Unit 02: Hairs and Fibers

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **3 Weeks**
Status: **Published**

Summary

Introduction: This unit focuses on methods of collection and analysis techniques of hairs and fibers. In this unit students will learn hair individual and class characteristics, collection and preservation of hair. Students will also learn how to collect fiber evidence and how to analyze its' physical and chemical properties.

Revision Date: July, 2019

9.4.2.CI	Creativity and Innovation
MA.K-12.1	Make sense of problems and persevere in solving them.
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.
MA.K-12.5	Use appropriate tools strategically.
9.4.2.DC	Digital Citizenship
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.IML	Information and Media Literacy
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.
9.4.2.TL	Technology Literacy
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.

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-PS4-4	Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
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-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.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.

Essential Questions/Enduring Understandings

- What is the forensic value of hair in determining origin?
- What properties of fibers are most useful for forensic comparisons?
- What features are useful for microscopic comparison of human hairs?
- What are the proper techniques for collection of fiber evidence?

Objectives

Students will know…..

- the basic parts of hair: medulla, cortex and cuticle.
- proper examination techniques to determine characteristics of fiber being examined.

Students will be skilled at…..

- differentiating between human and animal hair.
- differentiating between the types of man-made and natural fibers.
- identifying the basic parts of hair: medulla, cortex and cuticle.

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.
- Complete Hairs lab – using a microscope to compare different samples of hairs.
- Complete Fibers lab – using the microscope and the burn test to compare different samples of fibers.
- Read and discuss Case studies.

Assessment

Benchmark

- 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 use a microscope to sketch and identify various types of hairs and determine species origin.
- Demonstrate the ability to use a microscope and the burn test to sketch and identify various types of fibers.
- Demonstrate understanding written quizzes and tests about subject materials.

Alternate

- Draft a slides presentation communicating common methodologies for hair comparison and analysis.

Materials

- Teacher-presented notes on PowerPoint
- United Streaming short videos
- CSI Season 1