

# DNA Fingerprinting Analysis

Name \_\_\_\_\_  
Date \_\_\_\_\_ Per. \_\_\_\_\_

## How do Forensic Scientists test DNA?

In order to compare DNA from evidence to the DNA found in suspects, DNA fingerprints need to be created. This involves multiple steps.

**Step 1)** DNA is extracted from cells found on the scene or from the suspects.

Below are three strips that represent DNA from Ms. Leonardo, Mr. Johnson, and Ms. Hopkins.

→ Color each DNA strip a different color and label each suspect with their color.

Ms. Hopkins       Ms. Leonardo       Mr. Johnson

4.0 kb	3.5 kb	2.5 kb	5.0 kb
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Ms. Hopkins

6.0 kb	4.0 kb	3.0 kb	2.0 kb
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Ms. Leonardo

8.0 kb	4.5 kb	2.5 kb
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Mr. Johnson

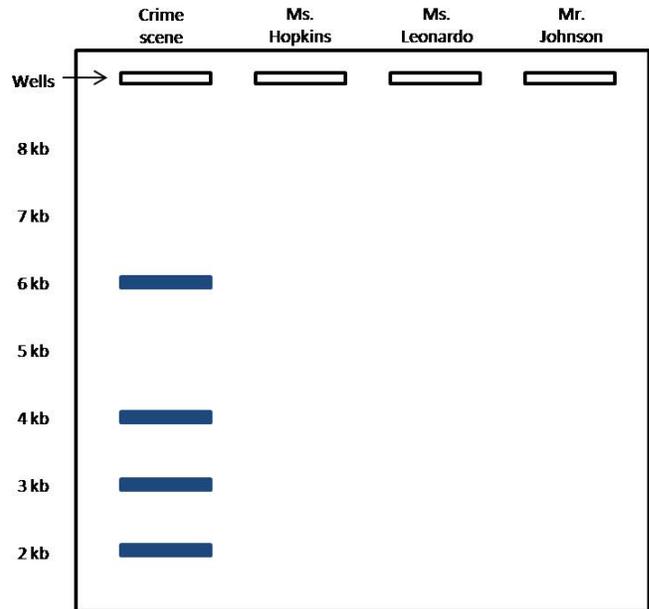
**Step 2)** DNA is mixed with **restriction enzymes** which cut the DNA in predictable places. Because everyone's DNA is different the enzyme will cut each strand differently, making a unique pattern with the DNA fragments.

→ Indicate the number and length of each suspect's DNA fragments.

- Ms. Hopkins    1. \_\_\_\_\_    2. \_\_\_\_\_  
                         3. \_\_\_\_\_    4. \_\_\_\_\_
- Ms. Leonardo    1. \_\_\_\_\_    2. \_\_\_\_\_  
                         3. \_\_\_\_\_    4. \_\_\_\_\_
- Mr. Johnson    1. \_\_\_\_\_    2. \_\_\_\_\_  
                         3. \_\_\_\_\_

**Step 3)** The DNA is put into a gel and electricity is added. This process is known as gel electrophoresis. Because DNA has a negative charge it wants to move towards the positive charge and so it moves down the gel. The smaller pieces are faster and therefore go farther. Thus, the fragments separate out on the gel according to their lengths, creating a unique fingerprint.

→ Look at the sample gel provided. For each suspect draw and color in their fragments of DNA in the correct place in the gel. Be sure to keep each DNA band the same width as the well.



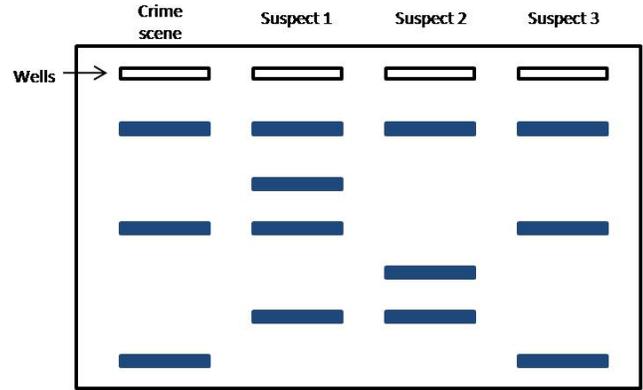
List the lengths of the crime scene DNA fragments.

\_\_\_\_\_

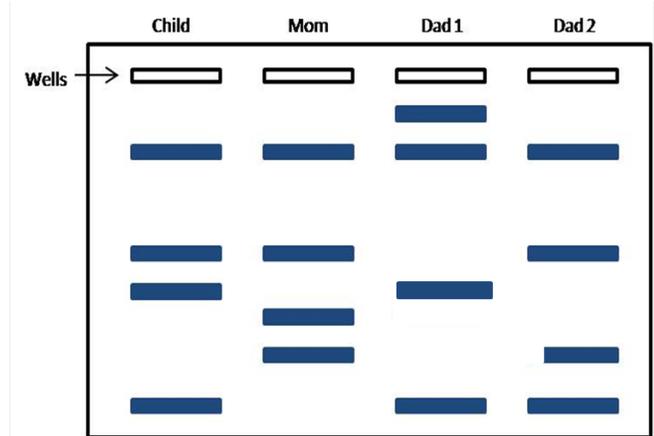
**Step 4)** The final step is to analyze the DNA fingerprints of the suspects and compare them to the evidence.

Who is the likely suspect? \_\_\_\_\_

- In a criminal case, the person can only be a match if  
 \_\_\_\_\_  
 \_\_\_\_\_
- Examine the gel to the right. Which suspect's DNA was at the crime scene? \_\_\_\_\_  
 How do you know?  
 \_\_\_\_\_  
 \_\_\_\_\_



- In a paternity case, you need to compare the possible dad's DNA to the \_\_\_\_\_ and the \_\_\_\_\_. \_\_\_\_\_ of the kids bands should be the same as mom and \_\_\_\_\_ should be the same as dad.
- Examine the gel to the right. Who is the child's father?  
 \_\_\_\_\_
- How do you know?  
 \_\_\_\_\_  
 \_\_\_\_\_



**Gel Electrophoresis**

- Gel electrophoresis is a technique used to create \_\_\_\_\_.
- DNA fingerprints are used to compare people's DNA in the field of \_\_\_\_\_ to help solve crimes.

How Gel Electrophoresis works:

- The DNA is cut into pieces by a \_\_\_\_\_.
- The DNA is loaded into \_\_\_\_\_ at one end of the \_\_\_\_\_.
- An electric current is applied to the gel, and the \_\_\_\_\_ charged DNA moves toward the \_\_\_\_\_ side of the gel.
- Smaller fragments of DNA move \_\_\_\_\_ because it is easier for them to move through the gel matrix.
- When the \_\_\_\_\_ fragments of DNA start to reach the end of the gel, the electricity is turned off.

The gel is stained, so that the DNA can be seen and analyzed.

- The \_\_\_\_\_ fragments of DNA are \_\_\_\_\_ from the wells and the \_\_\_\_\_ fragments of DNA are \_\_\_\_\_ to the wells.