

Science

Unit 5: Forensics and Scientific Method

<p>Essential Understandings</p>	<ul style="list-style-type: none"> ▪ Forensic scientists follow the scientific method to investigate and solve crimes. ▪ A forensic scientist must be an accurate observer and recorder. ▪ A relationship exists between evidence and explanation. ▪ Logical conclusions are based on evidence and not influenced by bias or generalizations. ▪ Evidence, no matter how small, can have a big impact. ▪ Experiments should be repeatable through methodology. ▪ Many scientific and technological discoveries have taken place by accident, by chance, or by necessity.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ▪ What is forensics? ▪ What are the different types of evidence that can be found at a crime scene? ▪ What are the characteristics of a successful forensic scientist? ▪ How can evidence be preserved? ▪ What conclusions can be drawn from the different types of evidence? ▪ What is the scientific method? ▪ What is a testable hypothesis? ▪ What makes an experiment fair and well-designed? ▪ What is bias and how can it affect conclusions? ▪ What technologies exist to solve crimes and how has it changed over time?
<p>Essential Knowledge</p>	<ul style="list-style-type: none"> ▪ There are many tools that a forensics scientist uses to solve crimes. ▪ There are three basic types of fingerprints. ▪ Questions can be answered through scientific investigations. ▪ Descriptions, explanations, predictions, and models can be developed using evidence. ▪ Findings must be communicated in a way the audience can understand.
<p>Vocabulary</p>	<ul style="list-style-type: none"> ▪ <u>Terms:</u> <ul style="list-style-type: none"> ○ evidence, data, forensics, fibers, fingerprints, DNA, experiment, observation, inference, deduction, scientific method, contamination, prediction, hypothesis, variables (independent, dependent, controlled), sample size, conclusion, analysis, evaluate, trials, subjects, bias
<p>Essential Skills</p>	<ul style="list-style-type: none"> ▪ Support reasoning using a variety of evidence. ▪ Determine your own type of fingerprint. ▪ Make observations accurately. ▪ Identify and perform roles necessary to accomplish group tasks. ▪ Conduct an experiment and communicate the results. ▪ Measure using the SI system.

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<p>Related Maine Learning Results</p>	<p><u>Science</u></p> <p>B. The Skills and Traits of Scientific Inquiry and Technological Design</p> <p>B1.Skill and Traits of Scientific Inquiry</p> <p>Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments.</p> <ol style="list-style-type: none">a. Identify questions that can be answered through scientific investigations.b. Design and safely conduct scientific investigations including experiments with controlled variables.c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data.d. Use mathematics to gather, organize, and present data and structure convincing explanations.e. Use logical, critical reasoning and evidence to develop descriptions, explanations, predictions, and models.f. Communicate, critique, and analyze their own scientific work and the work of other students. <p>B2.Skills and Traits of Technological Design</p> <p>Students use a systematic process, tools, equipment, and a variety of materials to design and produce a solution or product to meet a specified need, using established criteria.</p> <ol style="list-style-type: none">a. Identify appropriate problems for technological design.b. Design a solution or product.c. Communicate a proposed design using drawings and simple models.d. Implement a proposed design.e. Evaluate a completed design or product.f. Suggest improvements for their own and others' designs and try out proposed modifications.g. Explain the designs process including the stages of problems identification, solution design, implementation, and evaluation.
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<p align="center">Related Maine Learning Results</p>	<p>C. The Scientific and Technological Enterprise</p> <p>C1. Understandings of Inquiry Students describe how scientists use varied and systematic approaches to investigations that may lead to further investigations.</p> <ol style="list-style-type: none"> a. Explain how the type of question informs the type of investigation. b. Explain why it is important to identify and control variables and replicate trials in experiments. c. Describe how scientists' analyses of findings can lead to new investigations. <p>C2. Understandings About Science and Technology Students understand and compare the similarities and differences between scientific inquiry and technological design.</p> <ol style="list-style-type: none"> a. Compare the process of scientific inquiry to the process of technological design. b. Explain how constraints and consequences impact scientific inquiry and technological design. <p>C3. Science, Technology, and Society Students identify and describe the role of science and technology in addressing personal and societal challenges.</p> <ol style="list-style-type: none"> c. Identify factors that influence the development and use of science and technology.
<p align="center">Sample Lessons And Activities</p>	<ul style="list-style-type: none"> ▪ Crime scene handouts ▪ Labs (e.g., fingerprinting, counterfeiting, chemical reagent) ▪ Design, run, and communicate the results of an experiment
<p align="center">Sample Classroom Assessment Methods</p>	<ul style="list-style-type: none"> ▪ Analysis of a crime scene ▪ Science Fair presentation
<p align="center">Sample Resources</p>	<ul style="list-style-type: none"> ▪ <u>Publications:</u> <ul style="list-style-type: none"> ○ <u>Crime and Detection</u> – Brian Lane ▪ <u>Videos:</u> <ul style="list-style-type: none"> ○ <u>Scientific Method</u> ○ http://www.cool-science-projects.com/independent-and-dependent-variables.html ○ http://nces.ed.gov/nceskids/help/user_guide/graph/variables.asp ○ http://www.quia.com/pop/184568.html ▪ <u>Materials:</u> hand lenses, microscopes <ul style="list-style-type: none"> ○ <u>People:</u> School Resource Officer ○ ▪ <u>Videos:</u> <ul style="list-style-type: none"> ○ <u>Forensics</u> – Bill Nye

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