NEW ZEALAND
MARINE STUDIES CENTRE

Evolution: Patterns and Processes

LOCATION: NZ Marine Studies Centre, Portobello, Dunedin

PROGRAMME DESCRIPTION:
Explore living examples of adaptive radiation, divergent and convergent evolution. Students will use a range of tools for evolution. The programme includes analysis of fossils, biogeography, comparative anatomy, life histories, and mRNA analysis. This also includes marine examples of allopatric and sympatric speciation.
Extensions: Links in with the programme Behaviour of Marine Invertebrates.

LEARNING OUTCOMES:
Students will:

- describe processes and patterns of evolution.
- demonstrate an understanding of evolutionary processes leading to speciation.

Extras:
Gain a new or renewed appreciation for marine life and the marine environment.
Students will gain an understanding of marine science as a possible field of study or a future career.

YEAR/LEVEL: Year 13, Biology level 8
CURRICULUM LINKS:
Living World: level 8, Ecology, Evolution. NCEA Biology 3.4 AS 90717 – This AS involves the description of processes and patterns of evolution.

KEY COMPETENCIES: Thinking, managing self, relating to others. Nature of Science: understanding, investigating.
PRE TRIP PREPARATION: Teachers should share and unpack the achievement standard requirements and assessment criteria with the students before coming. Some general background research on the tools used by scientists to understand evolutionary processes.

RESOURCES AVAILABLE TO SUPPORT PROGRAMME:
A student booklet for photocopying is sent out with booking confirmation.
RELATED TOPICS: Life Processes, explore the diverse ways in which animals and plants carry out life processes. Form and function, understanding animal adaptations in relation to their way of life.

PROGRAMME COSTS: $16.00 per student (GST excl.)
PROGRAMME LENGTH: 4 hours.
GROUP INFORMATION: Groups of 15 or more are preferred, up to a maximum of 60 students.
With 20 or more students we divide the group and rotate through activities.

SAFETY ACTION PLAN:
In the field: as per field operations.
In Laboratory: as per Lab safety.
Covid guidelines: as per Government and University of Otago operations.

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Example itinerary

10.00 am
Arrive at NZ Marine Studies Centre
LAB: Introduction to the programme and H&S

10.15 am
AQUARIUM: identification and characteristics of the major marine phyla.

10.30 am
LAB and AQUARIUM: adaptive radiation in molluscs

11.00 am
Morning tea

11.15 am
LAB: dissection of marine animal, investigative challenge

12.00 pm
Practical enquiry into variation in population data (limpet size and height)
Investigate local marine fossil record

12.30 pm
Lunch

1.00 pm
Sympatric and allopatric speciation - examples in local species

1.30 pm
Investigative challenge – unknown organism. Using the tools learned throughout the day to establish the evolutionary relationship.

1.50 pm
Review and overview

2.00 pm
Depart NZ Marine Studies Centre / opportunity to stay for afternoon tea