Unit 05: Blood Analysis

Content Area: **Science**
Course(s):
Time Period: **Marking Period 2**
Length: **4 Weeks**
Status: **Published**

Summary

Introduction: This unit focuses on blood as evidence and the techniques used to obtain information from blood such as identification techniques and blood spatter analysis.

Revision Date: July, 2019

9.4.2.CI	Creativity and Innovation
MA.K-12.1	Make sense of problems and persevere in solving them.
9.2.12.CAP	Career Awareness and Planning
MA.K-12.2	Reason abstractly and quantitatively.
9.4.2.CT	Critical Thinking and Problem-solving
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
HS-PS1-2	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
9.4.2.DC.6	Identify respectful and responsible ways to communicate in digital environments.
LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
9.4.2.GCA	Global and Cultural Awareness
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LA.WHST.9-10.1.B	Develop claim(s) and counterclaims using sound reasoning, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
LA.WHST.9-10.1.D	Establish and maintain a style and tone appropriate to the audience and purpose (e.g., formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.

LA.WHST.9-10.2.B	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).
LA.WHST.9-10.2.D	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
LA.WHST.9-10.2.E	Establish and maintain a style and tone appropriate to the audience and purpose (e.g., formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
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.

Essential Questions/Enduring Understandings

- How does direction and force of impact cause blood staining patterns?
- How can properties such as height, angle, and origin be determined from blood spatter evidence?
- How can the identity of each of the four ABO blood groups be established?
- How is blood found, identified, collected and analyzed in crime scene reconstruction to identify an individual?

Objectives

Students will know...

- Monoclonal antibodies as a more uniform and specific collection of antibodies designed to combine with a single antigen site.
- A broad scope of laboratory tests that use specific antigen and serum antibody reactions.
- A series of antibodies that are designed to attack some particular site on the antigen of interest are called polyclonal antibodies.

Students will be skilled at...

- Identifying of each of the four ABO blood groups by testing the blood with anti-A and anti-B sera.
- Performing the Kastle-Meyer color test to determine if a stain is blood.
- Performing the luminol tests to search out trace amounts of blood located at crime scenes.
- Determining the species origin of a questioned blood stain using the precipitin test.
- Describing the effect of height on blood drops.
- Describing the effect of surface angle on blood drops.
- Analyzing convergence patterns.
- Interpreting blow back.

Learning Plan

- Pre-assessment to determine the direction of work.
- Preview the essential questions and connect to learning throughout the unit.
- Provide lecture and opportunities for discussion about the guiding questions.
- Read and discuss Case Studies.
- Complete Blood Spatter Lab – students perform a lab that investigates drop height effect, surface angle effect, convergence patterns, blow back and establishing angle from droplet dimensions.
- Complete Blood Typing Lab – students use fake blood samples to practice blood typing techniques.

Assessment

Baseline

- Pre-assessment to determine the direction of work.

Formative

- Meaningfully participate in guided question and answer sessions, group and individual discussions, show an understanding of the purpose of the unit lesson(s), and their key terms and concepts.
- Participate in classroom activities such as class discussion, question and answer session, cooperative group projects and presentation of research.

Summative

- Demonstrate the ability to determine the impact angle of a blood drop based on its length and width.
- Demonstrate the ability to properly determine the blood type of an unknown sample.
- Demonstrate the ability to determine the point of origin of a blood drop based on its length and width and the point of convergence.
- Demonstrate the ability to determine the type of impact that caused various blood stains.
- Demonstrate understanding written quizzes and tests about subject materials.

Alternative

- Create a presentation on blood spatter analysis techniques to demonstrate mastery

Materials

- Teacher-presented notes on PowerPoint
- United Streaming short videos

- CSI Season 1