

DNA CSI



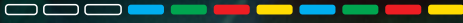
Promoting DNA awareness in South Africa



DNA PROJECT



FIGHTING CRIME WITH SCIENCE



DNA CSI

D

- **Don't touch**

Nothing should be touched unless absolutely necessary

N

- **Note, record, observe**

Make a note of anything you think will assist the investigation, record it in writing and observe anything unusual or of value to the investigation

A

- **Assist police officers**

Provide assistance by requesting witnesses to wait near the crime scene for an Investigating Officer.

C

- **Comfort and support victims**

Offer aid and comfort at the crime scene but be aware that you should not disturb the crime scene while doing so

S

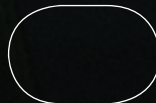
- **Secure the crime scene**

Prevent unnecessary access to the crime scene

I

- **Insist no-one interferes**

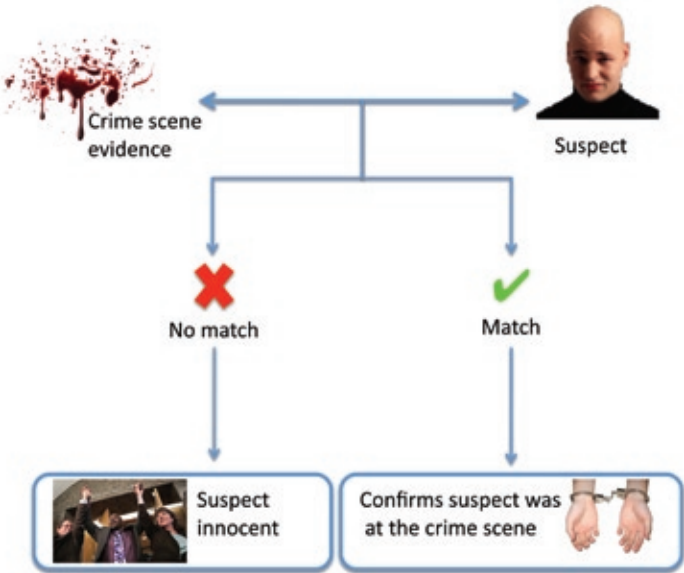
The crime scene may contain valuable evidence and the less people who enter the crime scene the greater the chance of finding DNA evidence

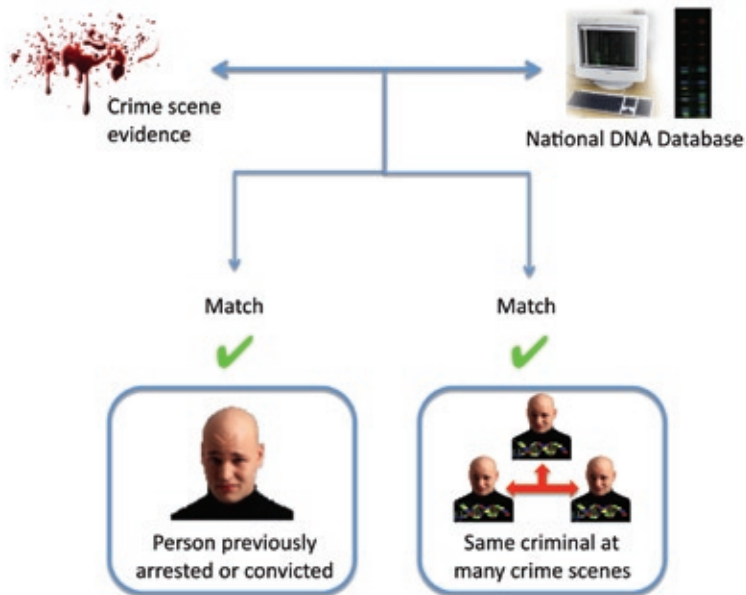




What is a DNA profile? How does DNA help to solve crimes?

