



High School Science Virtual Learning

Forensic Science

DNA Analysis

May 15th, 2020



High School Forensic Science

Lesson: May 15th, 2020

Objective/Learning Target:

Students will be able to understand how DNA from a crime scene is used and analyzed to better solve cases.

Let's get started!

1. How could someone possibly leave DNA at a crime scene? List three ways minimum.
2. What part of DNA is going to be unique to each person?





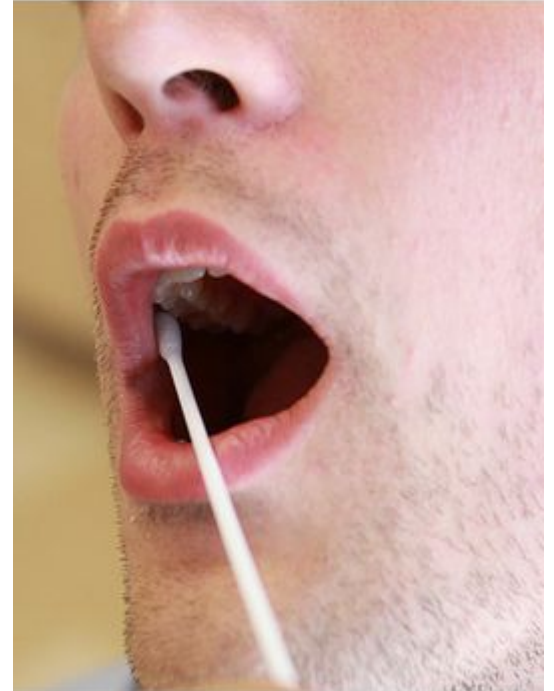
KEY

1. How could someone possibly leave DNA at a crime scene? List three ways minimum. - saliva, fingerprints, footprints, hair, nasal mucus, semen, skin/body parts, and sweat. Blood alone is not going to leave DNA.
2. What part of DNA is going to be unique to each person? - The sequence of nitrogenous bases.

Lesson Activity:

Directions: Go to this site and answer the questions on how DNA used in forensics.

Link(s): [DNA Analysis](#)





Practice

You will use the information from the activity on slide 5 to answer the following questions.



Practice Questions- Answers can be found in the article from slide 5.

1. Other than crime scenes, what are two instances that DNA profiling might be used?
2. What is extragenic DNA?
3. What is a polymorphism? How is it used to identify each individual? What types of DNA evidence are considered poor sources and why?
4. How is DNA extracted from a sample?
5. SNPs are commonly used to identify an individual in forensic testing. What are SNPs and explain what their title means.
6. There are many other types of DNA analysis, but what is the process of making extra copies of that DNA and why would it be necessary?

Answer Key: Once you have completed the practice questions check with the work.

1. Other than crime scenes, what are two instances that DNA profiling might be used? - Paternity testing and in disaster victim cases for identification.
2. What is extragenic DNA? - DNA that does not code for a known gene sequence.
3. What is a polymorphism? How is it used to identify each individual? - A polymorphism is a variation of a repetitive sequence of DNA that is one of many tandem repeats. Each person's polymorphism number and location is unique and creates a distinctive band pattern when analyzed.
4. What types of DNA evidence are considered poor sources and why? - Urine, faeces, and dead skin cells because of all the contaminants.
5. How is DNA extracted from a sample? - Cells are lysed with a buffer solution and then centrifuged to denature proteins and fats. A column with a positive charge is used to attract the slightly negative DNA to it and the other materials are "washed" away. DNA is recovered with water and then quantified using spectrophotometer techniques.
6. SNPs are commonly used to identify an individual in forensic testing. What are SNPs and explain what their title means. - SNPs are Single Nucleotide Polymorphisms and they are the difference of one nucleotide in a sequence that is unique to that individual.
7. There are many other types of DNA analysis, but what is the process of making extra copies of that DNA and why would it be necessary? - Polymerase Chain Reaction (PCR) and this is helpful when there is not a lot of a DNA sample available, so you make a ton of copies in order to do more testing.



More Practice

You will use the information from the activity on the following slide and on slide 5 to answer questions.



More Practice

Be sure to read the rest of the [first article](#) after the PCR section, there is a ton more great information that can help you there too! Go to this [site](#) and answer the following questions.

I do want to point out that the article says we can get DNA from blood. We cannot get DNA from red blood cells, but other components of blood and this can be a difficult process, so usually we say blood is not a 100% true identifier.



More Practice Questions

1. Is DNA evidence proof enough to convict someone? -
2. What are some other types of biological evidence you might find at the crime scene?
3. Notice, the database of DNA profiles consists of mostly convicted felons, what if the perpetrator does not have a DNA profile?



More Practice Questions **KEY**

1. Is DNA evidence proof enough to convict someone? - No, usually another form of evidence like a fingerprint is also needed.
2. What are some other types of biological evidence you might find at the crime scene? - blood spatter, fingerprints, footprints, or microbes.
3. Notice, the database of DNA profiles consists of mostly convicted felons, what if the perpetrator does not have a DNA profile? - He or she will not be in the database and the actual person's DNA will need to be tested to surely identify him/ her.



Additional Practice

[Use of DNA in the Legal System](#)

[DNA and Forensics Science Processes](#) (I would watch this on 1.25 or 1.5 speed if you can)