**IB Biology Chapter 5 Notes:** Evolution & Natural Selection (5.1 & 5.2) **NAME:**

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| **Word** | **Definition** |
| **Evolution** | The process of cumulative change in the heritable characteristics in a population |
| **Species** | A group of similar organisms in an area that can interbreed and make fertile offspring |
| **Natural selection** | The process of how within a population there is unequal survival and reproduction of individuals. |
| **Heritable** | Can be passed from parent to child (offspring) |
| **Gene frequency** | The relative amount (percentage) of a particular gene in a population |
| **Origins** | The beginning/start |
| **Artificial selection** | Humans selecting which organisms survive and reproduce |
| **Sexual selection** | Selecting organisms that have traits that help them to reproduce/attract mates |
| **Overproduction** | Making more offspring than are needed or can survive |
| **Variation** | Difference in heritable traits of a species |
| **Resistance** | The ability to not be affected by or withstand something |
| **Homologous structures** | Structures that similar in form and function but are found in seemingly dissimilar species. |
| **Selective pressure** | The thing in an area that selects for certain traits that help an organism to survive and reproduce |
| **Adaptation** | A characteristic or trait that helps an organism survive and/or reproduce in a particular area |
| **Divergence** | When populations evolve to become different from one another. |
| **Speciation** | When groups that were originally part of the same population evolve to become separate species. |
| **Fossil record** | The preserved remains of organisms found underground in layers based on geological time period. |

5.1.1 Evolution occurs when heritable characteristics of a species change.

5.1.2 The fossil record provides evidence for evolution.

5.1.3 Selective breeding and domesticated animals shows that artificial selection can cause evolution.

5.1.4 Evolution of homologous structures by adaptive radiation explains similarities in structure when there are differences in function.

5.1.7 Compare the pentadactly limb of mammals, birds, amphibians, and reptiles with different methods of locomotion.

5.1.5 Populations of a species can gradually diverge into separate species by evolution.

5.1.6 Continuous variation across the geographical range of related populations matches the concept of gradual divergence.

Outline how the fossil record gives evidence for evolution:

Outline how the selective breeding gives evidence for evolution:

Outline how homologous structures give evidence for evolution:

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| **Organism (type)** | **Function of pentadactly limb** |
| Crocodile (reptile) |  |
| Penguin (bird) |  |
| Echidna (mammal) |  |
| Frog (amphibian) |  |

What is ‘speciation’ and how can it occur?

Outline how variation across geographic ranges gives evidence for evolution:

5.1.8 Development of melanistic insects in polluted areas.

5.2.1 Natural selection can only occur if there is variation amongst members of the same species.

5.2.2 Mutation, meiosis, and sexual reproduction cause variation between individuals in a species.

5.2.3 Adaptations are characteristics that make an individual suited to its environment and way of life.

5.2.4 Species tend to produce more offspring than the environment can support (overproduction).

5.2.5 Individuals that are better adapted tend to survive and produce more offspring while the less well adapted tend to die or produce fewer offspring.

5.2.6 Individuals that reproduce pass on characteristics to their offspring.

What is a melanistic insect?

Describe how melanistic varieties of insect (particularly the melanic moth) evolved in polluted areas:

What is variation and why is it important for evolution?

Outline sources of variation in population:

What is an adaptation?

What is overproduction and how does it relate to natural selection?

Differentiate between heritable and acquired characteristics—which can be passed to offspring?

5.2.7 Natural selection increases the frequency of characteristics that make individuals better adapted and decreases the frequency of other characteristics leading to changes within the species.

5.2.8 Describe changes in beaks of finches on Daphne Major.

5.2.9 Describe evolution of antibiotic resistance in bacteria.

Describe how natural selection leads to evolution in a population:

Describe the changes in beak length in *G. fortis* on Daphne Major:

*What was the variation in the finches?*

*What was the environmental change?*

*What was the adaptation?*

*How did the traits of the G. fortis population change and why?*

Outline how strains of bacteria evolve to become resistant to antibiotics: