### Science
#### Unit 5: Forensics and Scientific Method

| Essential Understandings | 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. |

| Essential Questions | 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? |

| Essential Knowledge | 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. |

| Vocabulary | Terms:  
|            | 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 |

| Essential Skills | 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. |
### Related Maine Learning Results

<table>
<thead>
<tr>
<th>Science</th>
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<tbody>
<tr>
<td>B. The Skills and Traits of Scientific Inquiry and Technological Design</td>
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<tr>
<td>B1. Skill and Traits of Scientific Inquiry</td>
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<tr>
<td>Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments.</td>
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<tr>
<td>a. Identify questions that can be answered through scientific investigations.</td>
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<td>b. Design and safely conduct scientific investigations including experiments with controlled variables.</td>
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<td>c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data.</td>
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<tr>
<td>d. Use mathematics to gather, organize, and present data and structure convincing explanations.</td>
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<tr>
<td>e. Use logical, critical reasoning and evidence to develop descriptions, explanations, predictions, and models.</td>
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<td>f. Communicate, critique, and analyze their own scientific work and the work of other students.</td>
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<tr>
<td>B2. Skills and Traits of Technological Design</td>
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<tr>
<td>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.</td>
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<tr>
<td>a. Identify appropriate problems for technological design.</td>
</tr>
<tr>
<td>b. Design a solution or product.</td>
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<tr>
<td>c. Communicate a proposed design using drawings and simple models.</td>
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<tr>
<td>d. Implement a proposed design.</td>
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<td>e. Evaluate a completed design or product.</td>
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<td>f. Suggest improvements for their own and others’ designs and try out proposed modifications.</td>
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<tr>
<td>g. Explain the designs process including the stages of problems identification, solution design, implementation, and evaluation.</td>
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### Related Maine Learning Results

- **C. The Scientific and Technological Enterprise**
  - **C1. Understandings of Inquiry**
    - Students describe how scientists use varied and systematic approaches to investigations that may lead to further investigations.
    - **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.
  - **C2. Understandings About Science and Technology**
    - Students understand and compare the similarities and differences between scientific inquiry and technological design.
    - **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.
  - **C3. Science, Technology, and Society**
    - Students identify and describe the role of science and technology in addressing personal and societal challenges.
    - **c.** Identify factors that influence the development and use of science and technology.

### Sample Lessons and Activities

- Crime scene handouts
- Labs (e.g., fingerprinting, counterfeiting, chemical reagent)
- Design, run, and communicate the results of an experiment

### Sample Classroom Assessment Methods

- Analysis of a crime scene
- Science Fair presentation

### Sample Resources

- **Publications:**
  - Crime and Detection – Brian Lane
- **Videos:**
  - Scientific Method
- **Materials:**
  - hand lenses, microscopes
  - People: School Resource Officer
- **Videos:**
  - Forensics – Bill Nye
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