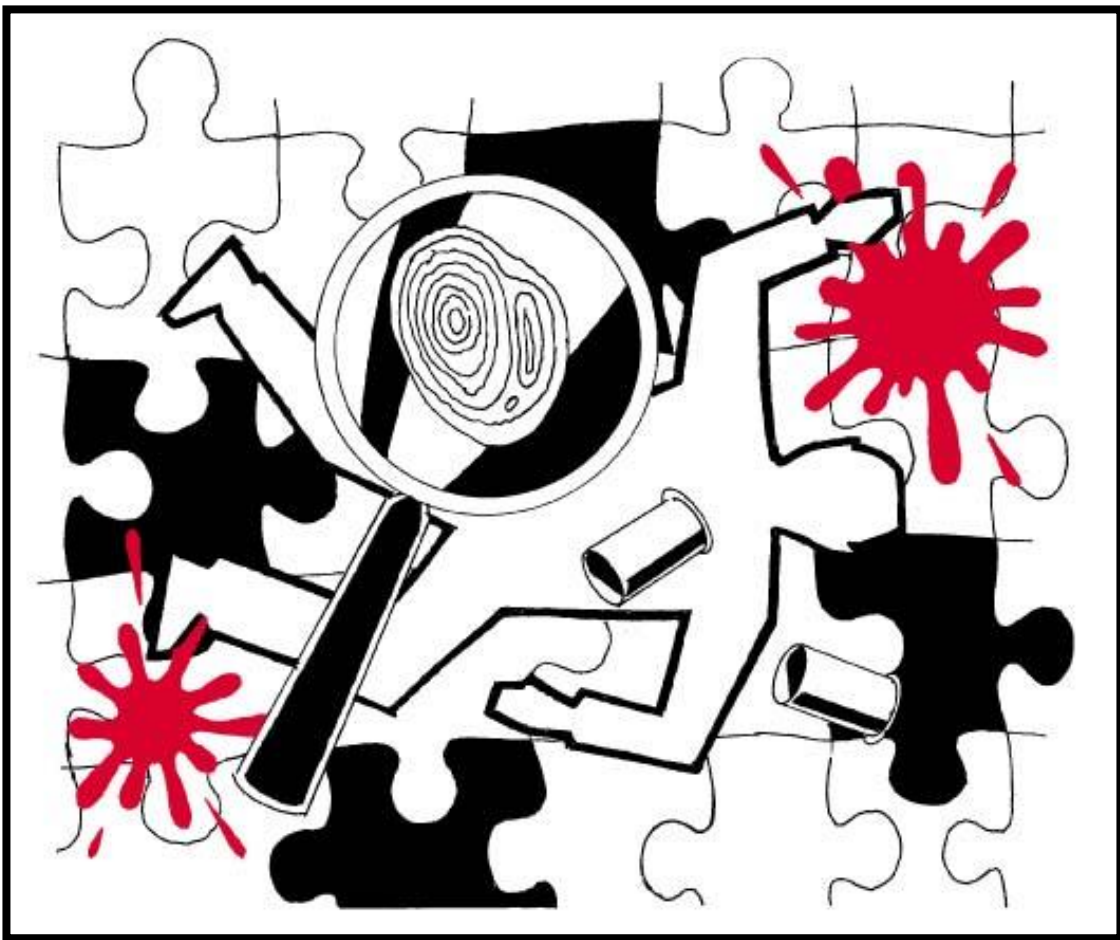


Introduction to Forensic Science





An Introduction to Forensic Science



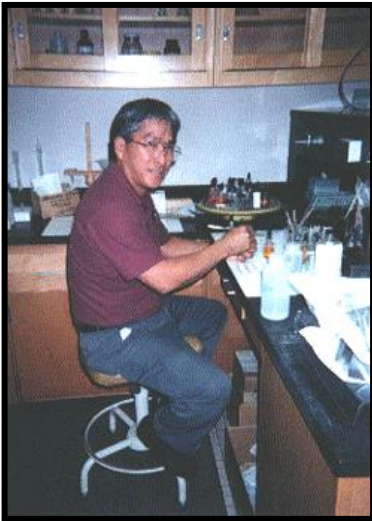
What is forensic science?

Forensic science is essentially the search for information concerning past events specific to criminal investigations. A forensic scientist may be a specialist in one particular area or he/she may be trained in a number of areas of expertise.

