Who Did It?

Grade level: 6-8 Subject: Forensic Science Duration: Two to three class

Lesson Plan Sections

Objectives | Materials | Procedures | Discussion Questions | Evaluation | Extensions | Suggested Readings | Vocabulary | Academic Standards | Credit

Objectives

Students will do the following:

1. Explore how forensic science is used in criminal investigations
2. Apply the principles of forensic science to a hypothetical crime
3. Use the scientific process to solve a fictional crime

Materials

The class will need the following:

- Newsprint and markers
- Plastic bags (one for each student)
- Adhesive tape (for gathering thread sample)
- White paper
- A soft pencil
- Clear tape
- Microscopes or hand lenses
- Internet access (optional but very helpful)

Each student will supply the following:

- A hair sample
- A thread sample from their clothing

Procedures

1. Before class begins, pick one student to be the perpetrator of fictional classroom crime. Collect a hair sample, a thread sam fingerprint from that person. (See Step 6 for instructions on h obtain fingerprints.) This is the main evidence from the crime Place the evidence in a plastic bag. Although the student you will participate in the activity with the rest of the class, it's im choose someone who will not reveal his or her role as the per during the two or three days of this lesson.
2. Tell students that during the next few days they will try to sol "crime" that took place in the classroom. Make it clear to stud this is a simulation of a crime, not an actual event that took p them the story below. (Feel free to embellish the story, but st basic elements of the crime.)

   Last night, a crime was committed in our classroom. Someon ransacked the teacher's desk, throwing supplies on the floor a some money hidden in one of the drawers. We have been luc enough to gather evidence from the scene of the crime, whic a fingerprint, a hair sample, and a thread from an article of cl The evidence has been placed in a plastic bag. Now it is up to to try to solve the crime.
3. Show students the plastic bag of evidence. Then ask students would begin to solve this crime. How do they analyze the evic discovered at the scene of the crime? Write students' ideas or of newsprint.
4. Tell students that the Federal Bureau of Investigation—the FB with serious crimes. While the classroom crime is much less s than those the FBI usually deals with, students may be able t something about solving crimes by finding out how the FBI do Give students an opportunity to browse the FBI Web site at FI
5. If students haven't already come to this conclusion, tell them everyone in the class is a prime suspect in the crime because have access. The first step is to collect the same evidence fro student as that found at the crime scene. To begin the collect process, give each student a plastic bag. Tell students to plac sample and a thread from their clothing into the bag. (Have s use a piece of adhesive tape to pull a piece of thread off their Alternatively, students may snip a small thread from the insid clothing with a pair of scissors.)
6. Tell students that they must also submit fingerprints for analy student should follow the directions below:

   a. Draw a dark pencil smudge on a piece of scratch paper.
   b. Beginning with the little finger on your right hand, rub y fingers on the pencil smudge until they are covered.
   c. Put a small piece of clear tape on the pad of your right Gently press the tape. Carefully remove the tape and pl one edge of a clean sheet of paper.
   d. Repeat the process for the remaining fingers on your rig placing the pieces of tape across the sheet of paper.
   Label each piece of tape with the following abbreviation
   T for the thumb I for the index finger M for the mi finger R for the ring finger L for the little finger

e. Then follow the same steps for your left hand. For more information on how to take fingerprints, check out the f Web site: The Science of Forensics.

7. After all students have collected the evidence, tell them to an carefully. Ask students to use a microscope or a hand lens to each piece of evidence and record their findings on charts like shown below. Each student will analyze their own evidence.

Strand of Hair

Characteristic	Observations
Color	
Length	
Other features	

Thread Sample

Characteristic	Observations
Color	
Size	
Texture	
Other features	

The FBI categorizes fingerprints by three different patterns: lo arcs, and whorls. Pictures of these three types of fingerprints found at the following Web site: Overview of Fingerprints. Tel to use a hand lens or a microscope to determine their fingerp and then to record their results.

Fingerprint

Characteristic	Observations
Loop pattern	
Arc pattern	
Whorl pattern	

8. As students are analyzing their evidence, place the evidence f crime scene in a prominent place. Have students mount their completed charts on a bulletin board. As a class, make observ about the criminal's evidence. Complete charts for the hair, th and fingerprints of the culprit, and post those completed char bulletin board along with the others.

