Introduction to Case 96-3337
Case 96-3337
This R/O (Reporting Officer) was on routine patrol in the St. Stephens area. On May 9 at 1 a.m. I saw a light on in a classroom of St. Stephens HS. In investigated and found the door to the building open. When I walked into the classroom I saw the body of a white male lying on the floor. There was blood on the floor and a gunshot wound in the head. A wallet was in his pants pocket with no money, but had driver's license with the name Ralph Voosen. A file cabinet drawer containing files of school material was pulled open. A spent gun cartridge was on the floor. No other people were in the building. I called for back up and ambulance. Attempt to revive victim was not successful, and he was pronounced DOA at Catawba Hospital.
Officer J. Beach
Autopsy Report:
Name: Ralph Voosen
Description: White Male, 5'8", 180 lb. DOB 5/12/66
Brown hair, no facial hair or tattoos
Blood type A
Cause of death--massive hemorrhage in brain
Findings:
Bullet was in brain. No barium or lead was found on hands. There were skin cells under the fingernails of the victim.
Time of death is estimated to be between 11 p.m and midnight on Dec. 8.
Toxicology report: no alcohol or unusual material in blood.
Dr. P. J. Keeler, pathologist

Crime Scene Report
No fingerprints were found at the scene other than those of the deceased. Hair samples were taken in the room. Blood was sampled from victim and from the floor. Victim's clothes were taken and examined. A note was found in the right pants pocket which read "Meet me in your classroom at 11 p.m. tonight. We need to talk." The wallet contained a driver's license but no money. The victim had a set of keys with a front door key to the building, classroom key, house key and key to the victim's car.
Officer Glen Walker, Evidence Technician

CASE 96-3337: Interviews
Transcript of Interview with Pat Mayhew,102 15th St. NE, May 9, 9 a.m.
Pat Mayhew is a white female, DOB 4/3/71
She has blond hair, blue eyes and is 5'6", 130 pounds
She works as a receptionist/bookkeeper for Mr. Voosen's company Compufix. Ms. Mayhew was very upset when she was told of Mr. Voosen's death. She said they were dating and had discussed marriage. On the night of May 9 she went to dinner with the deceased from 7-9 p.m. after his daughter’s basketball game. He had apologised for

being late because his daughter had a bloody nose. After dinner, the couple came back to her house where they watched t.v. Mr. Voosen left around 10:30. He said he was going home to bed. No mention was made of going to school.

This R/O interviewed neighbors of Pat Mayhew on both sides of the street. The only neighbor home on May 8 was Ellen Carolla, 104 15th St. NE
Interviewed on May 9 10 a.m Mrs. Carolla has a clear view of the Mayhew driveway when her curtain is open. She said she saw a car drive up around 9 p.m. on May 9 as a t.v. program was ending. She had her windows open and heard Ms. Mayhew and boyfriend Ralph Voosen in heated argument. Mrs. Carolla said she heard Ms. Mayhew say "You are such a loser and I wish I 'd never set eyes on you." The couple then went into Ms. Mayhew's house. Mrs. Carolla went to bed at 10 p.m. and did not see or hear Mr. Voosen leave.

Interview with Richard J. Barnes
1960 44th St. NW, Hickory
Partner with Mr. Voosen, the deceased in computer repair business called Compufix for 2 years.
Interviewed May 9, 2 p.m.
Mr. Barnes is a white male, 150 lb. 5'10" DOB June 1, 1970, Red hair, brown eyes
He had invested in 50% of the business with Mr. Voosen. He mainly traveled out of town to fix computers, leaving Mr Voosen to do some repair work in town on weekends and in the summer. The business was going very well, they had more work than they could keep up with. On the night of May 9 he said he was home repairing computers and went to bed around 11 p.m. He has no witnesses to this.

Interview with Mr. Scott Stuckey, science teacher at St. Stephens High School
3205 34th St. Dr. NE
Time of Interview: 8 a.m. May 9
Mr. Stuckey confirmed that the deceased was employed as a teacher at the high school and that he also had a computer repair business on the side. Mr. Stuckey was a friend of the deceased and talked with him when they had hall duty together. He said the deceased had been dating Pat Mayhew on a regular basis, and that before dating the deceased, Ms. Mayhew had dated Patrick Barnes, the partner in the business. He said that he couldn't imagine what Mr. Voosen was doing in the school at the time of death. He could have come to get an old test or handout that he needed to redo for school. He did not know offhand of any enemies the deceased might have. He was not that familiar with the computer business and how it was going.
Officer J. Beach

Banking Information
Wachovia Bank Acct. 66208 321-00
Ralph Voosen

Transactions		
December 6	Check to Compufix, Inc	4000.00
May 7	No transactions	
May 8	Wachovia Visa Charge	
	Red Lobster, Hickory	46.42
	9:01 p.m.	
	ATM Withdrawal	
	10:45 p.m.	300.00

