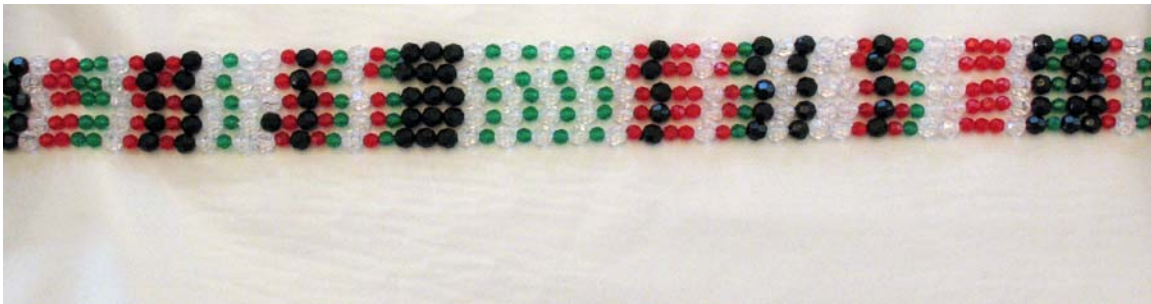


DNA Fingerprinting Activity

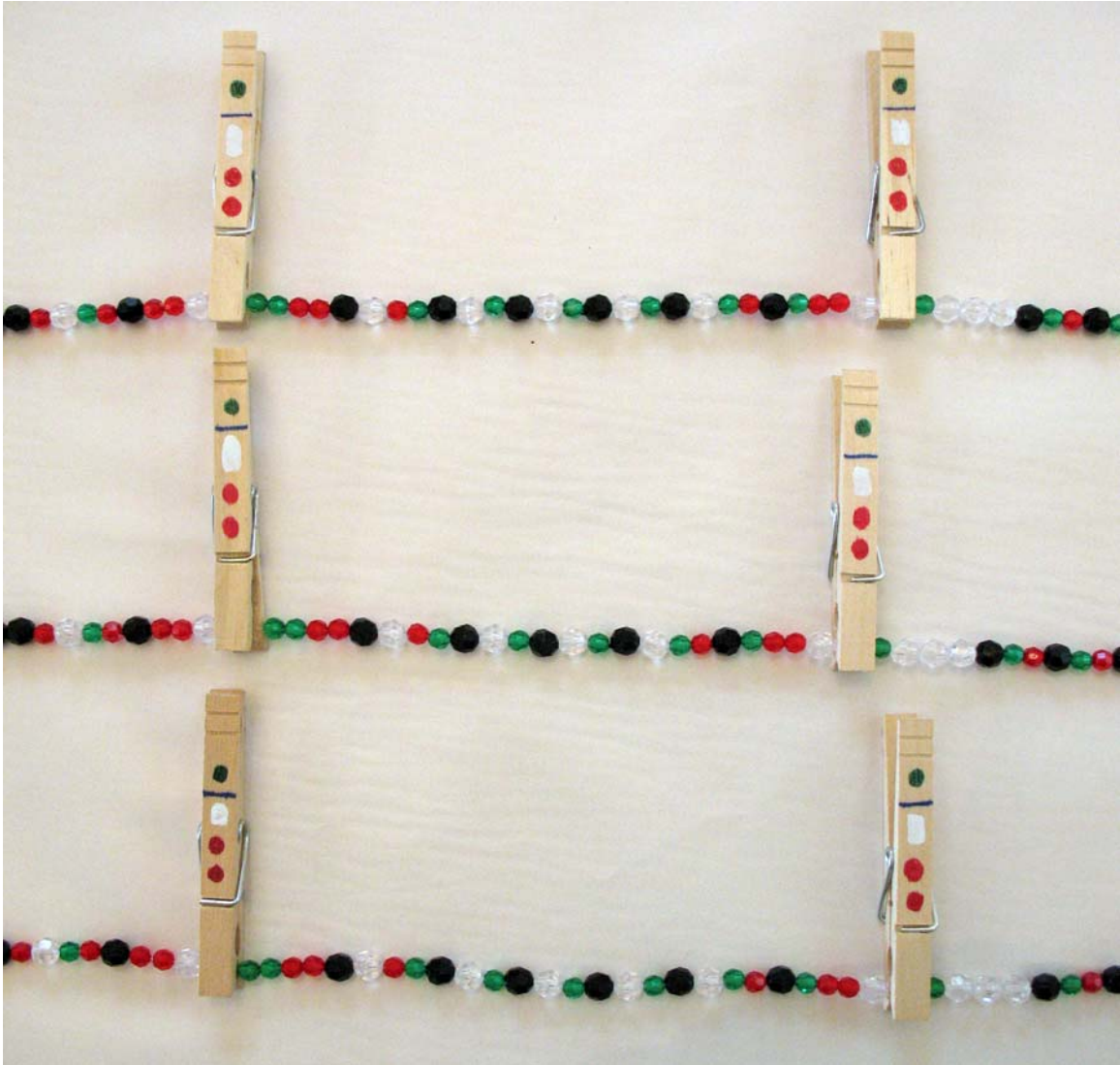
Students are given 5 strands of beads, each approximately 10 feet long, representing strands of DNA. One strand was collected from a crime scene, and the other four represent suspects in the case.