9. Ask students to compare the charts from their classmates wit evidence from the crime scene to determine who committed t Have students write down who they think committed the crim

discuss possible suspects. Were most students able to figure i the class reach a consensus? Which piece of evidence did they most revealing?

10. Conclude the lesson by discussing other techniques detectives collect and analyze evidence from a crime scene. What other do they collect? What tools can they use to analyze evidence?

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Discussion Questions

1. What other physical evidence would have been helpful in deter who committed the crime in the classroom? What kinds of anal you do on the other pieces of evidence? (Measure a footprint to shoe size; analyze the tread to determine the type of shoe; cor handwriting samples; analyze other fibers.)
2. What if you were called in to collect evidence from the scene of theft? How would you go about collecting evidence? What woul with your findings? What analyses would you perform on each evidence? What precautions would you need to take to make su evidence was authentic?
3. How important is technology to detectives? Can detectives do a effective job using the same tools you used, or must they use r sophisticated tools? Give reasons to support your ideas.

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Evaluation

Use the following three-point rubric to evaluate how well students evidence, record their findings, and use the evidence to draw conc about who committed a hypothetical crime:

- **Three points:** exhibited strong observation and recording s made accurate and detailed observation charts; demonstrate average ability to draw conclusions based on the evidence.
- **Two points:** exhibited average observation and recording s made accurate observation charts with some level of detail; demonstrated on-grade ability to draw conclusions based on evidence.
- **One point:** exhibited slightly below-average observation an recording skills; made observation charts with some accurat information but with little detail; demonstrated difficulty dra conclusions based on the evidence.

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Extensions

History of Forensic Science
Have students find out how forensic science has evolved in the Un States. They can find answers to the following questions on these sites: http://www.mdpd.com/astmhtm.html
http://library.thinkquest.org/3116/history.htm

1. When was forensic science first practiced in the United State
2. Who were the key players in the history of forensic science?
3. What contribution did each key player make to the advancer the field?
4. Describe an early case that made use of forensic science. W investigators able to solve the crime?
5. What safeguards are in place to ensure that forensic science properly?
6. Name at least one recent development in the field of forensi

After students complete their research, have them develop a visua on a piece of poster board or on the computer. The display could b line, a look at key figures, or a drawing of one aspect of forensics. students time in class to share their displays.

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Suggested Readings

High-Tech IDs: From Finger Scans to Voice Patterns
Salvatore Tocci. Franklin Watts, 2000.
Learn about the science of biometrics—the unique, measurable ph behavioral characteristics of an individual—and how this new scier changing the world. From security devices to crime detection, bior includes things that seem like they belong in a science fiction mov scanning, hand scanning, signature verification, DNA testing, and Each chapter explains how these various technologies work and us cases of crimes being solved to illustrate their practical use. The b concludes with a short glossary and endnotes.

Whodunit? Science Solves the Crime
Steven Otfinoski. W. H. Freeman, 1995.
For an illustration of the different facets of forensic science at worl you don't mind a bit of gore), this is a fascinating collection. Each details a particular crime and the detective work that solved it. Th range from all over the world and span two centuries. It's particula interesting to see how developments in the scientific world have b applied to crime detection.

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Vocabulary

crime scene
Definition: The place where some form of illegal activity, such as or a murder, took place.
Context: Police detectives try to collect evidence from a **crime sc** quickly as possible, before fingerprints vanish or the wind blows fi away.

evidence
Definition: Something that furnishes proof of a crime and is used of law.
Context: Fingerprints are an important type of **evidence** that det

look for after a crime has taken place.

fingerprint analysis
Definition: The study of fingerprints, which can take the form of a arc, a whorl, or a combination of these.
Context: Fingerprint analysis is an important part of crime inve because each person's fingerprints are unique.

forensic science
Definition: The study of evidence discovered at a crime scene an a court of law.
Context: The author of the Sherlock Holmes stories, Sir Arthur Co Doyle, was also responsible for furthering the work of **forensic sc** applying the principles of fingerprinting and firearm identification t investigation work.

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Standards

This lesson adheres to the National Science Education Standards f students in grades 5-8: Science as Inquiry.

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Credit

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