

**Year 12 General Biology**

**Marking Guide**

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| **Task 4: Extended Response – Genetic Variation Part B** | **Weighting**  10% |

**PART A:**

-Process of meiosis (1 mark)

-Labelled diagram of the stages of meiosis (2 marks)

-Homologous chromosomes (1 mark)

-Chromosome crossover (1 mark)

-How mutations occur in genes (1 mark)

-The process of natural selection (1 mark)

-Factors that influence natural selection (1 mark)

-Speciation (1 mark)

-References (1 mark)

**PART B:**

1. Genetic variation is a prerequisite for evolution. Mutation is one source of genetic variation and meiosis is another. **Identify** and **explain** how meiosis and mutation produce genetic variation when fertilisation occurs during reproduction (7 marks)

Meiosis creates haploid cells (1 mark) randomisation of chromosomes and genes during meiosis (1 mark) meiosis creates haploid cells (1 mark) mutation causes changes in DNA (1 mark) fertilisation fusion of gametes (1 mark) fertilisation causes random assortment of genes from both gametes (1 mark) haploid number of chromosomes becomes diploid number of chromosomes (1 mark)

1. **List** two examples of mutagens and **explain** what mutagens are and how they can affect the genes of an organism. **Explain** whether mutations are normally harmful to an organism or not. (6 marks)

Mutagens: UV light, radiation, chemicals, viruses (1 mark each)

Mutagen: Something that increases the likely hood of mutation (1 mark)

Causes permanent change in the DNA sequence (1 mark)

Mutations are normally harmless/don't affect the organism (1 mark), some can be harmful, some can be useful (1 mark)

1. **Explain** what natural selection is and what processes contribute to natural selection and how this creates new species. (7 marks)

Natural selection is a mechanism of evolution (1 mark), which causes species to genetically change over time (1 mark).

Natural selection requires variation (1 mark), inheritance (1 mark), environmental stressors/struggle (1 mark)

Natural selection leads to genetic change over time (1 mark) once the changes are significant enough a new species is created (1 mark)