

Procedure


Part 1: DNA Fingerprinting

DNA fingerprinting is the process of identifying differences in the DNA of individuals. This can be done with gel electrophoresis, a process that separates segments of DNA cut according to DNA sequences that are unique among individuals. Using this technology the DNA fingerprint of an individual can be compared to that of a sample found at a crime scene. Follow the steps below to learn more about DNA fingerprinting and gel electrophoresis.

1. As a class or individually, view the video “How does DNA fingerprinting work?” at the Naked Science Scrapbook site. <http://www.thenakedscientists.com/HTML/podcasts/scrapbook/show/2011.10.27/>
2. Read the article “Can DNA Demand a Verdict?” at the Learn Genetics website and answer the following questions. The article can be found at: <http://learn.genetics.utah.edu/content/labs/gel/forensics/>
3. What percentage of genetic material is the same in everyone?
4. Where can DNA evidence be found at a crime scene?
5. What procedure does The National Research Council recommend to reduce human error?
6. What other evidence must be taken into consideration in addition to DNA evidence?

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To the right of the article are the steps of forensic DNA analysis. Use this graphic to draw a sketch for the following steps. For Step 7 draw the bands shown in green on the website.

Forensic DNA Analysis Step	Drawing
Step 1: Collect evidence from the crime scene.	
Step 2: Isolate DNA from an evidence sample.	
Step 3: Cut the DNA into fragments using specialized protein "scissors" called restriction enzymes. For every person, the sizes of the cut fragments are unique – except for identical twins.	
Step 4: Separate the negatively charged DNA fragments in a gel by passing an electric current through it.	
Step 7: Compare the fragment profile of the evidence DNA with those of the suspects and victim to see if they match.	

7. Look at the image in Step 7. Based on the DNA analysis of the gel electrophoresis, which suspect would you identify as the culprit? Explain.