LIST OF EVIDENCE--HANDOUT 2
Case 96-3337
Exhibit A-hair from deceased Ralph Voosen
Exhibit B-hairs from crime scene
Exhibit C-Hair from Pat Mayhew
Exhibit X-Hair from Richard Barnes
Exhibit D-Blood from crime scene
Exhibit E-blood from victim
Exhibit F-Blood from Pat Mayhew
Exhibit G-Blood from Richard Barnes
Exhibit I--Piece of note
Exhibit J-Pen from pocket of deceased
Exhibit K-Pen from purse of Pat Mayhew
Exhibit L- Pen from pocket of Richard Barnes
Exhibit M-DNA from cells found under fingernails of victim
Exhibit N-DNA from white blood cells of Pat Mayhew
Exhibit O-DNA from white blood cells of Richard Barnes
Exhibit P-wallet containing drivers license, ATM teller receipt

Background information

Forensic analysts are often asked to compare hair found at a crime scene with hair from a particular individual. The examiner compares a variety of factors, including color, coarseness, granule distribution, hair diameter and the presence or absence of a medulla.

Each hair grows out of a tiny pocket in the skin called a follicle. The base of the hair--the part attached to the follicle--is called the root hair. A strand of hair has three layers: cuticle, cortex and medulla. The cuticle is the outer covering. It consists of tough overlapping scales that point toward the tip end. The cortex contains pigment granules. These give hair its color. The color, shape, and distribution of the granules provide important points of comparison between the hair of different individuals. Generally, African American hair is curly and contains unevenly distributed pigment granules. Caucasian hair is usually straight or wavy, with more evenly distributed pigment granules. The medulla is a hollow tube that runs the length of the hair. Sometimes it is present, sometimes not. Sometimes the canal is continuous, while in other cases it is fragmented. For example, except for the Asian race, human head hairs usually have fragmented medullae or no medullae at all. Among Asians, head hair generally have continuous medullae. Sometimes the hair found at a crime scene is from an animal. This too may be helpful, for it is possible to identify the species. Different species have different scale patterns on the cuticle of the hair. Animal hair has a characteristically thicker medulla and cuticle than in a human, since their hair is their means of warmth.

Procedure: Case 96-3337

1. Obtain labeled bags of hair (Exhibits A, B, C, X)
2. Sign on the label that you handled the bag.
3. Examine the strands under a microscope. Look for medulla, cuticle and scales. Look for distribution of pigment granules. Use micro ruler to measure diameter of each hair.
4. Include pictures and record observations in addition to measurements with your data sheet.
5. Determine if the hair is human or animal.
6. Determine if the hairs at the crime scene are from the victim or from one of the suspects.

Background Information

Blood is a red, sticky fluid. Several kinds of cells are suspended in the blood: red blood cells, white blood cells and platelets. Many chemicals are also suspended, including proteins, sugars, fats, salts, enzymes and gases. Each person's blood has certain inherited characteristics that distinguish it from the blood of other people. But only recently have scientists developed the ability to identify most of these characteristics. Until the 1980's, blood was primarily differentiated according to the presence of three substances that are on the outside of red blood cells called **antigens**. These are the A, B, and D antigens. The presence or absence of A and B antigens on the the blood determines a persons blood type. If the A antigen is present, the person has A type blood. If the B antigen is present, he has B type blood. If both antigens are present, the blood type is AB. If no antigens are present the person has O type blood. The other important blood antigen is the Rh factor, or D antigen. If one has the D antigen, the person is Rh positive. If he lacks it, he is Rh negative. In order to type a person's blood, antibodies (called agglutinins) made to the antigen are added to the drop of blood. If clumping occurs, then the blood type is known.

Since the girlfriend claims that the victim's daughter had a bloody nose a a basketball game determine if one of the blood contributions is from his daughter. Use a punnett square.

anti-A agglutinin + blood clumping occurs	**anti-B agglutinin + blood clumping occurs**	**Blood type**
yes	no	A
no	yes	B
yes	yes	AB
no	no	O

Procedure: Case 96-3337

(Note: because of blood-borne pathogens, you will be working with simulated, not real blood)
Sign and date the label on the evidence bags.

1. Place 2 drops of blood from the crime scene (Exhibit D) on the microscope slide.
2. Add a drop of Anti-A antiserum to the drop and stir it with the yellow toothpick. Immediately throw the toothpick into the disposal container.
3. Add a drop of Anti-B antiserum to the second drop of blood. Stir it with the blue toothpick and immediately throw the toothpick away.
4. Observe the clumping and determine the blood type.
5. Repeat the procedure for blood from Exhibit E, F, and G. Be sure to record your data. Place used slides in dishpan.
6. Explain the genetics of blood typing. Include a punnett square to show if one of the samples could be from a daughter.

Forensic Lab Activity--Ink Chromatography

1. Background Chromatography (Chroma=color and graphia=writing) is an ancient method used to separate and identify parts of a mixture. Ink is a mixture of several colors used to produce one. Using chromatography, the colors in ink can be separated. If ink is exposed to certain liquids, called solvents, the colors will dissolve and separate within the liquid. If the solution is then allowed to soak into a piece of chromatography paper, the different colors will created bands on the paper. They will remain in solution. Inks of the same type will always produce the same banding pattern when this technique is used. The resultant paper with bands on it is called a chromatograph.

