



Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)
- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-4)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)

Asking Questions and Defining Problems

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HS-ETS1-1)

Disciplinary Core Ideas (DCIs):

PS1.B: Chemical Reactions

- Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (HS-PS1-5)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1) Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-4)
- Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). (HS-PS3-4)

PS3.D: Energy in Chemical Processes



- Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. (HS-PS3-4)

LS1.A: Structure and Function

- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)

LS1.B: Growth and Development of Organisms

- In multicellular organisms, individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)

LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2), (HS-LS2-6)

ETS1.A: Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (HS-ETS1-1)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (HS-ETS1-1)

Crosscutting Concepts:



Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-5)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-PS3-4)
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2), (HS-LS1-4)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)
- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6)

Scale, Proportion, and Quantity

- Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)

Connections to Nature of Science Scientific

Investigations Use a Variety of Methods

- Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)

Scientific Knowledge is Open to Revision in Light of New Evidence

- Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-2)
- Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HS-LS2-6)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1)

Unit Enduring Understandings:

- There are several types of trace evidence including, hair, fingerprints, and ballistics



- Fingerprint patterns are unique and help identify a person related to a crime.
- Hair evidence is class evidence and can be used to determine if a person is related to a crime
- Ballistics evidence can be used to match bullets and toolmarks to those found at a crime scene

Unit Learning Targets:

Students will be able to determine if trace evidence is class or individual evidence.

Students will be able to differentiate between loops, arches, and whorls fingerprint patterns.

Students will be able to understand the different techniques used in “lifting” fingerprints.

Students will be able to differentiate between human and animal hair

students will be able to discuss the stages of hair growth

Students will be able to match the striation patterns of bullets and fire pin marks.



Evidence of Learning

Summative Final Exam

Assessment:

Equipment Needed: Laptops, Projector, Microscopes

Teacher Teacher Online Resources, Video Sources, Prior Laboratory Results.

Resources:

Formative Assessments:

- Quizzes
- Do Nows
- Lab Skills
- Discussion Questions
- Video Questionnaires



Lesson Plans

Lesson	Time Frame
Lesson 1 Ballistics	6 days
Lesson 2 Fingerprints	8 days
Lesson 3 Hair and Fiber	8 days

Teacher Notes: Emphasize to students that forensic match conclusions are based on quantifiable points of alignment, not intuition. Whether they are matching striation lines in ballistics, ridge patterns in fingerprints, or cuticle structures in hair, they must defend their claims using objective geometric and physical data.

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

[Forensics Magazine](#)

[Forensics Science Simplified](#)

[Forensics Basics](#)

[The Science Spot: Forensics Science Lesson Plans](#)



Lesson Plan 1 Template

Content Area: Forensic Science Lesson Title: Ballistics Time Frame: 6 days

Lesson Components

21st Century Themes

☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☐ Health Literacy

21st Century Skills

☐ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections: Chemistry, Biology, Physics

Integration of Technology:

- Student iPads running interactive Nearpod modules to view high-resolution macro-photographs of breech-face markings and zoom into micro-striation timelines.
- Digital interactive assessment platforms used via iPad to run real-time student pulse checks and digital exit tickets.
- Collaborative cloud-based slide decks to compile comparison microscope side-by-side matching profiles from lab teams.

Equipment Needed:

- Student iPads for running Socrative, accessing digital guided notes, and analyzing evidence images.
- Classroom display projector paired with a digital document camera.
- Inert, completely deactivated display ammunition cartridges (showing casing, primer, powder, and bullet separation).
- High-resolution physical portfolios displaying firing-pin impressions, ejector marks, and bullet striations.
- Handheld optical magnifiers or stereomicroscopes for analyzing casing surfaces.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Describe the history of firearms, charting the mechanical evolution from matchlock and flintlock systems to modern rimfire and centerfire self-contained cartridges. • Describe how bullets have advanced and improved, analyzing the	Lesson Sequence 1. Phenomenon: An investigator analyzing a copper-jacketed bullet recovered from a convenience store drywall notes a series of parallel microscopic scratches engraved into its sides that perfectly match the scratch profile of a test-fired round from	• Ballistics Quiz: An interactive electronic assessment evaluating a student's capacity to correctly label bullet components and separate class metrics from individual toolmarks. • Forensic CER Technical Document: A written scientific defense



ballistic advantages of expanding hollow-points versus full-metal jacket structural designs.

- Identify the Class and Individual characteristics that can be found on ballistics at a crime scene, separating caliber and twist direction from unique microscopic breech-face striations.
- Match firing-pin markings and striation patterns on bullet casings, executing a forensic comparison alignment to determine firearm matches.

a suspect's handgun, even though a second bullet found at the scene shows completely distorted, smoothed-out markings because it passed through a steel security gate and underwent catastrophic thermal and mechanical deformation.

