

Question 30 (7 marks)

Geological and biological history of New Zealand

<i>Event</i>	<i>Time</i>
Australia and New Zealand separated	85–65 million years ago
New Zealand drifted east and subsided, its land mostly under seawater (most fossils are marine)	85–22 million years ago
Mammals became abundant worldwide	60 million years ago
Earliest migratory bird fossils	55 million years ago
New land created by volcanoes in New Zealand	22 million years ago to present
Many new, unique species of birds appear in the fossil record	20 million years ago to present
Islands completely devoid of mammals. Birds occupied niches that were usually occupied by mammals	700 years ago

Use this information and other relevant knowledge to demonstrate how the practice of biology has led to the validation of current theories of evolution.

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The practice of biology has led to the validation of current theories of evolution. The current theory of evolution states that organisms change over generations due to ~~select~~ natural selection and this leads to ~~change~~ new species. The information in the geological and biological history of New Zealand clearly shows mammals not being present in New Zealand, despite being present elsewhere in the world. This indicates that mammals were unable to cross the ocean to New Zealand, and this matches the biological record of no mammals as mammals became abundant after New Zealand drifted east, to the geological record of New Zealand drifting east. The evidence provided by the practice of biology has thus led to the validation of current

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Theories of evolution. In addition since New Zealand is ^{desert} ~~island~~ of mammals, current theories of evolution predict that other species will fill those niches, which is validated by the biological record of birds occupying niches usually occupied by mammals in New Zealand. ~~The~~ The practice of biology, by ^{studying} ~~the~~ distribution of species on landmasses demonstrates that the distribution of species correlates with the geological record further providing ^{evidence} ~~proof~~ for the validation of current theories of evolution. The practice of biology, such as comparative anatomy, ^{study of} ~~study~~ similar structures in organisms further validates the theory of evolution. ~~Through~~ ^{through} the study of the pentadactyl limb in mammals for example, to demonstrate ^{they} ~~it~~ had a common ancestor. Additional studies such as comparative embryology, ^{study} ~~study~~ how embryos of different species develop, has allowed additional evidence for the validation of current theories of evolution. Comparative biochemistry ^{through} ~~through~~ techniques such as DNA hybridisation ^{show} ~~show~~ how genetically similar organisms are, this provides ^{even more evidence} ~~more evidence~~ for ^{current} ~~current~~ theories of evolution as it shows ~~the~~ ^{similarity of} ~~the~~ species changing ^{over} ~~over~~ time. Finally, the ^{study} ~~study~~ of ^{fossils} ~~fossils~~ in paleontology and comparing them to fossils of different locations and ^{time periods} ~~time periods~~ allows biologists to track how the distribution of organisms changed in the past, such as mammals being unable to cross to New Zealand during the time they became abundant elsewhere. The combined evidence from the wide range of fields within biology has led to ^{the} ~~the~~ validation of current theories of evolution by verifying models and patterns in the theories of evolution.

End of Question 30