2. **Procedure Case 96-337**
    1. Sign and date the label on the evidence bag.
    2. Take out the piece of the note in Exhibit I. Add .5 ml of solvent to the test tube. Place the strip of paper into the test tube, so that the pointed tip just touches the solvent. Cover and let set for 20 minutes.
    3.
    4. Take the pen that is Exhibit J. Make a dark band of ink on a piece of chromatography paper 2 cm from the bottom edge of the pointed tip of the paper. Repeat the procedure as in number 2 above.
    5. Do the same procedure with ink from the pen in Exhibits K and L.
    6. Set the test tubes in a rack. Wait until the solvent no longer appears to be moving up the chromatography paper leaving color bands. Let the four papers dry and then tape them into the Lab Report form. Be sure to identify which is Exhibit I, J, K and L.

Background information:

During the investigation of violent crimes such as homicide, fingerprints are not the most common type of evidence recovered by police officers. They are more likely to recover hair or blood. Forensic scientists have been able to use a new technique developed by molecular geneticist Dr. Ray White in 1980. It is popularly called "DNA fingerprinting" and was first admitted as evidence in a court to convict someone in 1987.

In every cell of a person's body, DNA is found in the nucleus. No two people, except identical twins, have the same DNA. DNA is made of a series of 4 bases--adenine, thymine, cytosine and guanine. The order of the bases determines a person's genetic code. Some parts of the code are very similar in all people; for example, the code for building a human heart. However, some portions of the code varies greatly from person to person. These are called polymorphic (poly=many and morphic=shape) segments. Person A might have 6 repeats of a segment, person B may have 17 repeats and person C 12. When several different sequences are considered, the chances that any two individuals will have exactly the same variation are very remote.

To perform DNA fingerprinting, the DNA of cells from a crime scene is copied over and over by a process called polymerase chain reaction (PCR). A single drop of blood or the root of a single hair could be enough to identify the DNA. Using a search warrant, cells are taken from a suspect by drawing blood or taking hair. The DNA from the crime scene and suspect are cut with chemical scissors called restriction enzymes. Then the cut DNA is placed in wells at the top of a gel. The fragments are separated by electrophoresis. If the bands of the suspect's DNA matches the bands of the evidence DNA, the chances are very great that the suspect was present at the crime scene. Interestingly, the first time DNA was used to convict a person in a jury trial in North Carolina was in 1992, in a case of rape that occurred in Catawba County.

Procedure: Case 96-3337

1. Sign and date the evidence
2. Pour the agarose gel you receive from your teacher into the gel electrophoresis chamber. Place a comb into the agarose mixture. Allow it to harden. When the agarose is solid, cover it with TBE electrophoresis buffer. Remove the comb.
3. In the first well pipette DNA from Exhibit M (the cells found under the nails of the deceased). Using a **clean** pipette, place DNA from Exhibit N (suspect 1) into the second well. Again using a **clean** pipette, place DNA from Exhibit O (suspect 2) into the third well.
4. Put the lid on the gel chamber. Be sure the wells are at the black (negative) electrode. Plug the leads into the power supply and allow the fragments to separate. Allow to run for 25 minutes. Your teacher will possibly have to turn off the power later in the day.
5. The next day, visualize the bands by placing the gel carefully in methylene blue stain. Let the stain set for 30 minutes, then remove the gel while wearing gloves on your hands. Place the gel in distilled water for destaining. Finally, set the gel on the white light source and compare the bands.
6. Measure and draw the bands on your report form exactly as they appear on the gel.

FORENSIC LAB REPORT FORM

Hair Analysis

Pictures and measurements from each hair sample:

Exhibit A	Exhibit B	Exhibit C	Exhibit X

Blood Analysis

Exhibit	Sample	Type
D		
E		
F		
G		
Possible Punnett Squares:		

Chromatograms

Using your knowledge of the electromagnetic light spectrum, why might black ink have more than one color in it?

Sketch each and label

I J K L

DNA

Sketch each lane and the band positions. Label

Conclusion Report:
Proposed Scenario for evening of May 8:

Conclusions with supporting evidence:

EVALUATION::Flow chart of tests

Test for hair	
Must involve microscope	/5
Must show comparison between animal and human	/5
Test for blood	
Involve ABO antisera	/5
Detail where clumping occurs in each type	/5
A possible Punnett sqares	/5
Test for DNA	
Use gel electrophoresis	/5
Comparison of bands from different sources	/5
Explain theory of Electrophoresis	/5
Test for ink	
Use chromatography	/5
Location of bands at same site mean same source	/5
Explain theory of chromatography	/5
Total	**/55**

Experimental technique

Make dry mount directly	/5
Set up chromatogram	/5
Load gel properly and follow kit instructions	/5
Mix blood and antiserum without contamination	/5
Group works well, divides tasks, stays on task, cleans up	/10
Total	**/30**