Daradgee Environmental Education Centre Program Overview

SUSTAINABILITY - Polly Creek

Polly Creek is a beautiful freshwater creek located approximately 4 km from Daradgee EEC. This habitat consists of a series of shallow to medium depth pools with flowing water creating sets of riffles along its length. Polly Creek is an excellent example of a low level Wet Tropical Rainforest, with a well vegetated riparian zone.

At Polly Creek students observe characteristics of a healthy freshwater stream, conduct water quality investigations, and support with photographic and sketching audit type activities. Whilst the investigations to evaluate water quality occur predominately at Polly Creek, additional extension activities and challenges can be conducted back at Daradgee or school.

Polly Creek is a well shaded, safe area for a refreshing swim.
### Activity Overview

The Benthic Macro Invertebrates Study is a practical and effective method of assessing water quality. Students are introduced to the topic of BMI’s and their presence as indicators of water quality. After clear instruction, students work in teams to locate, collect and identify specimens within a defined area of Polly Creek. At the conclusion of the activity students comparatively examine findings to determine the habitat/water quality. Inferences may be discussed regarding environmental contributors. To develop an understanding of the importance of the riparian zone and its effects on water quality students focus on what contributes to a healthy waterway. Once on task, students sketch a cross-section of the creek to represent the variety of vegetation and aquatic life/structure. Having determined what influences the pristine water quality students are to obtain photographic evidence for later assessment and reporting. Previous discussions from the BMI study should contribute to this understanding into what are the requirements of a healthy waterway.

### Core Learning Intent

Students investigate the biodiversity and water quality of a freshwater creek. Students develop an understanding of what is required to maintain a healthy waterway.

### Activity Objective

Students work together investigating and observing the biodiversity of Polly Creek. Through determining the range of BMI species found students are able to determine the quality of Polly Creek’s water. The riparian zone and creek bed are both considered and photographic evidence of what contributes to making Polly Creek pristine is collected. Human and environmental impacts upon the habitat of Polly Creek are also discussed.

With experience gained from these activities, teachers may organise follow up excursions to undertake comparative studies in their local waterways. While a half day excursion is enjoyable, those able to extend to a whole day will experience a very thorough, high quality experience. Finishing off with the relaxing swim is a great end.

### Evidence of Learning

Through the following activity students can incorporate information gathered around BMI and habitat diversity to determine the water quality of freshwater streams.

### Australian Curriculum - SCIENCE

PREP - SCIENCE UNDERSTANDING - Biological Sciences

- **Content Description** - Living things have basic needs, including food and water

SCIENCE INQUIRY SKILLS - Processing and analysing data and information

- **Content Description** - Engage in discussions about observations and use methods such as drawing to represent

Year 1 - SCIENCE UNDERSTANDING - Biological Sciences

- **Content Description** - Living things live in different places where their needs are met

- **Content Description** - Living things have a variety of external features

SCIENCE INQUIRY SKILLS - Planning And Conducting

- **Content description** - Participate in different types of guided investigations to explore and answer questions

Year 2 - SCIENCE UNDERSTANDING - Biological Sciences

- **Content Description** - Living things grow, change and have offspring similar to themselves

SCIENCE AS A HUMAN ENDEAVOUR - Use and influence of science

- **Content Description** - People use science in their daily lives, including when caring for their environment and living things
SCIENCE INQUIRY SKILLS - Questioning and Predicting

Content Description - Respond to and pose questions, and make predictions about familiar objects and events

Year 3 - SCIENCE UNDERSTANDING - Biological Sciences

Content Description - Living things can be grouped on the basis of observable features and can be distinguished from non-living things

SCIENCE AS A HUMAN ENDEAVOUR - Nature and development of Science

Content Description - Science involves making predictions and describing patterns and relationships

Content Description - Science knowledge helps people to understand the effect of their actions

Year 4 - SCIENCE UNDERSTANDING - Biological Sciences

Content Description - Living things have life cycles

- recognising that environmental factors can affect life cycles such as fire and seed germination

Content Description - Living things, including plants and animals, depend on each other and the environment to survive

SCIENCE AS A HUMAN ENDEAVOUR - Use and influence of science

Content Description - Science knowledge helps people to understand the effect of their actions

Year 5 - SCIENCE UNDERSTANDING - Biological Sciences

Content description - Living things have structural features and adaptations that help them to survive in their environment

Describing and listing adaptations of living things suited for particular Australian environments

Communicating

Content Description - Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts

Year 6 - SCIENCE UNDERSTANDING - Biological Sciences

Content Description - The growth and survival of living things are affected by the physical conditions of their environment

SCIENCE INQUIRY SKILLS - Questioning and Predicting

Content Description - With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be

Communicating

Content Description - Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts

Elaborations - using labeled diagrams, including cross-sectional representations, to communicate ideas and processes within multi-modal texts

Year 7 - SCIENCE UNDERSTANDING - Biological Sciences

Content description - There are differences within and between groups of organisms; classification helps organise this diversity

Content Description - Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions

Content Description - People use understanding and skills from across the disciplines of science in their occupations

Communicating

Content Description - Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies

Cross-curriculum priorities – SUSTAINABILITY

- OI.3 Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.

- OI.7 Actions for a more sustainable future reflect values of care, respect and responsibility, and
**C2C - SCIENCE**

**P,1,2: C2C Unit 1: Our living world** - In this unit students identify that living things have basic needs, including food and water, and have a variety of external features. They describe how living things grow, change and have offspring similar to themselves. Students explore how the needs of living things are met in their environment.

