**Year 12 Human Biology 2022**

**Topic Outline: Evidence for Evolution (Term 3 weeks 1-5)**

\*Pre-reading: Prior to the beginning of this topic, students should read *Human Perspectives* Chapter 10 and 11

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| **Week** | **Lesson** | **Syllabus Links** | **Lesson Content / Assessments** | **Study/Homework** |
| **1** | **A** | Science Inquiry Skills  Conduct investigations, including the use of virtual or real biotechnological techniques of polymerase chain reaction (PCR), gel electrophoresis for deoxyribonucleic acid (DNA) sequencing, and techniques for absolute and relative dating, safely, competently and methodically for valid and reliable collection of data  Represent data in useful and meaningful ways; organise and analyse data to identify trends, patterns and relationships; discuss ways in which measurement error, instrument accuracy, the nature of procedure and sample size may influence uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions  Interpret a range of scientific and media texts, and evaluate models, processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments  Select, use and/or construct appropriate representations, including phylogenetic trees, to communicate conceptual understanding, solve problems and make predictions.  Science as a Human Endeavour  Developments in Biotechnology have increased access to genetic information of species, populations and individuals, existing now or in the past, the interpretation and use of which may be open to ethical considerations  Developments in the fields of comparative genomics, comparative biochemistry and bioinformatics have enabled identification of further evidence for evolutionary relationships, which help refine existing models and theories  Science Understanding: Evidence for Evolution  Biotechnological techniques provide evidence for evolution by using PCR, bacterial enzymes and gel electrophoresis to facilitate DNA sequencing of genomes  Comparative studies of DNA (genomic and mitochondrial), proteins and anatomy, provide additional evidence for evolution; genomic information enables the construction of phylogenetic trees showing evolutionary relationships between groups  The fossils record is incomplete and cannot represent the entire biodiversity of a time or a location due to many factors that affect fossil formation, persistence of fossils and accessibility to fossilised remains  Sequencing a fossil record requires a combination of relative and absolute dating techniques to locate fossils onto a geological time line  Both relative and absolute dating techniques, including stratigraphy and index fossils, and absolute dating techniques, including radiocarbon dating and potassium-argon dating, have limitations of application  Science Understanding  Hominid evolutionary trends  Humans as primates are classified in the same taxonomic family as the great apes. The species within the family are differentiated by DNA nucleotide sequences, which brings about differences in:  Relative size of cerebral cortex  Mobility of digits  Locomotion – adaptations to bipedalism and quadrupedalism  Prognathism and Dentition | No School Today | You should spend a minimum of 30 min per day, 5 days a week on your Human Biology study. Aim to:   * Read through the textbook chapter(s) before starting the topic. * Read through your notes each day. * Complete, mark and correct the review worksheets given in class * Practice writing out processes and drawing flow diagrams. * Do the *Review* and *Apply your Knowledge* questions from the textbook as you go * Do the Past exam questions given.   Do any revision given or suggested by your teacher before tasks. |
|  | **B** | ***Test from Prior Topic*** |
|  | **C** | The human genome  Biotech and DNA  PCR |
|  | **D** | DNA Sequencing  Protein Electrophoresis |
| **2** | **A** | ***Go through test from prior topic***  DNA Sequencing cont… |
|  | **B** | Recombinant DNA technology and examples of use |
|  | **C** | Identification of hereditary diseases  Gene therapy  Cell replacement therapy and genetic engineering. |
|  | **D** | DNA evidence – ERVs, mt DNA |
| **3** | **A** | DNA evidence – protein sequencing |
|  | **B** | Fossil evidence –  Fossilisation  Absolute Dating: radiocarbon, potassium/argon |
|  | **C** | Consolidation of radiocarbon dating and potassium argon dating |
|  | **D** | Fossil Evidence -  Absolute Dating: Dendrochronology  Relative Dating: Stratigraphy |
| **4** | **A** | Fossil Evidence -  Relative dating: Fluorine dating  Phylogenetic Trees  Limitations of the fossil record |
|  | **B** | Comparative anatomy – embryology  Comparative anatomy – homologous structures  Comparative anatomy – vestigial structures  Geographical Evidence |
|  | **C** | Science Inquiry Simulation: Amino Acid Sequencing |
|  | **D** | **Task : Science Inquiry – Biotechnological Techniques** |
| **5** | **A** | Primate Evolutionary Trends:  Digits  Dentition  Cerebral Cortex Size  Gestation and Parental Care |

**Assessments: Wednesday 17th August (week 5) Task : Science Inquiry - Biotechnological Techniques (includes some content on Evidence for Evolution)**

***\*Note: Evidence for Evolution Content will also be assessed in Task 8 and Task 9 along with Hominid Evolutionary Trends***