

LENScience Senior Biology Seminar Series

Harnessing Biodiversity

Pre-Seminar Preparation Instructions

Pre-seminar school discussion

As a result of our isolation, Aotearoa-New Zealand has many unique native plants and animals found nowhere else in the world. These endemic species combined with the range of ecosystems and constituent communities found within New Zealand make our biodiversity both unique and vulnerable.

Understanding and managing biodiversity requires a combination of knowledge of ecology and evolution. This seminar will explore examples of services that ecosystems provide which support human society, and the importance of biodiversity in supporting ecosystems in the provision of these services.



The key concept in this seminar is that of the ecosystem, which you have studied in Year 12 Biology. What this seminar requires you to do is to bring together (integrate) everything you learnt about ecosystems and ecosystem processes in Year 12 and use this understanding to analyse the context presented in the seminar—increasing biodiversity in ecosystems. In doing so you will be thinking at scholarship level. This meets the Outcome Description from the Scholarship Biology Standard is “The student will analyse biological situations in terms of ecological and evolutionary principles and demonstrate integration of biological knowledge and skills”

The seminar will also provide you with good ideas for potential research questions for AS 90713 if you have not yet completed this and with good ideas for focus questions for AS 90714.

Pre-seminar activities:

1. With your class or study group, review and discuss the following core concepts of ecology:
 - Intra and inter-specific interactions
 - The different roles within a food chain / web
 - The nutrient cycles
 - The value of diversity within an ecosystem
2. Define biodiversity and discuss the factors that characterise New Zealand’s biodiversity.
3. Define biosecurity and discuss factors that challenge New Zealand’s biosecurity.
4. Using the [resources provided on the seminar web page](#), identify the key biodiversity or bioprotection issues for your region.

Pre-Seminar Preparation

As part of the seminar, each school is being asked to contribute some key information.



Bio-Protection
Bioprotection science for New Zealand

What is a worm worth?

During the seminar we are asking each school to participate in a mass experiment.

We have 110 schools registered from across New Zealand, so we hope we will get 110 sets of data coming in which will be analysed during the seminar and which each school will follow up after the seminar.

Your instructions.....

1. Find a grassy area or a garden in your school grounds where you can get permission to dig a small sample of soil (and put it all back carefully afterwards!)

2. Create a square on your spade:

Measure the width of the spade blade and record this.

Measure this distance up from the bottom of the spade blade.

Using a permanent marker pen, draw a line across the top of W.

3. Dig one hole the same width as your spade, and as deep as the red line on your spade. Collect the sample and put it into a labelled bag.

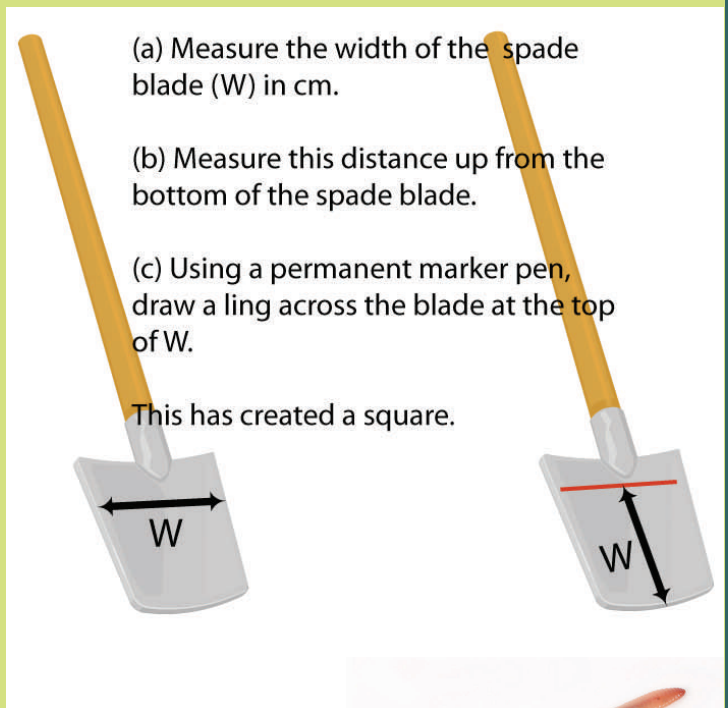
4. Spread the soil from your sample onto a newspaper. Pull the soil sample apart with your fingers and count the number of juvenile and adult earthworms from each sample. Adult earthworms have a saddle section.

5. Using an electronic balance to 2 decimal places, measure the total mass of worms in your sample.

6. Record your measurements ready to add your data to our mass experiment on June 23rd!

You will need to provide:

- W (cm) = the width of your spade
- the total number of adult worms in your sample
- the total number of juvenile worms in your sample
- the total biomass of all worms in your sample



Level 3 Achievement Standards linking to this seminar:

[AS 90713 Carry out a practical investigation into an aspect of an organism's ecological niche with guidance](#)

The seminar offers many potential ideas that you could develop for an investigation.

[AS 90714 Research a contemporary biological issue](#)

Protection of our biodiversity and the use of pesticides is an issue of concern for New Zealand. There are a range of perspectives on the appropriateness of the use of pesticides held by different stakeholders.

[AS 90716 Describe animal behaviour and plant responses in relation to environmental factors](#)

Key Concepts from Level 3 Biology that link to this seminar:

Nature of Science

- Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate.
- Develop and carry out investigations that extend your science knowledge, including developing understanding of the relationship between investigations and scientific theories and models.
- Use relevant information to develop a coherent understanding of socio-scientific issues, to identify possible responses at both personal and societal levels.

Ecology, Ecosystems and Biodiversity

Please remember these are only the objectives linking to this seminar—refer to your unit hand out at school for a full list

- Define the difference between individual, population, community, ecosystem and biosphere and the relationship between them
- Identify the biotic and abiotic components of an ecosystem and describe the relationship between these components
- Recognise that ecosystems are dynamic and subject to change
- Describe species interrelationships: mutualism, competition, exploitation.
- Describe nutrient cycles and cycling.
- Define biodiversity and explain the impact humans are having on biodiversity
- Recognise the importance of biodiversity



Plant and Animal Responses to the Environment

Please remember these are only the objectives linking to this seminar—refer to your unit hand out at school for a full list

- Define the term interspecific relationships and describe examples of these in terms of –ve, +ve and mutual interactions between individuals.
- Define herbivory and parasitism