2. Striation Alignment Do Now: Students activate their iPads to open a side-by-side image profile contrasting a crime scene bullet against a laboratory test-fired round. They perform an initial visual comparison, mapping lines of alignment between parallel striation scratches and logging their preliminary match assertions on a Nearpod collaboration board.
3. Structural Evolution Mini-Lecture: The teacher utilizes the projector to deliver an interactive visual history of firearms and ammunition. Students manipulate inert display cartridges at their desks to trace structural components, completing digital guided notes detailing how land-and-groove barrel rifling mechanically cuts individual markings into flying projectiles.
4. Collaborative Ballistic Analysis Lab: Working in

argument correctly aligning microscopic striation evidence with firearm identification principles, graded for structural logic.

- Ballistic Matching Worksheet Completion: A finalized data tracking log accurately pairing mystery crime scene casings to their source firearms based on firing-pin and ejector mark shapes.
- Students will define rifling as the spiral grooves cut into the internal surface of a firearm barrel that impart a stabilizing spin to a projectile.
- Students will correctly isolate firing-pin impressions as an individual characteristic when microscopic manufacturing toolmarks are present within the indentation on an exit voucher.



- investigative pairs, students analyze physical exemplar cards showing firing-pin impressions and breech-face scratch patterns. Using handheld magnifiers, they cross-examine the shapes, depths, and toolmarks on the primer caps of simulated casing samples, organizing their data into class or individual tracking sheets.
5. Claim-Evidence-Reasoning (CER) Synthesis: Teams draft a formal forensic CER response on their iPads. They must explicitly state whether a suspect weapon fired the recovered round, citing specific matching striation zones as evidence, and explaining the physics of how unique microscopic imperfections in a steel gun barrel are mechanically transferred to softer bullet metals during firing.
6. Digital Performance Assessment Loop: The lesson closes with an active Socratic diagnostic check-up. Students use their iPads to independently answer questions identifying bullet anatomical zones, defining ballistic class parameters, and diagnosing firearm



matches from mixed
toolmark slides.

Differentiation:

- Flexible Team and Workspace Configurations: Following all individual 504 and IEP plans, students maintain the explicit choice to work independently or with a peer partner during ballistic matching sequences, managing their own daily milestone targets within a structured unit timeline.
- Document and Note Layout Modifications: Digital note-taking folders are pre-loaded with bulleted summary lines, highlighted terminology glossaries, and pre-rendered anatomical diagrams to minimize transcription friction.
- Visual Comparison Anchors: High-contrast reference sheets showing clear visual exemplars of parallel matching lines versus mismatched tool markings are stationed at every workspace.
- Advanced students can use their iPads to calculate bullet kinetic energy changes, modeling how shifting a projectile's mass alters its deep structural penetration depth into a target medium.
- Structured sentence frames are built directly into the CER drafting interfaces: The lands and grooves inside the gun barrel cut unique [blank] characteristics onto the sides of the bullet, and because these microscopic scratches align perfectly with the test-fired round, the forensic analyst can infer a match based on these [blank] characteristics.

Resources Provided:

- Digital forensic ballistics textbook materials, interactive Socrative code entries, and toolmark imagery databases.
- Core Ballistics Pack (Cartridge guided note outlines, land-and-groove mapping schematics, casing match verification sheets, and CER writing frames).
- Inert training cartridges, macro-photographic evidence prints, and optical magnification devices.



Lesson Plan 2 Template

Content Area:	Forensic Science	Lesson Title:	Hair Analysis	Time Frame:	8 days
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Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☒ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ Information Literacy
☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy ☐ ICT Literacy

Interdisciplinary Connections: Biology, Chemistry

Integration of Technology:

- Student iPads running interactive Nearpod slide decks to examine high-magnification photomicrographs of distinct mammalian hair cuticles (imbricate, coronal, and spinous scales).
- Digital interactive software accessed via iPad to conduct automated, immediate formative diagnostic check-ins and multi-tiered vocabulary matching modules.
- Digital camera attachments or iPad lenses positioned over microscope eyepieces to snap, crop, and measure microscopic structural evidence bands.

Equipment Needed:

- Student iPads for data tracking, digital image capture, and interactive assessments.
- Compound light microscopes with multi-magnification nosepieces (40x, 100x, 400x).
- Pre-prepared slide sets containing diverse mammalian hair strands (e.g., human, dog, cat, deer, rabbit).
- Clear glass microscope slides, cover slips, clear fingernail polish (for scale casting), and fine-tip forceps.
- Transparent metric plastic grid rulers or software measurement overlays.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: • Identify if hair is human or animal by analyzing scale configurations and structural diameter patterns under high magnification. • Identify the parts of human hair, labeling the	Lesson Sequence 1. Phenomenon: Forensic scientists analyzing a single strand of hair recovered from a multi-million dollar art heist crime scene utilize a compound light microscope to instantly	• Forensic Trichology Lab Document: A fully executed data tracking guide containing calculated medullary indices, scale casting observations, and species



outer cuticle, the pigment-dense cortex, and the central innermost medulla core.

