**Biology - Yr 10 2018 -2019**

**Molecular Biology, Inheritance and Selection**

**Key concept: Relationships Related Models, Function Global concept: Scientific and Technical Innovation**

**Statement of inquiry: Characters of one generation are passed on to all the generations that follow**

**Inquiry Question: What are units of inheritance and how are they inherited from our ancestors?**

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| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
|   | Molecular Biology  | **UNIT 1 - Molecular Biology** LAB – Viewing your own cells**DNA Structure**1. Define gene, DNA and chromosome
2. Describe the structure of DNA
3. Draw simple diagrams of the structure of DNA

LAB: DNA extraction**Protein Synthesis - Transcription**1. State the function of a gene
2. State the location of transcription
3. Describe the process of transcription
4. Compare the structures of DNA and mRNA
5. State that mRNA has triplets of bases called codons which code for one amino acid

**Protein Synthesis - Translation**1. State the location of translation as the ribosome
2. State that tRNA has an anticodon
3. Describe the process of translation including complementary base pairing between codons and anticodons
4. State the bonds formed between amino acids as peptide bonds
5. Identify codons associated with amino acids, determining DNA and tRNA (anticodon sequences) and amino acid sequences

**Enzymes**1. Describe enzymes as proteins
2. Describe the action of enzymes as binding substrates with the active site to form and enzyme substrate complex with reference to specificity
3. Describe and explain the effect of substrate concentration, temperature and pH with reference to kinetic energy and denaturation
4. Define denaturation and explain the consequences for enzyme controlled reactions

LAB: Enzyme activity lab report using catalase and hydrogen peroxide | DNA extraction practical   | **Criterion B:**Enzyme Lab Report**Criterion C:** Enzyme Lab Report  |
| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
|   |  Inheritance                            | **UNIT 2 - Inheritance****Inheritance**1. State the difference between a genotype and phenotype
2. Use the terms homozygous and heterozygous
3. Explain how the characteristics are inherited
4. Describe how some characteristics are dominant and recessive
5. Create genetic cross diagrams to show inheritance
6. State what a family pedigree is
7. Interpret pedigree diagrams
8. Explain how sex is determined
9. Describe how recessive disorders are inherited

 **Codominance and Blood Groups**1. State the different blood groups
2. Relate blood group genotypes to their phenotypes with reference to codominance
3. Explain why it is important blood groups are the same in a blood transfusion
4. Describe how a blood group is passed onto the next generation

LAB - Transfusion analysis **UNIT 3 - Selection****Selective Breeding**1. Describe the process of selective breeding
2. Give examples of selective breeding including dogs and agriculture

**Natural Selection**1. Explain the importance of variation and mutation in natural selection
2. Identify selection pressures from given examples
3. Describe the principles of Darwinian natural selection
4. Produce a presentation on a short term example of evolution
5. Discuss antibiotic resistance as an example of evolution by natural selection
6. Evaluate the use of antibiotics

**Genetic Engineering (link to IDU with English)**1. **Describe where genetic engineering can be applied**
2. **Explain the process of genetic engineering**
3. **Describe the use of restriction enzymes and ligase to produce recombinant DNA (plasmids or virus vectors) which can be inserted into a different organism (transgenic organism)**
4. **Evaluate the ethical implications with the use of genetic technologies (for IDU)**
 |       |  **Criterion A:** Written test: DNA, Mitosis, inheritance, Family pedigrees, Blood Groups, selective breeding, natural selection,         |