List of specialists that may be employed as forensic scientists and expert witnesses:

- *Physical Anthropologist* – deals with human bones and the injuries and diseases that affect them.
- *Forensic Archaeologist* – responsible for excavation, search and location of grave sites.
- *Geologist/Soil Scientist* – can identify soils and where they come from.
- *Botanist* – can identify both macro and micro remains of plants and where to find them.
- *Forensic Ecologist* – can identify and place assemblages of plants and animals.
- *DNA Specialist* – takes samples from the crime scene to find DNA, replicate it, and compare it to that of the suspect.
- *Drug Specialist* – can identify illegal substances and their origin.
- *Chemist* – can identify types of chemical substances, their physical and chemical properties, their makeup and production, and their breakdown.
- *Fingerprint Specialist* – can locate fingerprints left at the scene of crime, ‘lift’ them, and analyze the prints.
- *Tool Marks/Footprints* – can make casts of marks left by tools and footwear and find the item responsible.
- *Pathologist* – responsible for carrying out an autopsy and reporting on injuries and/or cause of death. Can also identify different stages of decomposition and estimate time since death.
- *Forensic Odontologist* – can recognize teeth and search dental records.
- *Geophysicist* – can use known methods of ground imaging in the search for clandestine graves.
- *Palynologist* – can identify pollen grains, what plants they come from, ecological assemblages and where to locate them.
- *Entomologist* – can identify different species of insects. Particularly useful with maggots, as their rate of development can aid in the estimation of time since death.
- *GIS (geographic information systems)* – can use this computer program in crime detection and prevention.
- *Statistician* – can produce statistical analysis to determine relevance.
- *Scientific Dating* – can determine whether human remains are modern or archaeological. (>70 years)
- *Dog Handler* – can train or use dogs in search and recovery/rescue.
- *Hair and Fiber Analyst* – can identify hairs and fibers from clothing and identify their origin.
- *Document Specialist* – can identify and distinguish genuine from forged documents and signatures.
- *Psychologist* – can analyze the known series of events to gain insight into the suspect’s state of mind and motivation.

What is the role of the Forensic Scientist?



To answer questions for their employer

Forensic scientists are approached with a question or problem to solve. Questions like “Where did this come from?”, “What is this made from?”, or “How did this person die?” may sound simple, but often only someone with specific knowledge and expertise can answer them. Sometimes the answer is easy to come by for the forensic scientist, but sometimes these simple questions will take days, weeks, even months, of sample taking, research, and analysis to answer.

To be objective

Forensic scientists are not responsible for determining who is guilty of the crime; that is for a jury to decide. As an expert, the forensic scientist is not trying to *prove* anything, but is employed to provide information in an accurate and objective manner.

To act as an expert witness

The culmination of the analysis performed and conclusions reached is the expert witness report. This report is given to their employer and is then submitted to the court as evidence in the trial stage of a criminal investigation. The forensic scientist may be called upon by the court to appear personally as an expert witness to be questioned on their report. It is therefore **ESSENTIAL** that the report be as truthful, accurate, and thorough as possible lest the opposing side is able to poke holes in your testimony and therefore discredit you as an expert.



What is the goal of the Forensic Scientist?

TO CARRY OUT THEIR SPECIALTY TO THE BEST OF THEIR ABILITY.

Proxy Indicators:

Locard's Principle: whenever two things come into contact with one another, they each leave a trace of themselves behind.

Proxy indicators are the traces left behind from contact. These indicators can be traced back to their source thus placing a suspect at the scene of crime. Most work done by specialists deal with identifying and locating the origins of proxy indicators.

During a criminal investigation:



A forensic specialist will be contacted by the police only if their skills are required. The scientist may get involved at the start of the investigation, or sometime after the investigations has commenced. Most forensic scientists work in the lab, but some do visit the scene of crime.

At the scene, the police have established a cordon, an area roped off to keep evidence in and the public out. Anyone entering the cordon must have a legitimate reason to do so and must wear protective gear.

Process of the Forensic Scientist:

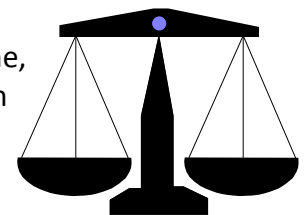
Observation – this may involve looking and taking photographs of physical evidence, a scene of crime, a fingerprint, or a bone.

Data Collection & Recording – most analyses require sample taking of such things as plants, soil, blood, and hair. Any and all information, even if it seems unimportant at the time, is recorded. These are your notes and they are to be included in the expert witness statement.

Analysis – this is the investigation of evidence and/or samples. Everything done is recording. Results are attained and recorded from which the scientist draws conclusion.

Conclusions – these are the answers to the questions initially ask by the employer.