The strands are virtually identical, with a few small rare variations that would be undetectable in normal laboratory procedures.

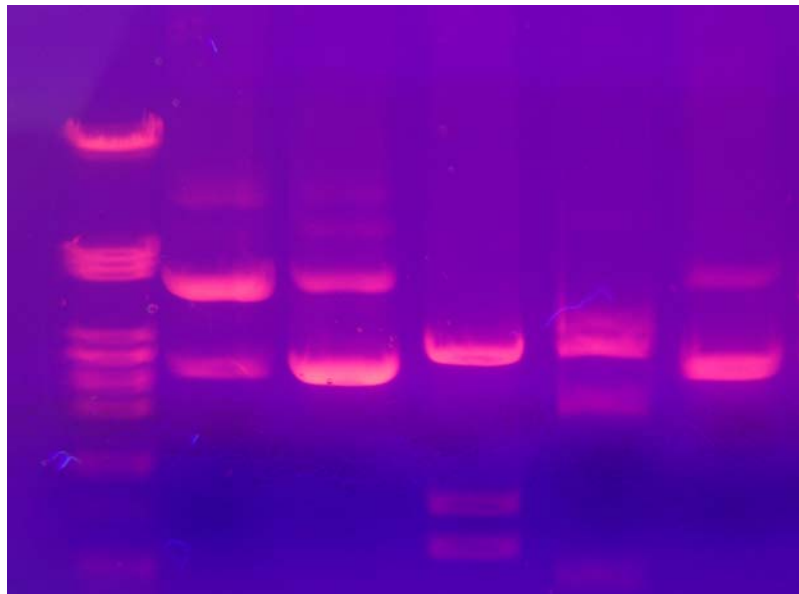


Clothespins represent restriction enzymes, which would cut the DNA strands at very specific locations. The one shown here attaches onto the DNA strand only where it finds the pattern (red red white green), and cuts the strand between the white and the green

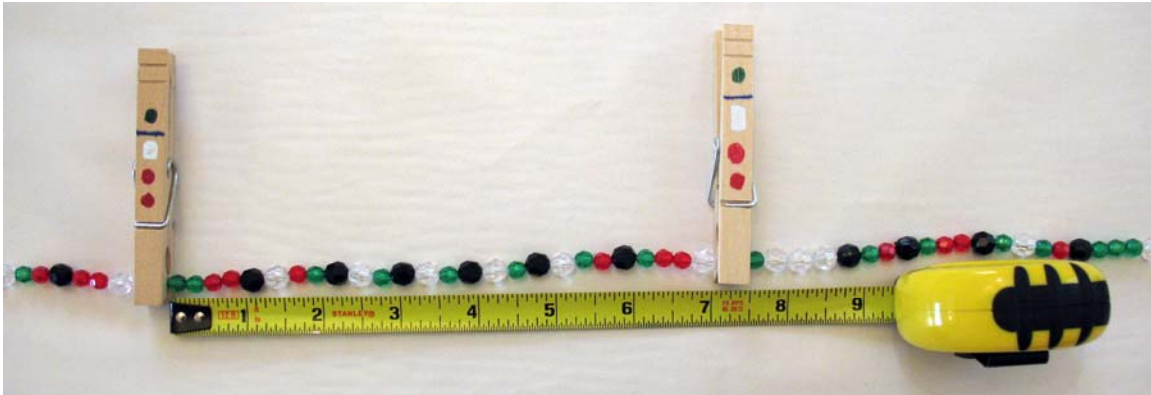


In the lab, gel electrophoresis would be used to separate the DNA strands into groups of different lengths:

