

# Missing Persons Case

## Purpose

The forensics team was called to a possible crime scene. A local home appears to have been the site of a crime with large amounts of blood found but no body. The family residing in the home is missing along with the family vehicle. Your task is to study the blood left behind and attempt to reconstruct the crime. Identify any of the blood or genetic material as coming from members of the family or from the perpetrator.

## Materials (per group of 4)

- A set of crime scene photos
- A ruler
- Blood collected from the crime scene
- An envelope containing of DNA from the crime scene
- A gel plate prepared with the standard and each member of the family.

## Members of the Family



Chris Jones  
Age: 32 yrs  
Height: 5'9"  
Weight: 160 lb  
Eyes: Hazel  
Hair: Brown  
Blood Type: A+



Michelle Jones  
Age: 26 yrs  
Height: 5'6"  
Weight: 125 lb  
Eyes: brown  
Hair: black  
Blood Type: B+



Maya Jones  
Age: 26 mo  
Height: 32"  
Weight: 24 lb  
Eyes: brown  
Hair: black  
Blood Type: AB+

## Procedure

1. You will be given evidence photos of the crime scene.
2. It is up to you to analyze the crime scene based on what you have learned in class to reconstruct the crime scene.
3. Make notes on each evidence photo stating what information you have gathered. Focus on the following in your notes:
  - a. Spatter patterns
  - b. An estimate of volume of blood loss
  - c. Velocity of spatter
  - d. Angle of impact
  - e. Point of origin
  - f. Approximate amount of blood lost.
4. Identify the blood type from the sample collected. Compare the blood type to each member of the family.
5. Analyze the DNA profile retrieved from the crime scene. Compare the genetic sequence to each member of the family.

6. Last compile what you have learned to complete a written report that may be shared in court.

### **Written Report**

1. The purpose of the written report is to use your knowledge of serology and genetic profiling to determine whether each member of the family should be classified as a victim or a suspect.
2. You must reference the blood spatter patterns, blood type analysis, and DNA profile to provide evidence of what happened to the missing family.
3. Throughout the written report you will be required to define any key terms and use proper grammar, and spelling.
4. The format for your written report to the jury is outlined as follows.

#### **I. Introduction**

- a. State the purpose of your report
- b. No factual or detailed information should be in the introduction
- c. State how you analyzed the crime scene
  - State what observational evidence was used to determine what happened to the family
  - State the significance of the analytical tests performed on the blood and genetic material collected
  - State whether or not it was possible to come to a conclusion on the source and circumstance of the blood left behind.

#### **II. Several Body Paragraphs, at least eight**

- a. One main idea or characteristic in each paragraph
- b. For each photograph you need to describe each of the following
  - spatter patterns
  - An estimate of volume of blood loss
  - velocity of spatter
  - angle of impact
  - point of origin
- c. For blood typing in one paragraph
  - Classify the blood type and which members of the family were able to be eliminated
  - Explain how the blood type was determined and what causes the reaction to take place
  - Again explain terms used to convince the jury
- d. For genetic profiling in one paragraph
  - Reference the genetic profile collected and tell which, if any family members were represented in the genetic profile.
  - Explain how the genetic sequencing was performed and how to read the profile.
  - Again explain terms used to convince the jury

#### **III. Conclusion (10 pts)**

- a. Summarize your findings, what do you think happened to the family?
- b. Is it possible the victim could have survived?
- c. Do not repeat detailed information?
- d. What other evidence do you see that may be used?
- e. How sure are you of this conclusion?

	1	2	3	4
<b>Introduction and Conclusion</b>	Little effort was apparent in the introduction and conclusion	Introduction and conclusion are complete but would be difficult for a jury to understand	Introduction and conclusion were clear and concise but did not follow the directions in the rubric	Introduction and conclusion were clear and concise. Stated all necessary information without including detailed information already in the body
<b>Blood Spatter Analysis</b>	Little effort into document analysis is apparent	Significant errors in document analysis, and/or explanation of was difficult to understand throughout.	Minor errors in blood spatter analysis, and/or explanation of was not quite clear in parts.	Each photograph was analyzed including each piece of required information, explanation of term used and how these patterns could occur was included.
<b>Blood Typing</b>	Little understanding of blood typing is apparent	Blood type was incorrectly identified or explanation has significant flaws or is difficult to understand	Blood type was correctly identified. Explanation is complete, thorough and easy to understand	Blood type was correctly identified. Explanation is complete, thorough and easy to understand
<b>Genetic Profiling</b>	Little effort into examination and comparison of the genetic profile is apparent	Significant errors in genetic profiling, and/or explanation of was difficult to follow or unconvincing throughout.	Minor errors in genetic profiles were made, and/or explanation of was not quite clear in parts.	Genetic profiling of each family member and blood collected at the crime scene was done, methods and comparison of profiling are clear.
<b>Suspect Identification</b>	Little evidence of an effort to identify the suspect using evidence is provided.	Suspect was not correctly identified but detailed reasoning for the conclusion was given. Or suspect was correctly identified but little reason is given	Suspect was correctly identified. Detailed reasoning was provided. Data which does not support the theory is not addressed or not sufficiently explained	Suspect was correctly identified. Detailed reasoning was provided citing specific traits. Any data that does not support the theory is acknowledged and explained.
<b>Use of Vocabulary</b>	2 or less words were properly used and defined	3-4 words were properly used and defined	5-7 words were properly used AND defined	8+ words were properly used AND defined
<b>Analysis Questions</b>	Fingerprint and Document analysis shows little understanding in the fundamentals of crime scene investigation	Fingerprint and Document analysis shows significant gaps in understanding in three to four areas.	Fingerprint and document analysis show significant gaps in understanding in one to two areas.	All answers on fingerprints and document analysis were correct and well-reasoned. Minor errors may only result in a dock of half a point.
<b>Comments</b>				