- Determine how hair can be used to identify a person at a crime scene, contrasting the class evidence limitations of a rootless shaft with the individualizing capacity of a follicular tag containing nuclear DNA.
- Use the rate of hair growth to determine if poisons or other substances have been taken and when, using a standard biological growth baseline to map systemic chemical exposure timelines.
- Calculate the medullary index of hair, using the ratio of internal medulla width to total shaft diameter to differentiate animal species from human samples.

rule out a suspect by calculating a medullary index of 0.15, confirming the hair is human; however, when they analyze the segment closest to the root using a chemical mass spectrometer, they discover a concentrated band of arsenic exactly 3 centimeters from the bulb, proving the victim was poisoned precisely three months before their death.

2. Cuticle and Keratin Structure Do Now: Students use their iPads to answer an initial visual prompt asking what biological and structural differences cause hair strands to emerge naturally straight, wavy, or tightly coiled. They share their thoughts to the class board, connecting hair shape to the cross-sectional geometry of the hair follicle.
3. Trichology & Toxicology Mini-Lecture: The teacher uses the display projector to stream micro-anatomy slides. Students complete digital guided notes detailing the three anatomical layers of hair and learn how toxic substances dissolve into the bloodstream and lock permanently into the growing keratin matrix at

determinations with no structural tracking errors.

- Online Review Profile: Real-time digital data submissions capturing individual student accuracy across hair layer labeling and classification questions.
- Toxicological Timeline Written Analysis: A short analytical case summary calculating when a historical victim ingested a substance based on a given growth rate of 1 centimeter per month and a specific physical centimeter measurement from the root.
- Students will define the medullary index as the ratio of the diameter of the central medulla to the total diameter of the entire hair shaft.
- Students will correctly classify a rootless hair shaft as class evidence because it lacks nuclear DNA, whereas a hair possessing a follicular tag represents individual evidence on an exit slip.



	a predictable biological growth rate of roughly 1 centimeter per month. 4. Microscopic Morphological Lab: Partner pairs configure their compound microscopes to analyze prepared human and animal hair samples. They observe the distribution of melanin pigment granules within the cortex and identify medulla patterns (fragmented, continuous, or absent), using their iPads to take photos of the structures through the lens. 5. Scale Casting & Medullary Index Mathematical Challenge: Teams paint a thin layer of clear polish on a blank slide, drop a hair strand onto it, and pull it away to create a permanent mold of the cuticle scale patterns. They then use microscope metrics to calculate the medullary index using regular text expressions: <i>Medullary Index = Width of Medulla / Width of Hair Shaft</i> They record how human indices are consistently less than 0.33, while animal indices measure 0.50 or greater. 6. Chronological Case Study & Socratic Synthesis: Teams analyze a digital	
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case file involving a historic poisoning timeline. Using their rulers, they map out the distance of toxic deposits from the root bulb to pinpoint the exact month of ingestion, followed by an individual Socratic interactive review quiz to verify their diagnostic skills before submitting their final lab sheets.

Differentiation:

- Experimental Design Autonomy: Following all active 504 and IEP accommodations, students can select an established, highly structured microscope procedure or design an independent tracking layout to compare synthetic fiber profiles against biological hair strands.
- Document and Media Scaffold Adjustments: Pre-highlighted instructional packets, bulleted vocabulary guides, and high-contrast identification keys mapping animal scale patterns are pre-loaded into student iPads to streamline analysis.
- Variable Partnership Structures: Students are provided the structural daily choice to process microscopy samples independently or share data parsing tasks alongside a designated laboratory partner within a flexible, student-driven unit timeline.
- Advanced students can use their iPads to calculate multi-month toxicology matrices where a victim's metabolic hair growth rate fluctuates due to chronic systemic illness or high-altitude environments.
- Structured sentence frames are built directly into the lab documentation interfaces: If the total width of a hair shaft is 90 microns and the medulla measures 15 microns, the calculated medullary index is [blank], which proves the sample belongs to a [blank] because the value is significantly less than 0.33.

Resources Provided:

- Digital forensic microscopy handbooks, historic toxicology case portfolios, and interactive digital code links.
- Core Trichology Pack (Medullary index equation cards, cuticle pattern matching keys, laboratory data grids, and timeline calibration maps).
- Compound microscopes, diverse mammalian hair slides, clear casting polish, slides, cover slips, and metric measuring grids.



Lesson Plan 3 Template

Content Area: Forensic Science	Lesson Title: Fingerprint Analysis	Time Frame: 8 Days
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Lesson Components

21st Century Themes

- | | |
|--|--|
| ☒ Global Awareness | ☒ Financial, Economic, Business and Entrepreneurial Literacy |
| ☐ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|---|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☐ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: Biology, Chemistry

Integration of Technology:

- Student iPads running interactive Nearpod units to view macro-photographic ridge galleries and digitally annotate individual minutiae layouts.
- Digital interactive testing programs utilized via iPad to conduct real-time formative structural evaluations and digital ridge pattern checks.
- Integrated iPad cameras used to snap macro-photographs of lifted latent prints, enhancing contrast digitally for group comparisons.

Equipment Needed:

- Student iPads with internet access for database cross-examinations and Socrative quizzes.
- Traditional ink strips or fingerprint rolling ink pads and official ten-print fingerprint ID cards.
- Professional latent print dusting kit: carbon black powder, magnetic powder, fiberglass dusting brushes, magnetic applicators, and clear adhesive lifting tape.
- Handheld magnifying glasses or optical loupes.
- Assorted structural testing surfaces (smooth glass blocks, unpainted wood, plastic tumblers, aluminum cans).
- High-visibility classroom posters displaying primary ridge formations and minutiae target keys (bifurcations, dots, enclosures).

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: Discuss the ways in which fingerprints were used throughout history, tracing the evolution from ancient Babylonian clay signatures to Sir William Herschel's	Lesson Sequence Phenomenon: A burglar wearing thin latex gloves leaves a perfect, high-detail identification print on a glass jewelry case; despite the barrier, the intense pressure and	Forensic Ten-Print Card Portfolio: A completed, high-contrast rolled fingerprint card with each finger cleanly labeled by pattern type



contracts and modern biometric databases. • Classify the different types of fingerprint patterns, identifying loops, whorls, and arches based on the presence and frequency of structural deltas. • Explain the chemical composition of fingerprints, detailing the water, oil, salt, and sebaceous amino acid secretions that form a latent impression. • Determine how fingerprints can be left at a crime scene, separating patent (visible), plastic (molded), and latent (invisible) prints based on surface contact dynamics. • Identify minutiae in fingerprints, mapping out specific ridge endings, bifurcations, short ridges, and dots to transition a print from class to individual evidence. • Create a fingerprint ID card and identify the types of fingerprint patterns they have, executing proper nail-to-nail rolling techniques. • Observe how to lift fingerprints from various surfaces, matching the correct powder processing modality to porous versus	ambient heat cause the friction ridges to press through the porous polymer, transferring an invisible matrix of 99% water mixed with microscopic traces of amino acids, fatty acids, and sodium chloride that remains chemically stable for weeks until exposed to specialized microscopic carbon powders. 2. Anatomical Ridge Mapping Do Now: Students use their iPads to explore online resources and identify which specific areas of the human body possess specialized friction ridge patterns (e.g., fingers, palms, toes, soles), posting their evolutionary explanations regarding friction grip to the Nearpod collaboration board. 3. Dactyloscopy & Secretion Mini-Lecture: The teacher utilizes the display projector to map the structural layers of the skin, focusing on the dermal papillae where friction ridges are anchored. Students take digital guided notes on how sweat glands secrete a distinct chemical matrix and explore the historical timeline of fingerprint classification systems.	(loop, whorl, arch) and free of smudging. • Latent Print Lift Presentation & Log Sheet: A physical card collection showing successfully dusted and lifted prints accompanied by a written explanation justifying why powder adhesion works on non-porous materials. • Minutiae Mapping Assessment: A marked-up fingerprint graphic or worksheet showing the accurate location, naming, and highlighting of a minimum of 8 separate individualizing minutiae points. • Digital Fingerprint Development Quiz: An electronic diagnostic readout confirming student comprehension of chemical processing reagents (superglue vs. ninhydrin) and pattern identification rules. • Students will define minutiae as the tiny ridge characteristics and structural interruptions, such as bifurcations or ridge endings, that make a fingerprint completely unique to an individual. • Students will correctly classify a loop pattern as a ridge formation that must have exactly one delta on an exit voucher.
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non-porous physical
evidence substrates.

