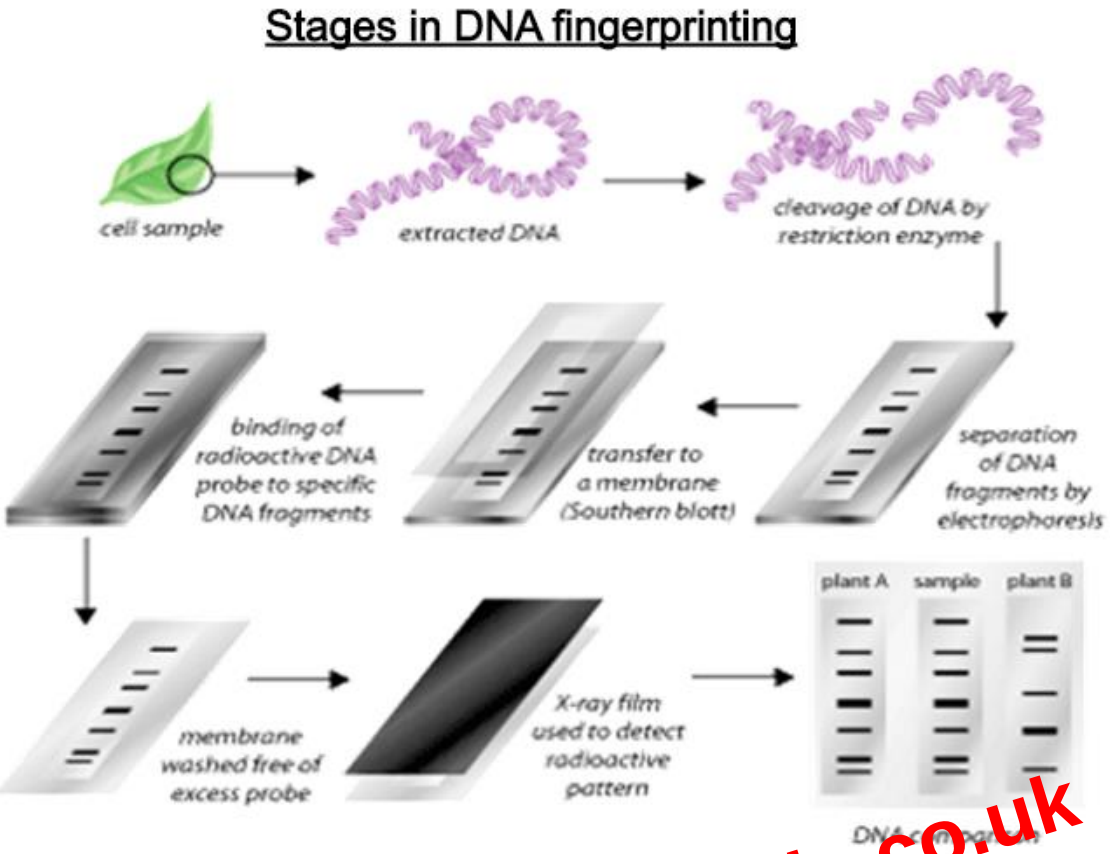
# Unit 18 - Assignment 4 - M4

A DNA fingerprint can be produced from a very small sample of blood. The first step of this method is of course sampling DNA. The sample has white blood cells. Detergent is used to break open the cells and separates the useable DNA from the extra cellular material. The next step of this process is to cut the DNA into smaller fragments, at a specific sequence, using the restriction enzymes. The result of this is many fragments (called restriction fragments length polymorphisms) varying in length, and either blunt of sticky ends being produced. The next step is the restriction fragments length polymorphisms being put in to an agarose gel. They are sorted into size using gel electrophoresis. The negative restriction fragments length polymorphisms will start to move towards the positive end, across the agarose gel. This happens as soon as the electric field's current is turned on. The smaller fragments move more than the larger fragments, across the agarose gel. The DNA will then become single stranded as the hydrogen bonds will begin to break which causes the nucleotides to become free (these will be used to pair up with probes; this is due to the alkali. The moisture from the gel is then absorbed by a piece of nylon and thin paper towels. The fragments are transferred from the gel, to the surface of the nylon. After this, the radioactive proves are washed over the nylon surface. The probes will join to any fragments of DNA which share the same structure. A photographic film is them placed on the nylon surface. The probes will leave marks on the film where they attached to the restriction fragments length polymorphisms. When the film is developed, dark bands will appear; this marks the length of the restriction fragments length polymorphisms that were crossbred. To be able to match the finger print with other, the x-ray is places on a light background, and the restriction fragments length polymorphisms lengths in the DNA are compared from the crime scene to the DNA of the suspect.




http://slideplayer.com/slide/5721366/



## Genetic fingerprints questions

1- Describe how genetic fingerprinting is carried out. (6 marks)

Short, highly-repeated 15-nucleotide segments, called minisatelites are located to find out how long they are. The length is used to find out how many times the 15-nucleotide sequence is repeated. The Restriction endonucleases cut the DNA at distinctive sites. The sites and the lengths of the resulting fragments will vary for each person. Before the fragments are incubated with DNA probes which are bind to particular minisatelites, they are sorted in size. The DNA is made detectable as soon as the probe binds to the DNA fragment. These detected fragments from two samples are compared. If they are the same length, we can see that they belong to the same person. The probability that a matching pattern could have happened by coincidence is calculated. The frequency of the differing DNA patters of different genes will vary; this will of course depend on the population. This method is very reliable as the chances of this coincidence occurring are extremely slim.

2- All three children on the chart had the same parents. One of the parents was **Adult 1**. Which of the other three adults on the chart was the other parent? Give the reason for your answer. (2 marks) **Adult 3**