**Yr 1: Unit 1: Living Adventure (Biology)** - In this unit students make links between external features of living things and the environment where they are found. Students predict consequences of environmental change on living things.

**Yr 2: Unit 3: Watch it grow! (Biology) C2C Unit 3: Good to Grow** - An ideal way to link science with literacy in the classroom. It provides opportunities for students to explore the growth of a range of living things and explore the processes of growth and change, of reproduction and death that apply to all animals. Through hands-on activities and investigations, students compare the growth of living things under different conditions.

**Yr 3: Unit 1: Is it Living? (Biology)** - In this unit students will justify groupings of living and non-living things according to observable features and the need for recognition of once-living things. Students will investigate the diversity of living and non-living things in their local environment and recognise the use of this knowledge in their lives.

**Yr 4: Unit 2: Ready, Set, Grow (Biology)** - This unit involves students investigating life cycles. They will examine relationships between living things and their dependence on the environment. By considering human and natural changes to the environment, students predict the effect of these changes on living things and possible consequences to species survival.

**Yr 5: Unit 1: Exploring our New World (Biology)** - In this unit students will examine the structural features and adaptations that assist living things to survive in their environment. They use this knowledge to pose questions and make predictions about the relationship between adaptations and environmental changes.

**Yr 6: Unit 4: Marvellous Micro-Organisms (Biology)** - An ideal way to link science with literacy in the classroom. It provides opportunities for students to develop an understanding of the role of micro-organisms in food and medicine. Students investigate the conditions micro-organisms need to grow, learn about yeast and the bread-making process, and research the development of penicillin.

**Yr 7: Unit 4: Organising Organisms/Primary Connections Unit: Affecting Organisms (Biology)**

There are differences within and between groups of organisms; classification helps organise this diversity.

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**Introduction**

- Sit students on tarps, welcome to location and identify associated hazards: cassowaries, leeches and wait-a-whiles. Introduce students to what BMI’s are. Demonstrate how to locate, collect and identify (based on body parts, size, shape) BMI’s using a nature viewer and instil methods of safe, gentle storage into a swimming pool (white plastic tub). Recommend use of leaf and water (not fingers) to pick up BMI’s, care taken not to remove eggs and returning rocks to the same position which they were found. Emphasize that this is a scientific collection; living healthy specimens are more valuable than damaged, dead specimens.
- Organise groups with viewers, ID charts and a swimming pools.

**Body**

**BMI Study**

- Groups are to be instructed in regards to safe and environmentally friendly methods of moving throughout the creek. Walk the group with equipment to their designated activity area. Direct groups, each with an accompanying adult to be periodically positioned along the creek. It is opportune to redemonstrate how to set up for the BMI study as follows.
1. Fill the swimming pool with approximately 3-5cm of water and sit it on the bank.
2. In pairs have students turn over rocks to locate and collect BMI’s as above.
3. Use ID chart to identify BMI’s. Initially collect specimens according to size and variety. As students become experienced more prolific creatures may be recognised on sight but not collected. DEEC staff to move between groups to support correct procedures, identification, management of site etc.

- Towards the end of the session, provide opportunity for students to view the collections of other groups with particular focus on size and variety of BMI’s.
- Once collections are shared, groups move in to a central point to focus on a discussion around the BMI’s and an audit of their riparian habitat.
- DEEC led conversations focus on nominating the most common BMI’s then to developing a clear mental picture of what components make up this habitat-
  - Water - cold, moving, clear, bubbling
  - Creek bed - stones, rocks, gravel, not muddy
  - Vegetation - native plants reaching into creek, shading, lots of variety (biodiverse)
  - Other vocab - riffles, verge, oxygenate, sediment

Photo Essay - The students are to work in small groups to locate and photograph as many of the physical features and plant groups of the Polly Creek habitat as possible.
- ‘Macro’ settings are utilised for the photography session in which students photograph examples of the BMI’s collected.
- Students are required to collect photographic evidence to depict what constitutes a pristine freshwater stream.
- Encourage students to photograph a range of fauna to further represent the biodiversity of Polly Creek.

Conclusion
Riparian Sketch - The purpose of this activity is to create a visual representation of the physical structure-parts of the creek and biodiversity of plant life at Polly Creek.
- The discussion focus is parts of the creek and plant groups. Students will be introduced to basic plant group characteristics to enable them to recognise palms, ferns, grasses, vines, creepers, moss, lichen, fungi, weeks, etc.

Freshwater Swim - Students are introduced to their recreational swim with the following conditions.
• Swimming Buddies - Students pair up for swimming. Whenever a whistle is blown (5-10min) all swimmers (and non-swimmers) point to their buddy. Adults check for all pairs, head count etc. before swimming continues.
• Students swim in wet footwear
• Swimming area to be clearly defined
Walk in and out of water, no diving or jumping in

**Differentiation**

**Physical Challenges** - Students with physical impairments ie. Require wheel chairs, crutches etc. may be able to walk into the Polly Creek base site with student/adult assistance. Access to the creek is challenging and moving up and down the rocky creek bed may very difficult or not possible for some students. These students may be able to wade or swim in the main pool and work with a nearby group to collect specimens. Sketching and completing the photo essay me be possible. There are no toilet facilities or built shelters at Polly Creek.

**Safety**

_Students are required to bring:_ Wet footwear which are secured to feet (must not slip off - will get wet), Sun Smart shirt, shorts or pants (swimmers can be worn underneath), towel, insect repellent (may be required) and hats.

_Visiting Teachers are required to provide:_ Medical Alert Forms, Medical First Aid Kit _catering to specific student requirements eg. including prescribed medications/epi-pens._

**Resources**