4. Ten-Print ID Card Laboratory: Working in investigative pairs, students execute a controlled rolling procedure using ink pads to compile their own official ten-print ID cards. They use handheld magnifying glasses to examine their prints, calculating their individual distribution percentages of loops, whorls, and arches, and logging their personal pattern totals into a shared spreadsheet.
5. Latent Evidence Powder Processing Lab: Student teams transition into active evidence processing. They place latent prints onto glass, plastic, and metal surfaces, then practice professional recovery techniques by choosing between carbon black powder applied with fiberglass brushes or magnetic powder managed with specialized magnetic wands. They secure the developed ridges using clear lifting tape and transfer the impressions onto white backing cards.
6. Minutiae Cross-Matching & Fuming Overview: Using their magnifying glasses or zoomed iPad photos, students isolate at least 8 to 12 distinct



minutiae points (such as bifurcations or ridge endings) on their lifted prints, matching their crime scene evidence to a suspect reference pool. The teacher concludes the session with a video demonstration breaking down advanced laboratory chemical development techniques like cyanoacrylate (superglue) fuming, ninhydrin reactive sprays, and iodine fuming chamber systems before launching an individual Socratic exit quiz.

Differentiation:

- Processing Modality Selection: Following all active 504 and IEP accommodations, students are given the choice to design their own unique surface-testing configuration or follow a heavily scaffolded, step-by-step instructional dusting procedure.
- Sensory and Cognitive Material Scaffolds: High-contrast reference charts detailing minutiae types, pre-highlighted laboratory instructions, and simplified bulleted vocabulary decks are pre-loaded onto student iPads.
- Task Customization Pathways: Teams operate within a flexible, student-managed unit timeline, choosing to divide fingerprint rolling, dusting, or micro-analysis roles evenly or work independently to match the reference cases.
- Advanced students can use their iPads to research the statistical probability of two individuals sharing identical minutiae layouts, calculating probability chains to show why matching points are legally accepted in court.
- Structured sentence frames are built directly into the forensic logs: The latent print was left on a non-porous glass block, meaning the [blank] powder adhered directly to the greasy lipids and amino acids left behind by the sweat glands, allowing me to isolate an individual match by mapping unique minutiae features like a [blank] where a single ridge splits into two paths.

Resources Provided:

- Digital dactyloscopy text manuals, biometric database informational articles, and interactive Socratic links.
- Core Fingerprint Pack (Ten-print registration sheets, pattern classification wheel guides, minutiae target maps, and chemical reagent comparison grids).
- Inking stations, carbon and magnetic powder arrays, fiberglass brushes, magnetic wands, lifting tapes, magnifying loupes, and varied test surfaces.



Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson **Strongly**, **Moderately** or **Weakly** meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	X		
Allow for student choice	X		
Provide scaffolding for acquiring targeted knowledge/skills		X	
Integrate global perspectives	X		
Integrate 21st century skills		X	
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills		X	
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills		X	
Are varied to address different student learning styles and preferences		X	
Are differentiated based on student needs		X	
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	X		
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	X		
Provide opportunities for student reflection and self- assessment		X	
Provide data to inform and adjust instruction to better meet the varying needs of learners		X	

Curriculum Design Template

Content Area: Science	Grade Level: 11-12	Unit Title:	Trace Evidence
Created: 2026	Board Approved on:	Type Here	



SPRINGFIELD PUBLIC SCHOOLS

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR EARLY CHILDHOOD AND ELEMENTARY SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
Review of directions
Use of mnemonics
Have student restate information
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Use of a study carrel
Assistance in maintaining uncluttered space
Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Use of manipulatives
No penalty for spelling errors or sloppy handwriting
Follow a routine/schedule
Alternate quiet and active time
Teach time management skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Adjusted assignment timelines
Visual daily schedule



SPRINGFIELD PUBLIC SCHOOLS

**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Untimed tests
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book tests
Read test and directions to student
Provide study outline prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator and/or number line for math tests
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS MODIFICATIONS:



SPRINGFIELD PUBLIC SCHOOLS

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Have parent sign behavior chart
Set and post class rules
Chart progress and maintain data



SPRINGFIELD PUBLIC SCHOOLS

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR MIDDLE AND HIGH SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
A locker with adapted lock
Review of directions
Review sessions
Use of mnemonics
Have student restate information
Provision of notes or outlines
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Weekly or bi-weekly home-school communication
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Lab and math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of tape recorder for lectures
Use of Interactive notebook
Use of a scribe
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Ability to type all assignments
Follow a routine/schedule
Teach time management and organizational skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Daily check-in with case manager or special education teacher
Adjusted assignment timelines
Visual daily schedule



SPRINGFIELD PUBLIC SCHOOLS

**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book or open-note tests
Read test and directions to student
Provide study guides prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Pace long-term projects
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Allow outlining, instead of writing for an essay or major project
Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator for math tests
Film or video supplements in place of reading text
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands



SPRINGFIELD PUBLIC SCHOOLS

**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Pass/no pass option
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS FOR STUDENTS:

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Set and post class rules
Chart progress and maintain data