A DNA profile is simply **a unique list of numbers** obtained from a person's DNA that acts as a personal "identification number". This identification number is very powerful because it allows forensic scientists to compare the DNA collected from a crime scene with that of a suspect who the police think may have committed a crime. In the same way as fingerprints link a suspect to a crime, DNA provides scientific evidence that can **identify or exclude a suspect** from a police investigation. It can also be used to identify a victim through DNA from relatives, even when no body can be found. DNA profiling can also link two or more crime scenes as when evidence from one crime scene is compared with evidence from another, the police can tell whether it was the same person who has committed two different crimes. Even very old cases, which the police thought would never be solved, may contain DNA evidence which can now be used to identify the person who committed that crime. However, just like fingerprints, DNA testing cannot tell the police when or for how long the suspect was at the crime scene.





How can DNA help to identify a suspect?

Once DNA samples have been collected from a crime scene and processed at the Forensic Science Laboratory, the DNA Profile, which is the “identification number” taken from the DNA sample, can be **compared** with the DNA profiles taken from **a known suspect**. If the DNA profiles of the suspect and the crime scene do NOT match, then we can say that the suspect did not leave DNA at the crime scene and the police may then exclude that person from their investigation. If the DNA profiles DO match, then the person suspected of committing the crime, may have left the DNA sample at the crime scene, which the police can use as evidence against the suspect. If no known suspect exists, the DNA profile taken from the crime scene is still valuable, as when it is entered onto the **National DNA Database**, the police can see whether that DNA profile links to another known DNA profile on the DNA Database or perhaps it may even **link several different crimes** to each other. This is why DNA Profiling is known as a ‘Criminal Intelligence Tool’ - because it provides the police with valuable clues as to who may have committed the crime.



Where can **DNA** evidence be found at a crime scene?

DNA can be obtained from materials or clothing containing blood or other body fluids, such as saliva or semen. DNA is commonly obtained from **blood, semen, skin cells** and **saliva**. It can also be found in **tissue, organs, muscle, brain cells, bone, teeth, hair, mucus, fingernails** and **perspiration**.

DNA has helped solve many cases where investigators collected evidence from unusual sources. For example, one murder was solved when the suspect's DNA, taken from saliva in a dental impression mold, matched the DNA swabbed from a bite mark on the victim. Numerous cases have been solved by DNA found in the saliva left on cigarette butts, postage stamps, and even the area around the mouth opening of a balaclava. DNA analysis of a even a single hair found on a victim can provide a critical piece of evidence used in a murder conviction.

DNA can be found in:



saliva



skin cells

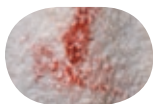


blood

Tiny amounts of evidence, such as a few cells, contain enough DNA to obtain a DNA profile of a suspect. The items on page 7 list some common pieces of evidence from which DNA may be obtained.



Evidence	Possible location of DNA evidence	Source of DNA
knobkerrie, cricket bat or similar large blunt weapon	handle end	sweat, skin, blood, tissue, hair
hat, bandana, or balaclava/mask	inside item	sweat, hair, dandruff
sunglasses or reading glasses	nose or ear pieces, lens	sweat, skin
facial tissue, cotton wool swab, ear bud, wash cloth	surface area	mucus, blood, sweat, semen, ear wax
clothing, including underwear worn during AND after attack	surface area	blood, sweat, semen
toothpick or dental floss	tips	saliva, semen, skin cells
used cigarette	cigarette butt	saliva
stamp or envelope	licked area	saliva
tape, cable tie or ligature	inside/outside surface	skin, sweat, saliva, hair
bottle, can, or glass	sides, mouthpiece	saliva, sweat
used condom	inside/outside surface	blood, semen, vaginal or rectal cells
blanket, pillow, sheet	surface area	blood, sweat, hair, semen, urine, saliva
bullet	outside surface	blood, tissue
bite mark or area licked	person's skin or clothing	blood, saliva
fingernail, partial fingernail	scrapings	blood, sweat, tissue





Can DNA evidence become contaminated?

Yes, DNA evidence can easily be contaminated. Because extremely small samples of DNA can be used as evidence, a person must always be aware of contamination issues when identifying, collecting and preserving DNA evidence. DNA evidence can be contaminated when DNA from another source gets mixed with the DNA evidence that is relevant to the case at hand.