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## Documents and Fingerprints Analysis

Answer the following questions. Use complete sentences

1. Describe the structure of DNA

2. Write the complementary base pairs for the following sequence of DNA

T - A - G - C - T - A - T - T - C - G - G - A - T - C - A

3. Briefly describe the function of each of the following components of blood

a. Red blood Cells

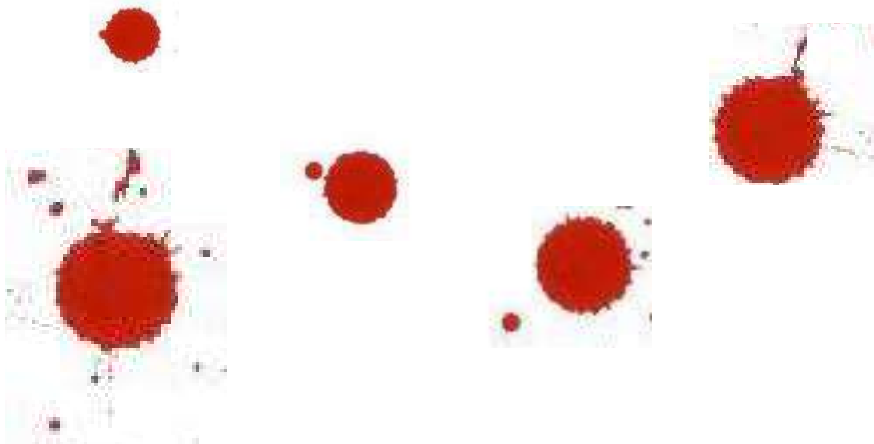
b. White Blood Cells

c. Platelets

d. Plasma

4. Can a man who has type A blood and a woman who has type B blood produce a child who has type O blood. Prove your answer by solving the cross.

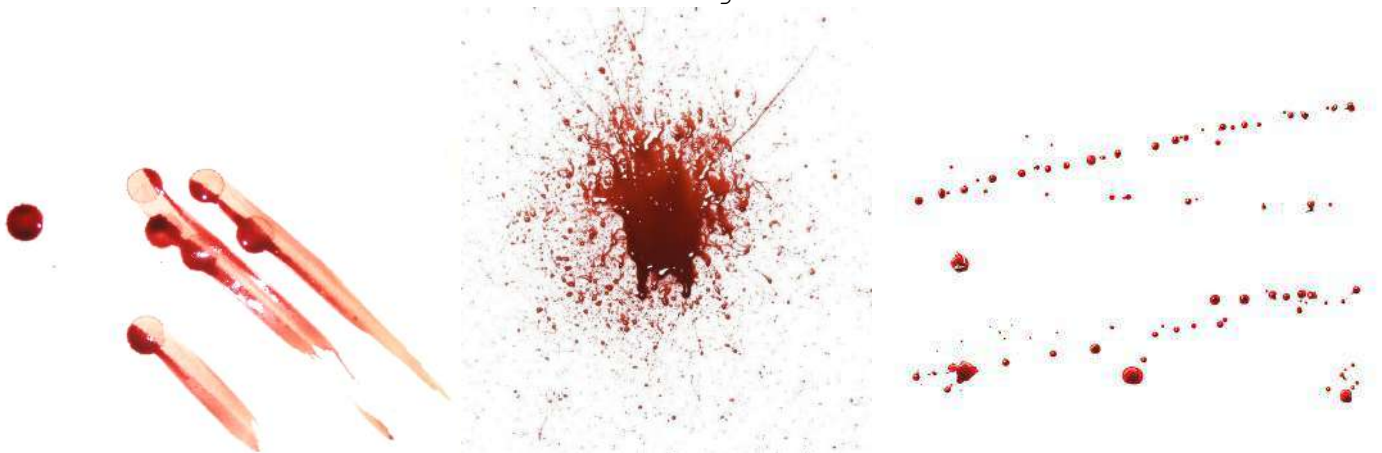
5. Number the blood drops from highest to lowest



6. Calculate the angle of impact of the drop below. Show all work and measurements



7. Describe how each of the following were made.



## Standards

5'AGCTTTTA3'

5'AGCTTCATTTA3'

5'AGCTTCATCATTTA3'

5'AGCTTCATCATCATTTA3'

5'AGCTTCATCATCATCATTTA3'

5'AGCTTCATCATCATCATCATTTA3'

5'AGCTTCATCATCATCATCATCATTTA3'

5'AGCTTCATCATCATCATCATCATCATTTA3'

Father

5'CTAGAAGCTTAAAGCTTCATCATTTAAGCTTCAAAGCTTTCGACCTAAATTGC3'

5'CTAGAAGCTTAAAGCTTCATCATCATCATCATTTAAGCTTCAAAGCTTTCGAC3'

Mother

5'CTAGAAGCTTAAAGCTTCATCATCATTTAAGCTTCAAAGCTTTCGACCTAAAT3'

5'CTAGAAGCTTAAAGCTTCATCATCATCATCATCATTTAAGCTTCAAAGCTT3'

Child

5'CTAGAAGCTTAAAGCTTCATCATTTAAGCTTCAAAGCTTTCGACCTAAATTGC3'

5'CTAGAAGCTTAAAGCTTCATCATCATCATCATCATTTAAGCTTCAAAGCTT3'

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Unknown Suspect

5'CTAGAAGCTTAAAGCTTCATCATCATCATCATCATTTAAGCTTCAAAGCTTTCG3'

5'CTAGAAGCTTAAAGCTTCATCATCATCATTTAAGCTTCAAAGCTTTCGACCTA3'

