- *Biotechnology* is humanity's newest tool for biological research
- It includes:
  - The polymerase chain reaction (PCR)
    - Copying DNA in a lab
  - DNA profiling
    - Using DNA to reveal its owner's identity
  - Gene sequencing
    - Including the Human Genome Project
    - Mapping DNA by finding where every nitrogenous base is
  - Gene transfer
    - Cutting and pasting genes to make new organisms
  - Cloning cells and animals

Gel electrophoresis

- A method to separate fragments of DNA or proteins by size to identify its origin
- Steps:
  - DNA strands are separated
    - Break of hydrogen bonds
  - DNA strands are cut in specific places by enzymes to various sizes
  - The samples are placed in the gel
    - Inside holes, called *wells*, that are aligned along one end of the gel
  - The gel is exposed to a electric current
    - Positive on one side, negative on the other
    - DNA is negatively charged, so it will travel towards the positive side
  - The big, heavy and least charged fragments will not travel far from the wells, but the small and most charged ones will
  - The DNA strands are coloured using aa chemical
  - The emerging DNA patterns are analysed
  - Or a *hybridization probe* can be added
    - A probe is a known sequence of a complementary DNA sequence that binds with a DNA strand in the gel revealing the presence of the gene we are interested in
- Can be used in forensic science and in paternity tests
- The act of comparing patterns is called *DNA profiling*