# Fieldwork Data - Teacher Notes

In the accompanying video interview with Dr Anneke Veenstra, a fieldwork project being conducted in the Gardiner’s Creek Reserve is described. In this project, a survey of invertebrates in parts of the Reserve was conducted. This data is provided here for teachers to use the in the teaching of content from the Victorian and Australian Science 7 - 10 science or senior Biology Curricula.

The data comprises a count of invertebrate specimens collected in pitfall traps at two locations in the Gardiners Creek Reserve in 2015. The two locations represent two different communities within the Reserve. They are described as *Grassy Woodland* and *Leafy Woodland.* The data was collected to serve as a baseline with which to compare future surveys. Changes in diversity over time can be used to inform environmental management decisions.

Teachers may use the data to develop Science Inquiry Skills described in the Victoria Curriculum: specifically *Recording and proces*sing and *Analysing and evaluating*. Alternatively, the data can be used to develop some of the Key Science Skills described under the heading *Analyse and evaluate data* in the *VCE Biology Study Design (2016)*.

The data also provides a real-world context in which to introduce students to the scientific names of taxa used in the classification and identification of common invertebrates. Thus, addressing the Victorian Curriculum content related to biological classification (VCSSU091). The data could also be used in the teaching of VCE Biology Unit 1 Outcome 2, *Organising biodiversity*.

Two learning tasks are suggested below; each with a brief overview. Suggested student worksheets for each task are also provided. Teachers may alter the tasks to suit their intended learning outcomes and the needs of their students.

## Task 1 – Naming and classifying invertebrates

### Curriculum links

This task is designed to develop the Science Understanding related to the Victoria Curriculum content

There are differences within and between groups of organisms; classification helps organise this diversity [(VCSSU091)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU091)

* grouping a variety of organisms on the basis of similarities and differences in particular features
* classifying using hierarchical systems, for example, kingdom, phylum, class, order, family, genus, species
* using scientific conventions for naming species
* using provided keys to identify organisms surveyed in a local habitat

### OR

VCE Biology Study Design Unit 1 Outcome 2

Organising biodiversity

* classification of biodiversity, past and present, into taxonomic groups based on shared morphological and molecular characteristics, and naming using binomial nomenclature

### Data

The raw data can be found in the Excel spreadsheet file *Invertebrate data\_Gardiners Creek Reserve.xls*

### The task

The raw fieldwork data is presented using the scientific names of the taxa, together with some common names. These scientific names are not immediately meaningful to most students. However, having the data presented in this way provides an opportunity and a real-world context for students to engage in the purposeful task or demystifying the information.

To begin to understand the data, students are set the task of finding common names that correspond to the scientific names provided in the spreadsheet. While some of this information is provided in the spreadsheets, it needs to be verified by the students. In completing the task students will incidentally begin to think about classification. This becomes an opportunity for students to learn how morphological similarities are used to classify living organisms.

The data refers to members of a **subphylum** (Myriapoda). Several **classes** of invertebrates and several **orders** of the **subclass** Pterygotaof the **class** Insecta included in the data. Students are asked to identify the features that are common to those organisms classified into each class and order in the data. This information is readily available on the internet and is usually accompanied with excellent images. If students are using computers or tablets, they can include images of representatives of each different **class** and **order** to illustrate the important features used in classification.

## Task 2 – Processing and analysing data

### Curriculum links

This task is designed to develop Science Inquiry Skills described in the Victoria Curriculum: particularly skills related to *Recording and processing* and *Analysing and evaluating*.

*Recording and processing*

Construct and use a range of representations including graphs, keys and models to record and summarise data from students’ own investigations and secondary sources, and to represent and analyse patterns and relationships (VCSIS110)

*Analysing and evaluating*

Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions (VCSIS111)

OR

VCE Biology Study Design

Units 1 – 4 Key science skills

Analyse and evaluate data, methods and scientific models

* + process quantitative data using appropriate mathematical relationships and units
  + organise, present and interpret data using schematic diagrams and flow charts, tables, bar charts, line graphs, ratios, percentages and calculations of mean

### Data

The raw data can be found in the Excel spreadsheet file *Invertebrate data\_Gardiners Creek Reserve.xls*

The data has been simplified for use by students in file XX .

### The task

Students use the original raw data to manipulate, to simplify and to present in a graphical form themselves. This is an excellent opportunity for students to learn the graphing tools provided in MS Excel. Alternatively, the students may be given the simplified data from which to draw graphs. If students do not have the technology or skills, the graphs can be hand drawn. There are learning advantages in each approach.

Students can construct

1. separate bar charts showing the relative numbers of each organism.
2. a combined bar chart that provides a comparison of the numbers of the different invertebrates at each site.
3. pie charts that show the relative abundance of each type of invertebrate at each site.



Data collected at another time could be represented in these ways. Significant changes in the absolute or relative numbers would be immediately evident.