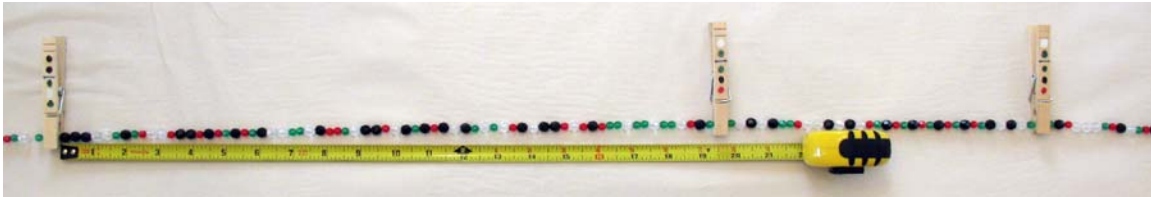
(Figure of Gel electrophoresis: 6 "DNA-tracks". In the first row (left), DNA with known fragment sizes was used as a reference. Different bands indicate different fragment sizes (the smaller, the faster it travels, the lower it is in the image); different intensities indicate different concentrations (the brighter, the more DNA). DNA was made visible using ethidium bromide and ultraviolet light. Image source: Wikimedia commons.



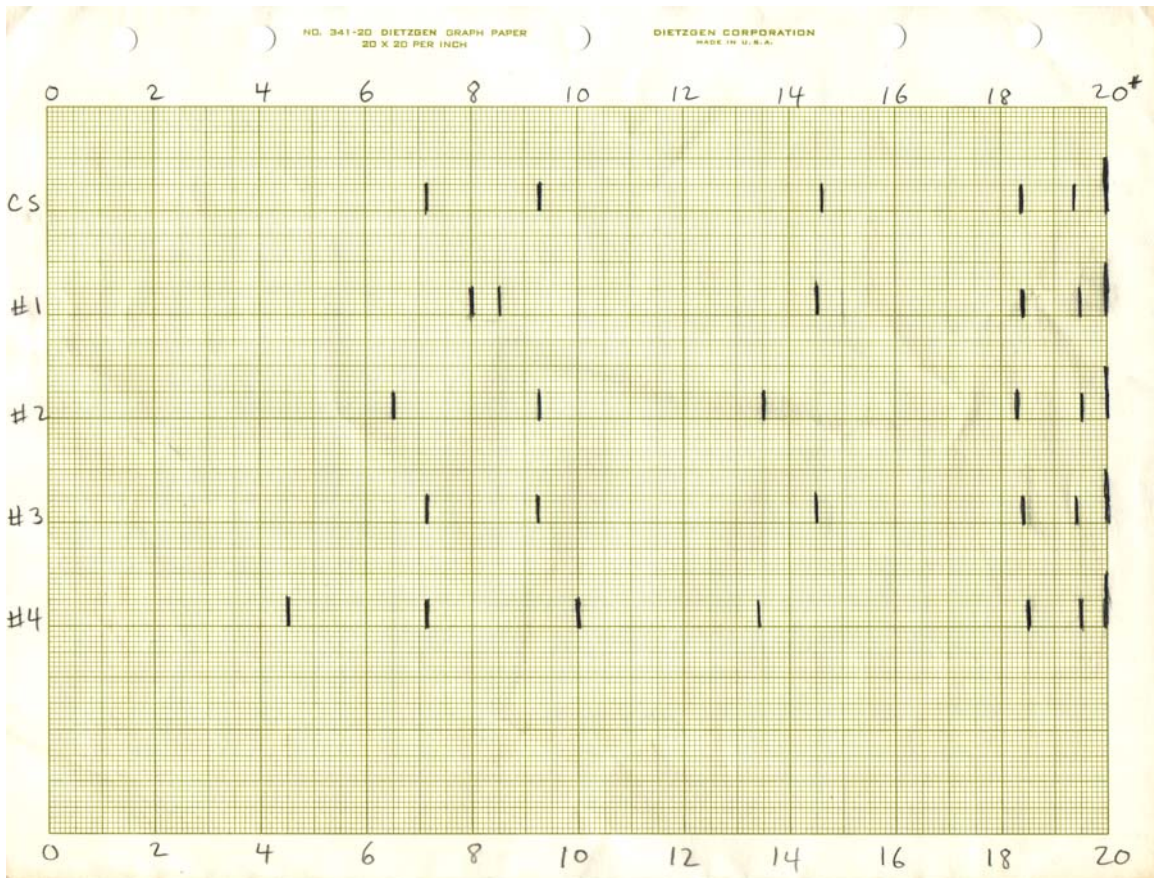
For the classroom experiment, students measure the lengths of the strand sections with an ordinary tape measure.



The sections between restricted sections are also measured, although many of these will ultimately be off the scale.



Students then plot the lengths for each of the DNA strands, and compare the graphs to identify the criminal. Lengths off the scale are marked at the right-hand edge, and if two strand sections are the exact same length, then the line is marked twice as high.



Each of the suspects may match the crime scene DNA in one or more lengths, but only one suspect matches in every single location. In the real world, the odds of this occurring by chance are on the order of one in 100 billion. In our case, we have clearly caught suspect number 3.