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Subject:	Biology
Type of Exam Preparation Material:	Study Notes
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Summary

This document contains information needed for each syllabus dot point for HSC Biology: 9.3 Blueprint of Life, as published by the Board of Studies (BOS). It includes definitions and concise information which facilitate learning. This section also emphasises on students having knowledge of real-life relevant examples associated with each dot point. Where students are required to gather, process and analyse information from secondary resources, brief and concise information is provided in this document as well. However, students are encouraged to deepen their understanding by carrying out further research, which is an essential skill for any students studying science-related subjects.

In general this document may be useful for,

Year 11 -12 HSC Biology students

Useful for

students as a study material and for revision

Notes about the Exam in General

1. *Section 1 contains Part A (Multiple Choice Questions) and Part B (Short and Long Response Questions) carrying 75%. Sections 1 usually only tests on the 3 Core Modules.*
2. *Section 2 contains questions for the Option that your teacher/you have chosen to study. It carries 25%.*

Use available evidence to analyse, using a named example, how advances in technology have changed scientific thinking about evolutionary relationships

- Initially = Using comparative anatomy → Gorillas, chimpanzees and orang-utans in one family
  Humans in another
- Later = Biochemistry (Amino-acid sequencing of cytochrome-c) → Chimpanzees = humans
  Slight difference with gorillas
- Current = Biochemistry (DNA) → Results of amino-acid sequencing confirmed

Analyse information from secondary sources on the historical development of theories of evolution and use available evidence to assess social and political influences on these developments

Lamarck (Inheritance of acquired characteristics) Mid 1700s

Darwin & Wallace (Natural selection – mechanism for evolution) Mid 1800s

Assessment

Social		Political	
Pros	Cons	Pros	Cons
- Scientific thinking gaining increasing popularity in the Victorian culture	- Lamarck's theory discredited by his colleague, Cuvier - Darwin and Wallace's theory faced strong opposition by theologists		- Political influence by the church which has been upholding creationism as the basis of life
Judgment : Both social and political influences have had a substantially negative impact on the development of theories of evolution especially in the restricted community of the 19th and early 20th century			

2. MENDEL'S EXPERIMENTS HELPED ADVANCE KNOWLEDGE OF INHERITANCE OF TRAITS

Outline the experiments carried out by Gregor Mendel

- Experimented with pea plants and a variety of traits associated with them
- Studied one characteristic at a time
- Crossed pure-breeding → Crossed hybrids (products of the 1st crossing)

Describe the aspects of the experimental techniques used by Mendel that led to his success

- Controlled : Pea plants self-pollinate and are not affected by outside influences e.g. wind
- Accuracy : Artificial cross-pollination by hand to ensure objectivity
- Quantitative analysis : Mathematical ratios lead to valid conclusions

Describe outcomes of monohybrid crosses involving simple dominance using Mendel's explanations

- Monohybrid : An individual with different factors for 1 trait
- Factors (before the term 'gene' or 'allele' came about) determine traits of the organism.
- Dominant factors → expressed. Recessive factors → not expressed in presence of dominant ones
- At any one time, only 2 factors of the same trait can be inherited by an organism

7. CURRENT REPRODUCTIVE TECHNOLOGIES AND GENETIC ENGINEERING HAVE THE POTENTIAL TO ALTER THE PATH OF EVOLUTION

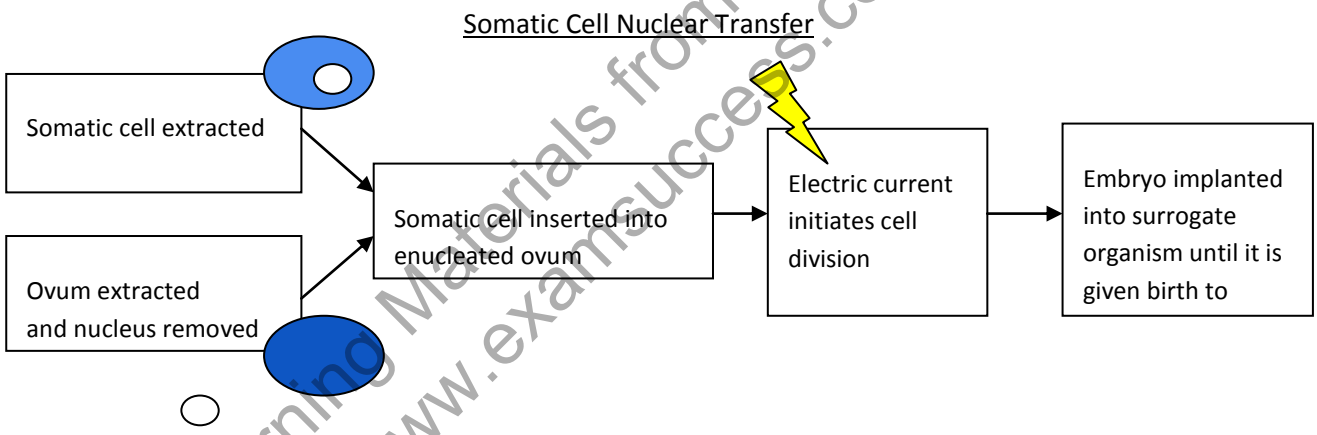
Process information from secondary sources to describe an example of hybridisation within a species and explain the purpose of this hybridisation

- Species : Corn → Hybrid corn (Zea mays)
- Purpose: Produce corn with higher yield

Identify how the following current reproductive techniques may alter the genetic composition of a population:

Artificial insemination	- Sperm from male inserted into vagina of female - Fertilisation → Some genetic variability - Usually selective → Decrease genetic variation
Artificial pollination	- Pollen from male anther placed on female stigma - Effects similar to artificial insemination
Cloning	- Producing individuals genetically identical to parent organisms - No genetic variability

Process information from secondary sources to describe a methodology used in cloning



Outline the processes used to produce transgenic species and include examples of this process and reasons for its use.

Analyse information from secondary sources to identify examples of the use of transgenic species

- Process :
    1. Restriction enzymes cut plasmid (circular DNA) of bacteria leaving sticky ends
    2. Gene can anneal to sticky ends with the help of DNA ligases
    3. Organism (now transgenic species) allowed to reproduce and generate the products needed

Example	Purpose
Inserting insulin-producing gene into bacteria	To prevent shortage of insulin essential for the survival of diabetic patients
Inserting cold-resistant gene from Arctic flounder into strawberries	To increase resistance to cold