Accommodations and Modifications for ESL Students

- Give tests orally
- Give instructions/directions in writing and orally
- Assign a peer tutor, same language or English speaking
- Allow use of bilingual/translation dictionary
- Provide summaries of text or study guides of particular chapters
- Allow errors in speaking
- Allow errors in writing
- Accept writing in first language
- Highlight key vocabulary
- Reduce amount of work required
- Assess comprehension through demonstration or other alternative means (gestures, drawings)
- Rephrase questions, directions, and explanations
- Reduce multiple choices on assessments
- Provide study guides and/ or outlines
- Shorten reading assignments
- Allow extended time for test/project completion
- Use of audio books
- Use of graphic organizers
- Use reduced text, so that print is not dense
- Use visuals/pictures throughout lesson/unit/assignment
- Adapt homework to reflect language proficiency/home support
- Adapt homework to reflect home support
- Provide hands-on activities and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Use of translation dictionaries to locate words in the native language
- Use anecdotal records and portfolio of work as forms of assessment
- Use story retellings to assess comprehension

What Does the Gifted and Talented Experience Look Like? *Springfield Public Schools*

Mission Statement

The Gifted and Talented Program of the Springfield Public Schools aims to provide a meaningful and rigorous education that instills the value of lifelong learning and empowers all students to reach their full potential and become self-fulfilled creative leaders in accordance with the comprehensive standards of our state. We accomplish this by offering challenging, real-world experiences in a student-centered environment.

We recognize that students come from diverse socioeconomic, cultural, and ethnic backgrounds, and the mission of the gifted and talented program is to provide opportunities for students to explore their intellectual, creative, and artistic gifts and talents within the classroom and with beyond-the-classroom experiences. It is essential to provide diverse, appropriate, and ongoing learning experiences and environments that incorporate students' academic, psychological, and social needs. Our responsibility is to provide students with educational alternatives that teach, challenge, and expand their knowledge, while simultaneously stressing the development of independent and self-directed learners who continuously generate questions, analyze, synthesize, and evaluate information and ideas.

New Jersey Administrative Code 6A:8-3.1 defines students who are gifted and talented as those students who possess or demonstrate high levels of ability in one or more content areas when compared to their chronological peers in the local district and who require modification of their educational program if they are to achieve in accordance with their capabilities.

Goals:

To support our mission, we have established the following goals to guide our work:

- To infuse into the general education program a broad range of activities for high-level learning that will challenge all students to perform at advanced levels, and provide extended opportunities, resources, and support in particular areas where student interest or talent is demonstrated.
- To provide a continuum of gifted education services that will strengthen the total school program, offer enriching and challenging learning opportunities for all students, and provide specialized learning experiences
- To promote achievement of students' best potentials and increased ability.

Through a productive and collaborative relationship among the building principals, classroom teachers, and the Gifted and Talented teacher, our schools can create programming that will enhance the learning experience for every student and serve the unique and specialized needs of students currently demonstrating gifted behaviors.

Elements of the Schoolwide Enrichment Model, W.I.N (What I Need), differentiated instruction, advanced classes, or individual programs into a student's regular instruction program are integral to this overarching framework for gifted education in the Springfield School District.

Reference Board Policy and Regulation 2464 – Gifted and Talented Pupils (M)

Early Childhood Center **Edward V. Walton**

Schoolwide Virtual Enrichment

All first and second grade students have access to the [Gifted and Talented Virtual Classroom](#). This virtual classroom is a space for students to complete various challenges and enrichment opportunities at their own pace. Students can receive feedback and additional adaptable resources to meet their individual learning needs. The virtual classroom design expands accessibility to enrichment resources and allows students to choose learning activities according to their unique interests and abilities. The purpose of the activities is to encourage problem-solving, develop critical thinking

skills, and expand curiosity and imagination. Activities are aligned to the New Jersey Student Learning Standards.

Gifted and Talented Teacher as a Resource

The Gifted and Talented teacher serves as a resource to all teachers within Edward V. Walton School. Teachers seeking resources for their high-ability learners will receive additional support from the Gifted and Talented teacher in various ways. This support may include additional units of study, challenging resources, and student projects.

Elementary Schools **James Caldwell** **Thelma L. Sandmeier**

The goal is to engage small groups of students in intensive learning experiences through standards-based, rigorous, and relevant units of study that supplement, not supplant, the grade-level curriculum and support students' unique learning needs.

Enrichment Experience Grade 3

Beginning in third grade, the G&T teacher will cycle through all classrooms to work on problem-solving and enrichment tasks with students. Driven by assessment data, academic performance, student interest, and teacher observation, small groups of students will meet with the G&T teacher during W.I.N. (What I Need) periods throughout the week that the teacher is assigned to their classroom teacher. Groupings will be flexible and monitored to best meet each student's needs throughout the school year. Activities will include brain teasers, puzzles, strategic thinking, problem-solving, and STEM challenges.

