Burrowing Crayfish – Scientific Inquiry skills
7. Where are they burrowing ?

Inquiry

How do I use science information to make a graph?
Making a prediction about where burrowing crayfish are found?
Finding patterns and trends in the data?
Using the data to tell an ecological story?

Lesson Overview:

This session provides students with the opportunity to use secondary data to investigate the distribution of Burrowing Crayfish communities in their local area. Students use secondary data to create a graph, make predictions and explore patterns and ecological relationships between habitats and the distribution of the Burrowing Crayfish. The students create a small mini report for the Nature Glenelg Trust project officers.

Key concepts: Development of scientific tools (tables, maps and monitoring sheets), recording of scientific data in tables, interpretation of data, identification of patterns, making predictions and connecting ecological relationships.

Teaching strategies: Graphing techniques, making a prediction and looking for patterns.

Equipment & Resources: Maps, iPads, science journals, graph paper,

ACARA Curriculum Linkages: Biological Science (refer to curriculum overview).

Activity Sequence: **2 hours**

1. **Engage**: Student are using some data that has already been collected. This information is secondary data as the data was collect independently by another person. The students are going to use the secondary data to make a predication, use a map and symbols, create a graph and explore patterns found in the data.

2. **Explore**: Using the base information contained in the unit re-create the data observed on the board.
   - **Discuss**: What can you see with the data? Is it organised? How is it organised?
   - **Using some of the data**: using the data for the location of the site
   - **Map Base**: Record the location using an agreed map symbols.
     - What patterns can you see? Can you see any patterns?
   - **Making a prediction**: Why do you think that the burrows are occurring where they are? What is your prediction? I think that the burrowing crayfish are found ………………. This is because ………………
   - **Graph creation:** Use the data that has been collected to make a simple graph with features including a title, labelled axis, correct measurements (m), scale selection, accuracy of marking the graph and neatness.

3. **Explain:** Describe the patterns that you can see from your graph.
   - What are the results saying?
   - Where are most of the burrows found?
   - Be specific and make reference to the data contained in the graph to support your explanations.

4. **Elaborate:** Writing down key findings about the site to create a mini report for the NGT team.
   Include: Title, graphs and explain What the ecological relationship between where the burrows are found and the ecosystem? What factors might these patterns be linked to (agriculture, drains, wetlands, housing)

5. **Evaluate**: How can we improve our survey techniques in future surveys.

Teachers working example:

This session uses whole class discussions, and requires the students to think independently about the data they have been provided with. The use of secondary data is important to give the students experience in using data before they conduct fieldwork investigations themselves. This process enables the students to be mindful in the process of data collection and how the data will be used to 'tell an ecological story' about the distribution of the Burrowing Crayfish.

Familiarise yourself with 'The Burrowing Crayfish secondary data' before beginning the activity. This will provide you with the knowledge of the types data that is to be discussed during the session.

The aim of the session is to provide and active way developing Science Inquiry Skills in processing and analysing data.

Teaching strategies:

Graphing:
A graph organises, represents and summarises information so that patterns and relationships can be identified. Understanding the conventions of constructing and using graphs is an important aspect of scientific literacy.During a scientific investigation, observations and measurements are made and measurements are usually recorded in a table. Graphs can be used to organise the data to identify patterns, which help answer the research question and communicate findings from the investigation.

Once you have decided to construct a graph, two decisions need to be made: What type of graph? And Which variable goes on each axis of the graph?

Looking for patterns:
Scientific work requires the investigation of patterns and the explanation of why these patterns may or may not exist. The use of a graph allows patterns and observations to be identified in a visual format. The students can then investigate the ecosystem relationships and begin to draw conclusions from the results obtained. Graphs also provide a way to support with evidence ideas to explain the observed ecosystem relationships. These results are then combined with the student's current scientific knowledge of the biology creature and ecology of the ecosystem. The students can therefore infer with evidence and draw conclusions about a particular ecosystem and its associated biota and potential impacts of ecosystem disturbance.

Transects and Quadrats: *Are scientific tools used in research. A **transect** is a line that use used to keep a reference point for field observations. It can denote the distance from an ecological feature or be used to set up to provide a reference point.*
Quadrats *are used to make a quantitative count of objects in a known area. This allows for a fair test to be conducted in a given area. The quadrat allows field studies to be replicated and kept consistent for comparison.*

Burrowing Crayfish Monitoring Sheet

Name:

Place: (Road near where burrow chimney's seen/found)

Number of chimneys seen (estimate):
0 – 10
10 – 40
40 – 60
60- 100
100+

Site description: paddock   wetland   river   forest
The burrows were seen….

On site monitoring: Quadrat number: Transect Distance: m

Height of chimney: cm
Width of chimney: Base   cm
                      Top   cm

Soil moisture: wet   damp   dry
Appearance of chimney: Shape and size of burrow entrance

Texture of mound: hard   soft

Active burrows:
Knocked off chimney top: date:
 Rebuilt chimney: date:

Map and or burrow pictures:

Burrowing Crayfish Data Sheet:

Date: 12 June 2015
Time: 2:35pm
Weather Conditions: over cast, cloudy, light rain, windy

Site Description:
The site is a semi-permanent wetland with an outer freshwater meadow. The area stays wet for 6-8 months of the year and dries out over summer months.

Site - 1	Quadrat number Quadrat size 4m by 4m	Transect line (m)	Total number of burrows	Average height of chimney at burrow entrance (cm).
Edge of wetland	1	0	3	22
	2	5	8	16
	3	10	19	12
	4	15	18	14
Outer freshwater meadow	5	20	22	11

Site Description: Cows are seen grazing in this freshwater meadow habitat. Foot prints are seen through out the wetland. An old drain line is dug on the outer edge in the freshwater meadow.

Site - 2	Quadrat number Quadrat size 4m by 4m	Transect line (m)	Total number of burrows	Average height of chimney at burrow entrance (cm).
Edge of wetland	1	0	6	21
	2	5	14	18
	3	10	6	8
	4	15	5	10
Outer freshwater meadow	5	20	9	8

Using the data in the tables make a graph to show what is happening in each of the sites: What is the
   1. Total number of burrows?
   2. Average height of the burrows?

What patterns can you see emerging? How can you explain these findings? Support your ideas.
Going further:
What is happening to the Burrowing Crayfish population?
What do you think is happening in the wetland?
What environmental factors may be at work? What man made influences may be at work?