## Diversity in Form and Function

### LOCATION:
New Zealand Marine Studies Centre, Portobello, Dunedin

### PROGRAMME DESCRIPTION:
This programme provides practical hands-on experiences in support of achievement standard 91155. Understanding animal (and plant) adaptations in relation to their way of life

An introduction to the marine and intertidal environment sets the scene for exploring the connection between adaptations and niche.

Students are guided through a series of dissections that deconstruct form in relation to function with reference to the organisms’ environments and niches.

A range of live marine animals are interpreted for students with particular reference to a particular life process focus determined by the teacher (one of: gas exchange and circulation, feeding and nutrition or reproduction)

A review places the specific experiences into the introductory framework

**Extensions:** Most commonly this programme is done in conjunction with the 12 shore survey programme connected to AS 91158 Investigate a pattern in an ecological community, with supervision.

Besides variations depending on the life process focus desired, teachers can also request a customized programme that relates to the particular marine environment they use for AS 91158.

### LEARNING OUTCOMES:
Students will
- Increase understanding of the relationship between niche and adaptation.
- Gain first hand experience of exemplar animal forms and their morphology.
- Develop understanding of the relationship between morphology and functionality in the context of survival in a particular niche.

**Extras:**
- Gain a new or renewed appreciation of marine life and the marine environment.
- Gain a new appreciation of marine science as a possible field of study or a future career.

### YEAR/LEVEL:
Year 12, Biology level 7

### CURRICULUM LINKS:
- **Nature of Science (NoS):** level 7 understanding, investigating, participating and contributing.
- **Science:** Living World: level 7, Life Processes-explore the diverse ways which animals and plants carry out the life processes. AS 91155 Understanding animal (and plant) adaptations in relation to their way of life.

### KEY COMPETENCIES:
Thinking, using language, symbols and text, managing self, relating to others.

### PRE TRIP PREPARATION:
Some general understanding of niche and adaptation would be helpful as would some background to the life process under scrutiny (one of: gas exchange and circulation, feeding and nutrition or reproduction).

### RESOURCES AVAILABLE TO SUPPORT PROGRAMME:
A student booklet with supporting worksheets is supplied with booking confirmation.

Class sets of Rocky shore and Sandy and Muddy Shore identification guides are available on application to the NZMSC.

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The NZ Marine Studies Centre is part of the Marine Science Department, University of Otago. This programme is supported by the Ministry of Education’s LEOTC service. See [WWW.MARINE.AC.NZ](http://WWW.MARINE.AC.NZ) for more programmes and resources.
### Programme Outline

**BOOKINGS:** Email: marine.studies@otago.ac.nz  
Phone: 03 479 5826

<table>
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<tr>
<th>RELATED TOPICS:</th>
<th>Level 7. Life Processes – Ecology - Explore ecological distribution patterns and explain possible causes of these patterns. AS 91158 Investigate a pattern in an ecological community, with supervision.</th>
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| PROGRAMME COSTS: | $8.50 per student (GST excl.) for 2.5 hrs  
if programme is combined with shore survey/patterns in the environment for a full day  
Cost is between $14.50 and $16 per student depending on time. |
| PROGRAMME LENGTH: | 2.5 hours  
If combined with shore survey/patterns in the environment then total time is 4.5 - 5 hrs. |
| GROUP INFORMATION: | Groups of 15 or more are preferred up to a maximum of 60 students.  
With 20 or more we divide the group up and rotate through activities. |
| SAFETY ACTION PLAN: | On beach: as per field operations  
In Laboratory: as per Lab safety |
| NZMSC CONTACT: | Steve Cutler  
Email: steve.cutler@otago.ac.nz  
Phone: 03 479 5843 |

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