Evidence Submission & Report – EVERYTHING the scientist has observed, done, and discovered gets written up in a report for their employer. This report can then be submitted to the court as an expert witness statement should the case be involved in a trial.



For more information visit these websites:

<http://www.crime-scene-investigator.net/>

Everything you ever wanted to know about real crime scene investigation.

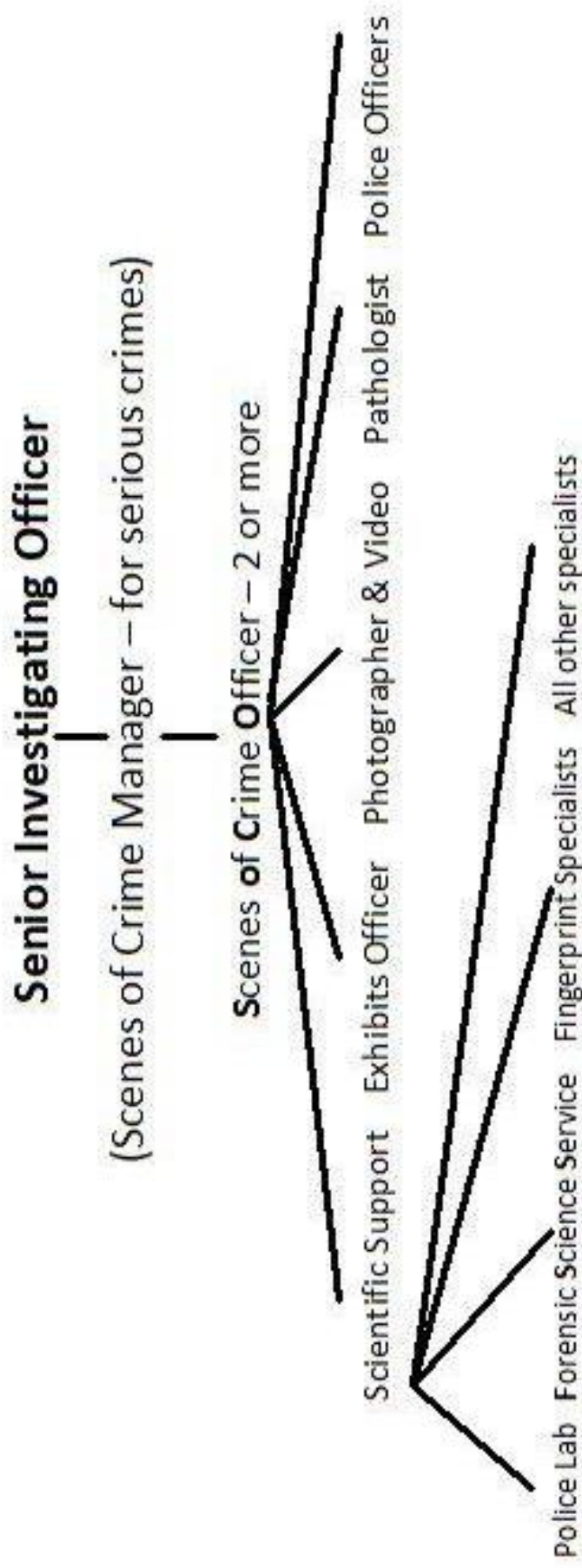
<http://www.virtualmuseum.ca/Exhibitions/Myst/en/index.html>

All about forensic science plus the Interactive Investigator

<http://www.aafs.org>

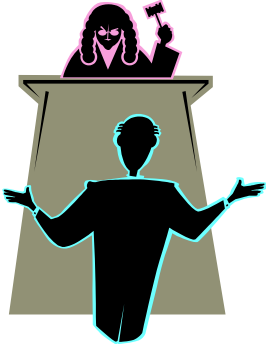
The American Academy of Forensic Science – info from the experts plus study info and career info

Chain of command at a Crime Scene:



Preparing for Court as an Expert Witness

Your role as the Expert Witness



Expert witnesses are a very important part of the criminal justice system. You are there to present factual evidence, but also to interpret your evidence and express and opinion. Your testimony is there to help the jury reach a decision. It is not your job to decide whether the suspect is guilty or innocent, but to explain as clearly as possible, what you have seen, recorded, and done, honestly and impartially.

The Report

Every forensic scientist who participates on a case **MUST** write an expert witness report on the tasks they have completed. The report must be as thorough as possible because, essentially, it is a piece of evidence that will be submitted to the jury to help them decided whether or not the suspect is guilty. The first page of every expert witness report should have the witness' name, address, age and signature. After that, the witness should list any and all education, experience, basically, anything that shows you are qualified to act as a witness.

