**Evidence for Evolution Test Revision**

**Biotechnology**

* DNA
* Polymerase Chain Reaction (PCR)
  + Denaturation
  + Annealing
  + Extension
* Gel Electrophoresis
  + Restriction enzymes
  + Structure of apparatus used for gel electrophoresis
  + DNA ladders
* DNA Profiling
  + Production and comparison of DNA fingerprints
* DNA Sequencing
  + Sanger’s sequencing
  + Structure of nucleotide including hydroxy (OH) group
  + ddNTP’s (ddTTP, ddATP, ddGTP & ddCTP)
* Ethical Considerations
  + Autonomy, confidentiality, equity & privacy.
* Comparative Genomics
  + Comparison of genomes, the more similarities – the more closely related
* Endogenous Retroviruses
  + Endogenous – part of an organism’s genome
  + Retrovirus – virus from the past
  + More endogenous retroviruses in common – the more closely related
* Mitochondrial DNA
  + Structure & inheritance – can be traced back along the maternal line
  + Most useful when comparing closely related species or individuals within a species
* Protein Sequences
  + Comparative protein studies – looking for similarities and differences between the protein sequences of closely related species.
  + Cytochrome c
  + Haemoglobin
  + The more similarities – the more closely related (shorter period since common ancestor)
* Bioinformatics
  + Use of computers and software describe the molecular components of living things and analyse this large amount of data.

**Other Evidence for Evolution**

* Fossils
  + Definition of fossils Vs Artefacts
  + Fossil formation – requirements for fossils to be formed – rapid burial etc
  + Problems with the fossil record
* Relative Dating
  + Determine if one is older or younger than the other.
  + Stratigraphy – Principle of Superposition & Correlation of Rock Strata
  + Index fossils – lived for a short period over a large area
  + Fluorine dating
* Absolute Dating
  + Actual age (in numbers) of specimen in years before present
  + Potassium – Argon
  + Carbon – 14
  + Conditions required, types of materials, time-scales - ages, limitations
  + Half-life for each of these and what does this mean
    - Be able to interpret graph of half-life and how this relates to ages suitable for this type of dating
* Comparative Anatomy
  + Comparison of structural features
  + Embryology
    - Gill slits & pouches, presence of tail, two-chambered heart, brain development
  + Homologous Structures
    - Eg forelimb bones arranged in a similar way, however may have different functions
  + Vestigial Structures
    - Structures which no longer have a function
      * Nictitating membrane, appendix, wisdom teeth, muscles to move ears
* Phylogenetic trees & Cladograms
  + Divergence & Speciation
  + Be able to identify the closely related species and last common ancestor