Targeted Gifted and Talented Programing Grades 4-5

Students may become identified as Gifted and Talented in fourth grade. Students that are identified may receive support from the G&T Teacher for up to five periods (200 minutes) a week during W.I.N. (What I Need) periods. Identified students will meet to explore grade-level content while incorporating depth and complexity in a student-centered, problem-based environment. The Gifted and Talented Program aims to provide students with various advanced and challenging learning experiences across content areas to promote independent thinking skills, refine critical thinking and communication skills, cultivate joy in learning, and expand student interests through problem-solving. The instruction that students receive incorporates 21st Century Skills and advanced content that is challenging, hands-on, and relevant to the real world.

Strategies and Practices that Support Gifted and Talented Students

- Adjusted Pace of Lessons
- Inquiry-Based Instruction
- Higher-Order Thinking Activities
- Interest-Based Content
- Real World Problem Solving/Problem Based Learning
- Independent Study/Passion Projects
- Units of Study with Like-Minded Peers

Schoolwide Virtual Enrichment

All JCS and TLS students have access to grade level-specific [Gifted and Talented Virtual Classrooms](#). These virtual classrooms are a space for students to complete various challenges and enrichment opportunities at their own pace. Students are able to receive feedback and additional opportunities based on their needs. The virtual classrooms have expanded the accessibility of enrichment resources directly to the students and allows for students to choose opportunities according to their interests and abilities. The purpose of the activities is to encourage problem solving, develop critical thinking skills, and expand curiosity and imagination in conjunction with the New Jersey Student Learning Standards.

Gifted and Talented Teacher as a Resource

In addition to classroom support, the Gifted and Talented teacher also serves as a resource to all teachers in the building. Teachers that are seeking resources for their high ability learners will receive additional support from the Gifted and Talented teacher in various ways. This may include additional units of study, challenging resources, student projects, and meeting with the G&T teacher as needed.

Additional Enrichment Opportunities

Across all grade levels 3-5, as recommended by the classroom teacher, students exhibiting a need for additional enrichment may have the opportunity to meet with the G&T teacher as the schedule allows. Groupings will be flexible and monitored to best meet the students' needs throughout the school year. Activities will include, brain teasers, puzzles, strategic thinking activities, problem-solving challenges, and STEM challenges. Students engage in an extended process of asking questions, using resources, and developing answers that lead to thinking about what and how they are learning. Students are held accountable for how they work and use their time by demonstrating their learning through products or presentations.

Students self-select to participate in individual and/or group projects based on interest and commitment. The classroom teacher and/or the enrichment teacher will help guide and monitor student exploration of chosen topics, facilitating their learning with resources and teaching of needed skills.

Secondary Schools
Florence M. Gaudineer Middle School
Jonathan Dayton High School

Grades 6-12: Access to specific content programs with higher levels of academic challenges (i.e. Pre-Algebra, Accelerated Communication Arts, and Advanced Placement Classes)

Dual Credit Courses provide students the opportunity to obtain high school credit, and college credit, simultaneously through partnerships with several institutions.

Project Lead the Way (PLTW) students become builders of technology by engaging in real world activities. Students are empowered as design thinkers collaborating on real world projects.

Gifted and Talented Identification Criteria

The Springfield Schools Gifted and Talented Program recognizes that students require differentiated learning experiences beyond the core curriculum being taught because of their advanced abilities in one or more content areas. These students may also have other cognitive qualities such as curiosity, creativity, motivation, leadership, and passion that require modifications to their academic experience.

Multiple Measures of Eligibility

Kindergarten through grade twelve identification process for gifted and talented students includes multiple measures. Multiple measures may include but are not limited to: achievement test scores; grades; student performance or products; intelligence testing; parent, student, and/or teacher recommendation; and other appropriate measures. The identification methodology is developmentally appropriate, non-discriminatory, and related to the programs and services offered by the Springfield School District. The identification procedures are reviewed annually.

According to N.J.A.C. 6A:8-3.1, all public school districts must have a board-approved gifted and talented identification process and provide services for identified students enrolled in the grades of that school district. The regulations require that identification and services be made available to students in grades K-12.

When students are recommended for the Gifted and Talented Program there are multiple measures that are considered to determine if services are necessary and appropriate. The assessments used are as follows:

- Cognitive Abilities Test (CogAT)
- Classroom Performance/Student Portfolios
- DRA2 Level
- iReady Diagnostic Scores
- Gifted Indicators Checklist
- Start Strong/NJSLA Assessment Data

The N.J.A.C. requires that students be compared to their chronological peers in the local school district. The New Jersey Department of Education has not established state-level criteria for identifying students who are gifted, such as mandated tests or assessments, grade point averages, or IQ scores. Local school districts must use multiple measures to identify students.

