Steps for Producing a DNA Fingerprint

1. Obtain DNA samples for comparison. Samples can be taken from blood, buccal swabs, hair, bone, teeth, fingernails, tissues from internal organs (including the brain), muscle, and skin. The buccal swab, which is taken from the inside of the cheek, is easy to collect.
2. Add restriction enzymes to the DNA. These enzymes cut the DNA molecules at different locations. The resulting lengths of DNA fragments will vary from person to person.
3. Prepare and pour agarose (A-guh-rohs) gel into a lab tray. This gel acts like a strainer to separate the short strands of DNA from the long strands because the short strands can move through the gel more easily.
4. Pour the fragmented DNA sample into the depression in the agarose gel. If you are processing more than one sample, be sure to label the source of each sample.
5. Begin electrophoresis using electrical current to separate DNA fragments by length. Shorter strands will move farther across the gel.
6. Place a nylon membrane on the gel to transfer the DNA for easier handling (blotting). Add chemicals to break the hydrogen bonds and separate the DNA into single strands.
7. Add probes with radioactive labeling to the membrane. These probes attach to complementary DNA segments of the same length and "mark" the segments to make them visible. Unused probes will wash away.
8. Place X-ray film on top of the membrane and place it in the developer. Once developed, the film will show locations on the membrane where the probes attached to the DNA fragments. This barcode-like image is the DNA fingerprint.
9. Line up the sample profiles side by side and compare them for the presence or absence of segments with particular lengths. The more segments that two samples have in common, the more likely it is that the samples came from the same person.