Heat, sunlight, moisture, bacteria and even mould may damage or effect the quality of the DNA that has been left at a crime scene, making the DNA sample useless to the police.

To ensure that DNA evidence is not contaminated, damaged or destroyed, crime scene investigators should ALWAYS:

- Wear disposable gloves AND change them often;
- Avoid touching the area where DNA may exist;
- Avoid talking, sneezing and coughing over evidence;
- Avoid touching own face, nose and mouth when collecting and packaging evidence;
- Air-dry evidence thoroughly before packaging;
- Put evidence into new paper bags or envelopes, not into plastic bags
- Put solid items such as pieces of glass, drinking vessels/bottles and weapons in rigid containers;
- Ensure the containers or bags are adequately sealed
- Avoid using staples to close the evidence bags;
- Ensure that the evidence bags are correctly labeled, indicating where, when, how and by whom the sample was taken.



How should **DNA** evidence be stored and transported?

It is very important for the police officer to get DNA evidence to the Forensic Science Laboratory **as quickly as possible**. When transporting and storing evidence that may contain DNA, it is also important to keep the evidence **dry** and **at room temperature**.



Once evidence has been secured in paper bags, envelopes or SAPS approved evidence collection kits, it should be sealed, labeled, and transported as soon as possible, in a way that ensures proper identification of where it was found and indicating the chain of custody followed.

Evidence that may contain DNA **should NEVER be placed in plastic** containers because plastic bags will retain damaging moisture.

Direct sunlight and warm conditions can also destroy DNA evidence, so one should avoid keeping evidence in places that may get hot, such as a room or police car without air conditioning.



How can a rape victim preserve DNA evidence

To assist in the collection of DNA evidence from victims of sexual assault, **victims should not:**

- **Change clothes.**
- **Shower or wash any part of their bodies.**

A rape victim should visit a qualified and registered medical doctor or forensic nurse examiner **immediately** after the sexual assault for treatment of any injuries and for the collection of forensic evidence. The Sexual Assault Evidence Collection Kits and generic Evidence Collection Kits developed by the SAPS Forensic Science Laboratory must be used by the examiner to ensure that the evidence is properly collected.



Who should you contact if you are a victim of crime?

SAPS Emergency Number 10111

SAPS Crime Stop 086 001 0111

Stop Women Abuse Hotline 0800 150 150

Childline 0800 055 555

Forensic Science Lab (Pretoria) Tel: 012 421 0271

Forensic Science Lab (Cape Town) Tel: 012 955 9000

DNA Case Work enquiries: VenterL2@saps.org.za

Crime Line - sms your anonymous tip off to 32211

South Africa's DNA Database

South Africa's National DNA Database currently contains:

- DNA profiles from certain suspects arrested for criminal offences.
- DNA profiles collected from some crime scenes.

South Africa is in the process of expanding the size of its National DNA Database because it has been shown that the greater the number of DNA Profiles on the Database, the greater the chance of solving crimes and catching criminals.

The expansion of South Africa's National DNA Database requires certain changes in the current law, and Parliament is reviewing an important new Bill which is called the Criminal Law (Forensic Procedures) Amendment Bill [B2-2009] which, when passed, will govern the way in which the DNA Database is managed and will dictate from whom DNA profiles may be collected and for how long those profiles may be kept on the Database.

DNA profiles obtained from people arrested for committing a crime as well as all convicted offenders' DNA profiles, once entered onto the DNA Database, will continually be searched against DNA profiles collected at crime scenes, to try and find a match between the profiles in order to identify a suspect. Given the number of repeat offenders in South Africa there is a very good chance that a person who committed the crime under investigation was convicted of a previous crime and already has his or her DNA profile on the National DNA Database. Even if a criminal is not identified through the DNA Database, crimes may be linked to each other if the same DNA profile is found at different crime scenes, thereby helping an investigation and eventually leading to the identification and conviction of the criminals.



