Forensic Detectives: Mysteries & Solutions

Grade Level: 6-8	**Subject:** Forensics	**Duration:** Three class periods

Objectives

Students will

- discuss forensic science, including evidence, techniques, and tools;
- research forensic tools and techniques; and
- write a report about a fictional crime scene.

Materials

- Computer with Internet access
- Empty manila folders (one for each team)
- Paper and pencil for each student

Procedures

1. After watching the program *Forensic Detectives: Mysteries and Solutions*, ask students the following questions: What is forensic science? *(The study of evidence discovered at a crime scene and used in a court of law)* Are forensic techniques used only to solve crimes? *(The program illustrated these non-crime examples: to identify skeletons in mass graves of Napoleon's army and to try to authenticate an alleged Leonardo da Vinci painting*.)

2. Tell students that they will explore the use of forensic science in the murder cases featured in the program. The detectives collected evidence, or clues to they hope will solve the crime; trace materials are very small pieces of evidence. What evidence did investigators use to solve the crime? (*blood, hair, fibers, and tire tracks*) How was this evidence helpful? (*The hair, fibers, and tire tracks linked the crime to the suspect's dog and to his girlfriend's home and car*.) Which evidence was not helpful in identifying a suspect? Why? (*The blood belonged to the victim*.)

3. Explain that forensic scientists special tools, techniques, and resources to collect, document, and analyze evidence. Ask students to brainstorm a list of the tools used in the investigation and how each tool was used. Create a chart of their answers.

Tool	**How it was used**
Luma Light	Revealed fibers, hair, and blood
Orange goggles	Made evidence lit by Luma Light stand out sharply; helped investigators spot evidence
Dental cement	Used to make castings of tire tracks
Microscope	Helped forensic chemist find and identify carpet fibers and dog hairs
Cameras	Supplied photographs of crime scene and evidence, such as tire tracks
Tire company database	Investigators found recent purchases of specific tire.
Ink prints	Made prints of tread patterns of suspect's tires.
Criminal files	Background check revealed the suspect's previous criminal activity and prison sentence.

4. Ask students to identify experts who helped in the investigation. (*Forensic science unit investigators, forensic chemist, tire track identification expert)* How were they valuable? (*They helped identify and analyze evidence*.)

5. Have the class brainstorm other tools or techniques used by forensic experts. (*Answers may include fingerprinting, DNA and handwriting analysis, lie detectors, chemical tests, and soil analysis.*)

6. Tell students that they will explore additional forensic tools and techniques that are featured in the Discovery Channel Web site: "You're on the Case" (http://dsc.discovery.com/fansites/onthecase/onthecase.html). Students should focus on three sections:

   Photo Gallery: close-up images of evidence seen with high-power microscopes show human and animal hair, blood, skin, fiber, dust, and more
   http://dsc.discovery.com/fansites/onthecase/photo/photo.html

   The Investigators Toolbox: articles about forensic tools and techniques, from psychological analysis to the blood detector luminol
   http://dsc.discovery.com/fansites/onthecase/toolbox/toolbox.html

   Ask the Expert: interviews, including with a forensic scientist and a forensic artist
   http://dsc.discovery.com/fansites/onthecase/qa/qa.html

7. Divide the class into teams of four or five. Explain that teams will investigate a fictitious crime. Using what they learned from viewing the program and the Web sites above, each team will reconstruct a crime scene with one piece of evidence for each team member. Then they will develop a crime folder that includes all the evidence. Students should work together to decide the pieces of evidence that will be found and the tools and techniques they will use to detect them. One person will record information about the crime scene, including location, time of discovery, description of scene, evidence found. Then each team member will write an individual report about a tool or technique, describing in detail the following:

   - the evidence,
   - the tool or technique that was used,
   - the analysis (include at least one picture or sketch, if applicable),
   - the conclusion.

8. Each team will place the reports into their crime-report folder to exchange with another team.

Evaluation

Use the following three-point rubric to evaluate students' work during this lesson.

- **Three points:** Students actively participated in class discussions about forensics, recalling several tools and techniques and their uses; wrote a well-organized, complete crime report that included a clear description of how a tool analyzed evidence.
- **Two points:** Students participated in class discussions about forensics, recalling a few tools and techniques and their uses; wrote an organized, satisfactory crime report that included an adequate description of how a tool analyzed evidence.
- **One point:** Students did not participate in class discussions about forensics, recalling few or no tools and techniques and their uses; wrote a disorganized, incomplete crime report that included an unclear description of how a tool analyzed evidence.

Vocabulary

crime scene
Definition: the location of a robbery, murder, or other criminal activity
Context: The suspect left a tire print at the crime scene.

evidence
Definition: an object or information used to reach a conclusion
Context: The evidence from a crime scene included tire tracks, fibers, hair, and blood.

forensic science
Definition: the study of evidence discovered at a crime scene and used in a court of law
Context: Forensic science is used to investigate details of a crime, first by locating and collecting physical evidence at the scene.

Luma Light
Definition: a high-powered light with wavelengths that cause blood or other materials to fluoresce or glow
Context: Investigators often rely on a Luma Light to reveal evidence blood at a crime scene that has been cleaned.

trace materials
Definition: small pieces of evidence such as fibers, hair, and blood, at a crime scene
Context: Searching the ground for trace evidence, investigators found tiny fibers.

Academic Standards

The National Academy of Sciences provides guidelines for teaching science and a coherent vision of what it means to be scientifically literate for students in grades K–12. To view the standards, visit this Web site: http://books.nap.edu/html/nses/html/overview.html#content.

This lesson plan addresses the following national standards:

- Science as Inquiry: Understandings about scientific inquiry
- Physical Science: Properties and changes of properties in matter
- Science in Personal and Social Perspectives: Science and technology in society
- History and Nature of Science: Science as a human endeavor

Credit

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