Procedures

<https://www.straussesmay.com/seportal/Public/DistrictPolicy.aspx?policyid=2464&id=b8a33a9f505e4998a6db3fb8e1de778b>

Gifted and Talented Program Identification Matrix

Minimum Score Required for Consideration: 14 Points

1 Point	2 Points	3 Points
Cogat Assessment Overall Stanine Score of a 7	Cogat Assessment Overall Stanine Score of an 8	Cogat Assessment Overall Stanine Score of a 9
iReady Math Assessment Just Below Current Grade Level	iReady Math Assessment On Grade Level	iReady Math Assessment ½ Year + Above Current Level
iReady ELA On Grade Level	iReady ELA ½ Year Above Current Level	iReady ELA One Full Grade Level + Above Current Level
NJSLA Math Approaching Expectations	NJSLA Math Met Expectations	NJSLA Math Exceed Expectations
NJSLA ELA Approaching Expectations	NJSLA ELA Met Expectations	NJSLA ELA Exceed Expectations
HOPE Teacher Rating Scale Raw Score: 11 - 29	HOPE Teacher Rating Scale Raw Score: 30 - 49	HOPE Teacher Rating Scale Raw Score: 50-66

Team meetings present the opportunity to review data and assess the educational needs of all students. Teacher provides examples of student work exhibiting above and beyond grade level expectations, creativity, leadership, critical and abstract thinking. Programs for gifted and talented students will be periodically evaluated for their continuing efficacy and adjusted accordingly. The parent of any student identified as gifted or talented shall be consulted regarding any program designed to address the student's particular needs.

Resource Links

https://riversideinsights.com/cognitive_abilities_test

<https://www.curriculumassociates.com/programs/i-ready-learning>

<https://www.nj.gov/education/assessment/resources/>

<https://www.routledge.com/HOPE-Teacher-Rating-Scale-Involving-Teachers-in-Equitable-Identification/Gentry-Pereira-Peters-McIntosh-Fugate/p/book/9781618214522#:~:text=The%20HOPE%20Teacher%20Rating%20Scale.making%20it%20easy%20to%20use.>

Gifted and talented student: The "[*Strengthening Gifted and Talented Education Act*](#)" defines a gifted and talented student as a "student who possesses or demonstrates a high level of ability in one or more content areas when compared to their chronological peers in the school district and who require modifications of their educational program if they are to achieve in accordance with their capabilities."

Twice-exceptional (2E) students: A twice-exceptional (2E) student is defined as "a student who is both gifted and a student with a disability. These students may also be referred to as having dual exceptionalities or as being gifted with learning disabilities (GT/LD). This also applies to students who are gifted with ADHD or gifted with autism" (New Jersey Association for Gifted Children, www.nagc.org).

Instructional adaptation: An adjustment or modification to instruction enabling a student who is gifted and talented to participate in, benefit from, and demonstrate knowledge and application of the New Jersey Student Learning Standards in one or more content areas at the instructional level of the student, not just the student's grade level.

Identifying gifted and talented students: The focus of identification is to provide programming and services in which students' specific learning needs and potential are appropriately addressed and met. In every New Jersey school district, there are students who require modifications to the general education curriculum if they are to achieve in accordance with their abilities. By identifying a student's general intellectual ability, creativity, or specific academic area aptitudes, we are acknowledging that they need programming and services outside of the general education/grade level curriculum to advance their learning.

[NJDOE Fast Facts](#)

<https://www.nj.gov/education/standards/gifted/>

<https://www.nj.gov/education/standards/gifted/legislation.shtml>

Supplemental Resources/Programming for Gifted Students

Edward V. Walton

- PETS Program – Primary Education Thinking Skills
- Group Solutions/Group Solutions 2 – Cooperative Logic Activities
- Lollipop Logic
- Beginning Thinking Skills
- AIMS Education Programming

James Caldwell and Thelma L. Sandmeier

Math/ELA

- Project M3: Mentoring Mathematical Minds
- Junior Great Books
- AIMS Education Programming
- Borenson Hands on Equations
- BizWorld
- Perplexors
- Advanced Math Explorations grade 3-5
- Challenging Units for Gifted Learners (ELA and Math)
- Creative Curriculum Extenders
- Differentiated Lessons & Projects
- Challenge Math Grades 4+
- Differentiating Instruction with Menus (All Content Areas)
- Jacob's Ladder
- Genius Hour/Passion Project
- Spatial Reasoning
- Logic Puzzles, Brain Games, Analogies

STEM

- Engineering is Elementary
- Engineer Throughout the Year
- PBS Design Squad
- DefinedSTEM
- Project Lead the Way (PLTW)

Enrichment Events

Experience for all students to be enriched through events related to the curricular or extracurricular activities. Examples include after school clubs, PTA-sponsored events, leadership opportunities, visual and performing arts, and community service opportunities.