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# Junk Science Locks Up Innocent People

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Segment Length: 5:08 minutes

## **Lesson Description:**

We learn from CSI, Law & Order, and NCIS that forensic science is infallible, leading to the conviction of people who might otherwise have gotten away with their crimes. But DNA testing has shown that bite marks, fingerprints, and carpet fiber and hair analyses have all led to the convictions of innocent people.

## **Concepts & Key Terms:**

Forensic science—the application of science to criminal and civil laws, mainly during criminal investigation, as governed by the legal standards of admissible evidence and criminal procedure.

## **Vocabulary:**

*Infallible* – (adj.) incapable of making mistakes or being wrong.

## **Objectives:**

Students will be able to:

- discuss problems with accepted applications of forensic science.
- explain the impact of DNA testing on previous convictions.
- evaluate the importance of DNA testing in the criminal justice system.

## **Preview Activity and Questions:**

Have students answer the following questions in their notebooks:

What types of evidence are used in criminal trials? List as many types of evidence as you can (Example: eyewitness testimony). Which type of evidence would you consider most reliable? Least reliable? Explain your reasoning.

Use Think, Pair, Share to have students answer the preview questions. After a few minutes, poll the students and ask the students to discuss their answers.

## **Viewing Guide:**

It is recommended that teachers show the video segment twice: once to allow students to view the video and focus on the issues presented, and once to allow them time to complete the viewing guide. After they complete the viewing guide, allow students a few minutes to work in pairs sharing and verifying answers.

## **Answers to Viewing Guide**

1. criminals
2. unreliable
3. tens of thousands
4. fingerprints
5. skeptical

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## Viewing Guide

Name \_\_\_\_\_

Date \_\_\_\_\_

Class \_\_\_\_\_

Teacher \_\_\_\_\_

**Directions:** As you watch the video, fill in the blanks with the correct words.

1. On TV, experts identify the killer by his bite mark.... In real life, experts claim they can identify \_\_\_\_\_ that way.
2. The doctor was just wrong. He was just wrong because it's an \_\_\_\_\_ technique.
3. If you think that maybe even one percent of convicted defendants may have been innocent, we have 2.6 million people in prison today so we are not talking about couple of people. We are talking about \_\_\_\_\_ of people.
4. FBI researchers say \_\_\_\_\_ are right more than 99% of the time. But that still leaves plenty of wrongful convictions.
5. Jurors tend to believe people who courts call "experts." But the "experts" often rely on junk science. Juries and judges should be much more \_\_\_\_\_.

**Now, take a few moments to reflect on the video and answer the question below:**

What does John Stossel mean by "junk science"? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What is one lesson you will take away from watching this video? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **Discussion and Analysis:**

1. What is the difference between what detectives can do on TV shows and what they can do in real life?
2. Why does John Stossel refer to forensic science as “junk science”?
3. If you were on a murder trial jury, what kind of evidence would you expect the prosecutors and defense to present?
4. If you were a juror, would the video you saw affect your vote to convict a person based on forensic evidence? DNA evidence? Explain. What if there were no DNA evidence?
5. Can we ever be 100% sure of a person’s guilt or innocence? What does it mean to prove guilt “beyond a reasonable doubt”?
6. What is an expert? Why do people trust experts?
7. Dr. Karazulas said he is not on the side of the prosecution or defense, and that he looks at the evidence neutrally. If so, does this mean we should accept his testimony as true? Why or why not?
8. In Alfred Swinton’s case, what did bite mark expert testimony show? What did the DNA evidence show? Why did the DNA evidence outweigh the bite mark testimony?
9. Suppose bite mark testimony is right two-thirds of the time, so that relying on it gets two guilty people convicted for every one innocent person that’s convicted. Should judges and jurors send people to jail based on bite mark evidence alone? Should they ever acquit based on the defense’s bite mark expert testimony? Why or why not?
10. What is good about convicting guilty people? What is bad about convicting innocent people? Which is more important? Discuss.
11. In the video, John Stossel said, “Why do judges admit this stuff? Why don’t defense attorneys get it thrown out?” What did he mean by “this stuff”? Has John Stossel presented enough evidence to persuade you that judges should throw all of it out? Why or why not?
12. Suppose a scientist claims that two chemicals react in a certain way, or that an object accelerates toward earth at 9.8 meters per second per second. How could you evaluate whether these claims are true? What are some ways of determining whether someone’s claims about science are true?
13. Suppose you are a juror at a murder trial. You hear from two eyewitnesses, each of whose testimony you judge to be most likely accurate and which place the defendant near the scene of the crime. You hear from a bite mark expert, who says he is 98% sure that bite marks on the victim are those of the defendant, pointing to several similarities between the defendant’s teeth and features of the bite marks. The defense attorney has yet to present his case. So far, how would you evaluate the evidence? Does it make you want to vote to convict? Explain.

### **Discuss These Lines from the Video:**

1. When the models of the teeth were laid onto the bite mark, it was a perfect match.
2. A forensic scientist is not on the side of the prosecution or the defense. We look at the evidence and we make sure that if we are going to make a decision it's going to be a truthful decision.
3. Bite marks is similar to you and I maybe looking at a cloud, and then I say to you, I say, "John doesn't that cloud look like a rabbit to you?" And you look at it and say, "Yeah Chris, I think that does look like a rabbit."
4. If you think that maybe even one percent of convicted defendants may have been innocent, we have 2.6 million people in prison today, so we are not talking about couple of people. We are talking about tens of thousands of people.
5. Sure, they're confident. It's faith-based science.
6. FBI researchers claim fingerprints are right more than 99% of the time. But that still leaves plenty of wrongful convictions.
7. Houck says he'd demand other evidence, but not all cops do.
8. Jurors tend to believe people who courts call "experts". But the "experts" often rely on junk science. Juries... and judges... should be much more skeptical.

### **Quotes for Discussion:**

For the law holds, that it is better that ten guilty persons escape, than that one innocent suffer.

– William Blackstone

The purpose of a criminal justice system is not to be fair. Its purpose is to protect law-abiding people from criminals.

– Thomas Sowell

Back off, man; I'm a scientist.

– Peter Venkman, *Ghostbusters*

Democratic societies function on faith in strangers—in police and judges—and in experts of all stripes, from scientists to journalists to economists.

– Charlotte Alter, *Time Magazine*

A wise man proportions his belief to the evidence.

– David Hume

On television and in the movies, crimes are always solved. Nothing is left uncertain.... In real life, on the other hand, many murders remain unsolved.

– Alan Dershowitz

Young man, let me remind you that this is a court of law, not a court of justice.

– Oliver Wendell Holmes, Jr.

A jury consists of twelve persons chosen to decide who has a better lawyer.

– Robert Frost

We live in a society absolutely dependent on science and technology, and yet have cleverly arranged things so that almost no one understands science and technology.

– Carl Sagan

Historically, the claim of consensus has been the first refuge of scoundrels; it is a way to avoid debate by claiming that the matter is already settled. – Michael Chrichton

Being a scientist requires having faith in uncertainty...learning to cultivate doubt. There is no surer way to screw up an experiment than to be certain of its outcome. – Stuart Firestein

### **Activities:**

1. Attend a trial or research several cases of people charged with lawbreaking. Note the evidence presented. How much is physical evidence of the kind this film encourages skepticism about? How much is eyewitness testimony? Categorize any other evidence that is presented. How persuasive do you find each piece of evidence, and why?
2. Research a criminal case from history. (Pick one in which it wasn't obvious who was guilty.) Conduct a mock trial of the case.
3. Research the Innocence Project. What is it? When was it established? How are cases selected for review? What are some notable successes of the project? Select one case and write a report explaining what evidence was used to convict the person and what evidence was presented to overturn the conviction.
4. Research the use of DNA evidence to exonerate those convicted of crimes in your state. How does a convict get access to a DNA test? What barriers are there to the convict accessing a test?
5. Write an essay about this famous quote: "For the law holds that it is better that ten guilty persons escape, than that one innocent suffer." Explain the meaning and why you agree or disagree.
6. Legally, jurors are supposed to vote for a criminal conviction only if the prosecution has proved its case "beyond a reasonable doubt." Someday, you may serve on a jury and have to apply that standard. Write an essay on the phrase, "beyond a reasonable doubt." What does it mean to you? Would you interpret it as a certain percentage likelihood of guilt, or in some other way? Why might we have decided that it was morally acceptable to punish only those whose guilt is established beyond a reasonable doubt?
7. Read "Pseudoscience in the Witness Box" by Dahlia Lithwick. Then write a summary using Cornell (two-column) notes.

[http://www.slate.com/articles/news\\_and\\_politics/jurisprudence/2015/04/fbi\\_s\\_flawed\\_forensics\\_expert\\_testimony\\_hair\\_analysis\\_bite\\_marks\\_fingerprints.html](http://www.slate.com/articles/news_and_politics/jurisprudence/2015/04/fbi_s_flawed_forensics_expert_testimony_hair_analysis_bite_marks_fingerprints.html)

8. Read and summarize "Forensic Tools: What's Reliable and What's Not-So-Scientific" by Jonathan Jones.

<https://www.pbs.org/wgbh/frontline/article/forensic-tools-whats-reliable-and-whats-not-so-scientific/>

Name \_\_\_\_\_  
Class \_\_\_\_\_ Per \_\_\_\_\_

Date \_\_\_\_\_  
Teacher \_\_\_\_\_

## Junk Science Locks Up Innocent People K-W-L Chart

Do you watch CSI? Law & Order? NCIS? These shows often show the use of modern science—forensics—to identify and convict criminals.

**Directions:** Complete the **K** and **W** sections prior to watching the video. After you have seen the video, complete the **L** section and answer the two questions below the K-W-L chart.

<b>K</b>	<b>W</b>	<b>L</b>
What I know about forensic science/ forensic evidence:	What I want to know forensic science/ forensic evidence:	What I've learned about forensic science/ forensic evidence:

After watching the video, how have your views of evidence changed? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Why does this matter? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_