

Topic 3: Biodiversity & Conservation (13 hours)

Subtopic 3.2 Origins of Biodiversity

Significant Ideas:

- ❖ Evolution is a gradual change in the genetic character of populations over many generations, achieved largely through the mechanism of natural selection.
- ❖ Environmental change gives new challenges to species, which drives the evolution of diversity.
- ❖ There have been major mass extinction events in the geological past.

Knowledge & Understanding

3.2.1 Biodiversity arises from **evolutionary processes**.

3.2.2 **Biological variation** arises randomly and can either be beneficial to, damaging to, or have no impact on, the survival of the individual.

3.2.3 **Natural selection** occurs through the following mechanism.

- 1) Within a population of one species, there is genetic diversity, which is called **variation**.
- 2) Due to natural variation, some individuals will be **fitter** than others.
- 3) Fitter individuals have an advantage and will **reproduce more successfully** than individuals who are less fit.
- 4) The offspring of fitter individuals may **inherit** the genes that give that

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| advantage. | |
| 3.2.4 This natural selection will contribute to the evolution of biodiversity over time. | |
| 3.2.5 Environmental change gives new challenges to species: those that are suited will survive, and those that are not suited will not survive. | |
| 3.2.6 Speciation is the formation of new species when populations of a species become isolated and evolve differently from other populations. | |
| 3.2.7 Isolation of populations can be caused by environmental changes forming barriers such as <i>mountain formation, changes in rivers, sea level change, climatic change, or plate movements</i> . The surface of the Earth is divided into crustal, tectonic plates that have moved throughout geological time . This has led to the creation of both land bridges and physical barriers with evolutionary consequences. | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 3.2.8 The distribution of continents has also caused climatic variations and variation in food supply, both contributing to evolution. | |
| 3.2.9 Mass extinctions of the past have been caused by various factors, such as <i>tectonic plate movements</i> , <i>supervolcano eruption</i> , <i>climatic changes</i> (including drought and ice ages), and <i>meteorite impact</i> – all of which resulted in new directions in evolution and therefore increased biodiversity. | |
| Applications & Skills | |
| 3.2.AS1 Explain how plate activity has influenced evolution and biodiversity. | |
| 3.2.AS2 Discuss the causes of mass extinctions. | |