The rest of the report is just that – a report on what you have done. The goal is to clearly express what you have contributed to the investigation and what results you have come up with. **DO NOT** say who you think is guilty; that is for the jury to decide.

Although all forensic scientists write reports, not all have to go to trial. Long before the trial, the reports are given to both the defense and prosecution attorneys to read over as they prepare to make their cases. A forensic scientist will only appear at the trial if one of the attorneys requests their appearance. They will question the expert if they think it will help their case, either because the analysis completed provides (or does not provide) evidence or because the attorney has found problems in the report and wants to discredit the witness and, therefore, throw out their evidence.



Going to court can be a very scary thing. But if you are prepared and confident, it can be a lot of fun. After all, **you** are the expert.

Before the trial, make sure you know exactly what is in your report because that, and only that, is what you will be questioned on. Make notes if you think that will help but don't plan to rely on them. If you are constantly referring to your notes, it will look like you don't know what you are talking about.



In the Witness Box

When it is your turn to give testimony, the prosecution attorney will call you. You will be ushered to the witness box and asked if you would like to take either the oath or the affirmation.

Decide beforehand:

1. Affirmation: "I affirm that I will tell the whole truth."
2. Oath (whist holding the Bible in your right hand): "I swear that I will tell the whole truth, so help me God."

Afterwards, you will be introduced to the court by the prosecution and asked to explain your area of expertise. You will then be asked questions to help explain to the court what sort of exercises you completed and what sort of results were achieved. Once this is finished, the Defense attorney will cross-examine you.

Forms of address:

- The judge - "Your Honor"
- The attorney/lawyer - "Sir" or "Madame"
- The suspects - refer to them as Mr. or Ms.
- The other people in your group - refer to them as your colleagues

Courtroom Dress, Demeanor, and Helpful Hints

- Dress smartly and in somber colors; look like a professional.
- Make sure your hair is neat and tidy.
- Make sure the clothes you do wear are comfortable, as in, warm enough or cool enough.
- Be confident and act in a professional manner.
- Look organized and like you know what you are doing.
- Be serious; you are an expert.
- Look where you are going – Don't rush; don't fall over.
- Stand up straight. This helps you to look and feel confident.
- Don't fidget as this will distract the jury from listening to what you're saying.
- Avoid getting angry or frustrated when being cross-examined; avoid being sarcastic.
- Maintain eye contact. If you look bored, the jury will get bored, too.

Remember: you are there for the jury and you want them to take you seriously.

Dealing with Cross-examination

Some expert witnesses and even police officers find the prospect of cross-examination particularly scary. But cross-examination is your chance to demonstrate your skills as a forensic scientist. Standing up to the challenge is one of the most satisfying elements of the job.

Listen carefully to the questions. If you do not understand the question, do not be afraid to politely ask the attorney to repeat or rephrase it for you.



Do not take any attacks by the defense personally. Don't become emotional or angry but respond firmly and courteously. Only by remaining calm can you effectively deal with cross-examination. The more cool and collected you appear, the more likely the jury will be convinced of your credibility as an expert and knowledgeable professional.

Finally...

You will not be the only person in the world nervous about giving evidence. Most forensic scientists dread going to court. But giving evidence can be extremely enjoyable and satisfying but only for those well prepared. Make sure you are as familiar as possible with everything in your report. A good standard of investigation, good preparation, and good presentation skills will give you the confidence you need to be both a credit to yourself and the service you represent.

Practical One – case studies

1. The police have come to you asking for your expert opinion. Read through each of the cases below and suggest to the police what they should do.
- A. A woman was assaulted in a park last week when it was quite rainy. The suspect was wearing a mask, a tracksuit, and trainers. After he stole her belongings, he jumped into a red 1985 Ford Escort and drove off. The police have apprehended a vehicle matching the description given by the victim. Nothing was found in the car other than a pair of dirty trainers caked with mud. What should the police do?

- B. An elderly man was found dead in his Philly apartment. The medical examiner concluded that the victim had been strangled to death because of bruising around the neck and a broken hyoid bone. In the apartment, near the body, the police found a piece of cord that may be the murder weapon. What can the police do with it to help catch the suspect?

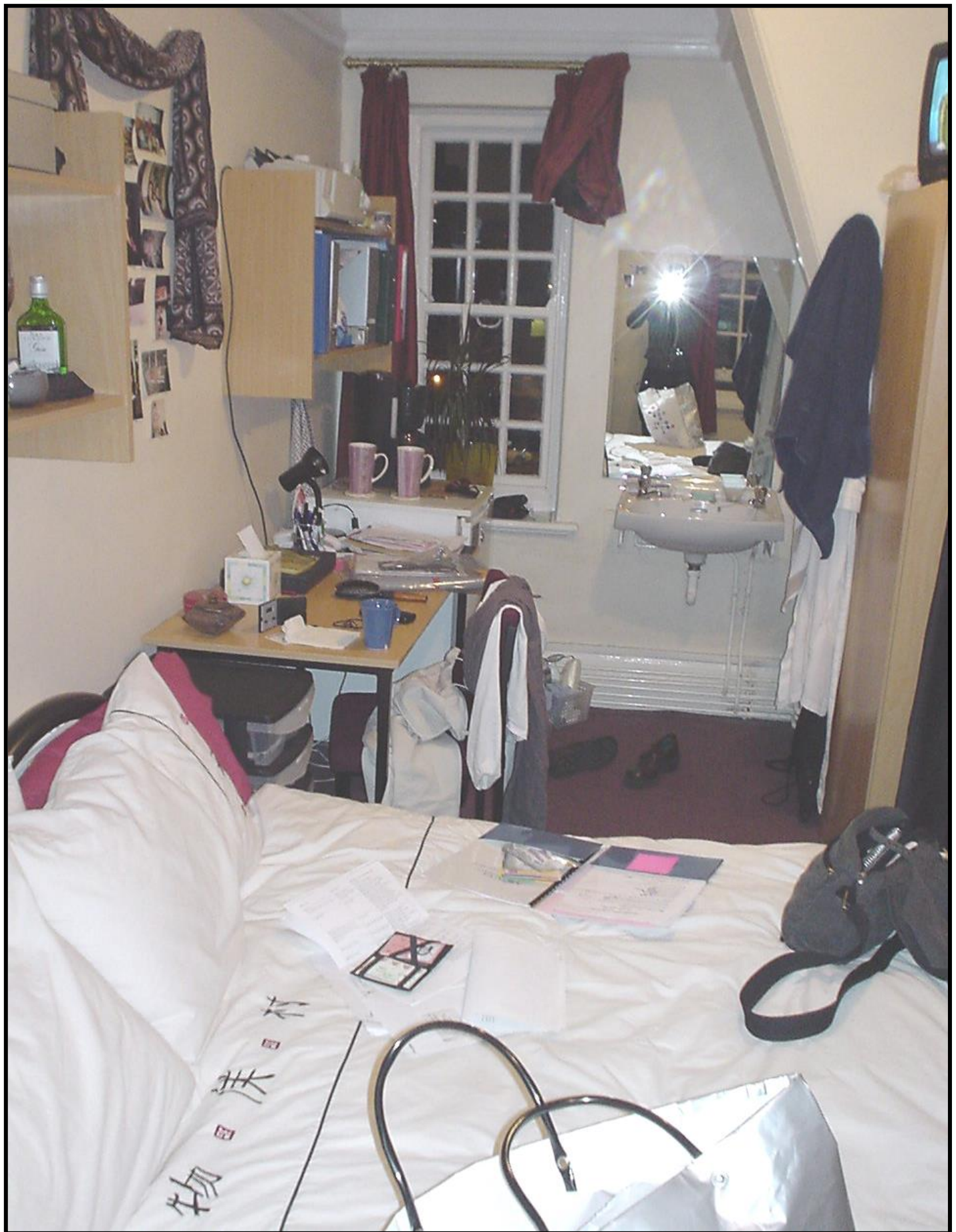
- C. A woman called 999 saying that her house had been burgled. Police arrived on the scene and found that one of the windows had been forced open by a tool of some sort. Later that day, police questioned a suspicious man who had been wondering around the neighborhood. In his jacket pocket was a screwdriver. What forensic analysis should the police do?

2. Look at the picture in your pack. In this room an unknown woman was killed. What sorts of things in the room could provide the police with information regarding the woman's identity?

3. Look at the picture again. The body was found on the bed with an empty bottle of pills nearby, but police are uncertain as to whether the death was suicide or murder. There are five pieces of evidence from the room that will help you solve the crime. Find them and decided if you think the death was a suicide or a murder?

Suicide / Murder





Introduction to Forensic Science

Vocabulary List

Forensic Science:

Criminal Investigation:

Specialist:

Odontologist:

Palynologist:

Entomologist:

Speculation:

Expert Witness:

Expert Witness Statement:

Defense:

Prosecution:

Scene of Crime Officer (SOCO):

Cordon:

Contamination:

Evidence Integrity:
