

Ecosystem Dynamics – New AUSECO Biology Programs

Hawksbury Sandstone Bushland

- Ku Ring Gai Chase National Park (Camp Kedron), Ingleside
- Garigal National Park, Forestville

Students investigate the **Hawksbury Sandstone Ecosystem** in detail. The day will begin with an understanding of the conditions of the bushland as a result of the geological history of the area, and observe some examples of **adaptations** of native sclerophyllous vegetation to these conditions. Students will also focus on two Indigenous organisms in detail – one plant and one animal, assessing their adaptations using microscopes and lenses to observe the organism up close. Our chosen animal depends on what is caught in Elliot traps set by Auseco staff the previous evening, but **students have an exciting chance to see either a Bush Rat, a Brown Antechinus, or perhaps even both!**

Students will then discuss various **sampling methods** used to sample small ground dwelling mammal populations, tree assemblages and populations, and other environmental factors. With background knowledge on how to sample populations, students will use scientific equipment to investigate how plant distribution and abundance varies within the national park, and how this correlates with changes in physical and chemical conditions. Students will set up *quadrats*, use *dichotomous keys* to identify vegetation, test for *soil moisture*, *soil depth*, *aspect of slopes*, and measure *ambient temperature*, to test how abiotic factors influence the biota and how certain species occupy specific locations.

Students will visit a lotic ecosystem (creek), to see how **human impact** & land use in the surrounding catchment area of the creek impacts its water quality. Students will perform a *bioindicator survey* of freshwater organisms and test *water pH* to quantify pollution levels.

Common biotic interactions that might influence the biota the students have seen today will also be discussed, with local examples of **symbiotic relationships and trophic interactions**.

The entire Hawksbury Sandstone ecosystem will be discussed in an **evolutionary context**, by understanding the evolution of sclerophylly with changing climates, and an in depth study of Long Leaf Lomatia, a **relictual species** of an ancient Lomatia species. Students will use their understanding of how past climate change has driven the evolution of modern native plants, to predict **future changes** to the bushland with global warming.

Rockplatform

- Long Reef Rock Platform, Long Reef

Students investigate the **intertidal rockshelf** in detail. The day will begin with an understanding of tides and how that may influence **abiotic and biotic** factors on the rockplatform. With this in mind, students will investigate a producer in detail (Common Brown Kelp), using *dichotomous keys* to classify and identify the organism, and discussing its **adaptations** to living in the subtidal areas of the rockplatform. Students later investigate an animal in detail using the same process, however they will **catch their own animal on the rockplatform** at low tide – a highlight of the day with many octopus, sea hares and fish out and about!

Out on the rockplatform, we will then discuss various **sampling methods** used to sample common rockplatform organisms, and other environmental factors. With background knowledge on how to conduct ecological surveys, students will use scientific equipment to investigate how the distribution and abundance of organisms varies across the rockplatform, and how this correlates with changes in physical and chemical conditions. Students will set up *quadrats* and *transect lines*, use *identification charts* to identify animals, and test rockpools for their *temperature*, *salinity* and *pH*, to see how abiotic factors influence the biota and how certain species occupy specific locations.

Common biotic interactions that might influence the biota the students have seen today will also be discussed, with local examples of **symbiotic relationships and trophic interactions**.

The rockplatform ecosystem will finally be discussed in an **evolutionary context**, by understanding the evolution of various phenotypic traits with respect to fossil species.

Rainforest

- Mt Keira Escarpment & Mt Keira Scout Camp, Wollongong

In the rainforest at Mt Keira Scout Camp, we will discuss various **sampling methods** used to sample common rainforest tree assemblages and other environmental factors. With background knowledge on how to conduct ecological surveys, students will use scientific equipment to investigate the abiotic factors important in determining the distribution and abundance of rainforest trees. Students will set up *quadrats*, use *dichotomous keys* to identify tree species, measure *foliage cover* and *tree height*, and test for *soil moisture*, *soil texture*, and *aspect of the slope*. With this data, students will also **classify** the type of rainforest present due to these physical and chemical conditions.

Common biotic interactions that might influence the biota the students have seen today will also be discussed, with local examples of **symbiotic relationships and trophic interactions**.

After familiarising themselves with some tree species, students will investigate one plant in detail using a microscope, and discuss **adaptations** it possesses.

Students end the day at the top of Mt Keira Escarpment (Mt Keira Lookout), which overlooks beautiful views of the Wollongong coastline. We begin with a brief discussion of the rainforest ecosystem in an **evolutionary context**, by looking at past changes in rainforest distribution. From this viewpoint, students can also identify current **human threats** to the biodiversity of Mt Keira rainforest, by observing surrounding land use adjacent to the rainforest, and assess land management strategies used to mitigate these impacts.

Wetlands

- Bonna Point, Kurnell (Botany Bay)

Students investigate **wetland environments (seagrass, mangroves, sand dunes and saltmarsh)** in detail. The day will begin with an understanding of tides and how that may influence **abiotic and biotic** factors in a wetland ecosystem.

Students will test for the abiotic characteristics of a fluctuating aquatic and terrestrial environment, using scientific equipment to test for *temperature*, *light intensity*, *water salinity* and *water pH*.

With this in mind, students will investigate two plants in detail – one aquatic (Grey Mangrove) and one terrestrial (Pigface), using **dichotomous keys** to classify and identify the organism, *microscopes* to observe the plants in detail, and discussing their **adaptations** to living in their respective environments.

Students later investigate an animal in detail using the same process, however they will **catch their own animal in the seagrass** at low tide – a highlight of the day!

We will then discuss various **sampling methods** used to sample common wetland organisms. With background knowledge on how to conduct ecological surveys, students will use *quadrats* and *transect lines* to survey for plant and animal abundance and distribution across mangroves and sand dunes, and see how this correlates with changes in physical and chemical conditions tested for earlier to see how abiotic factors influence the biota and how certain species occupy specific locations.

Common biotic interactions that might influence the biota the students have seen today will also be discussed, with local examples of **symbiotic relationships and trophic interactions**.

Wetland vegetation will finally be discussed in an **evolutionary context**, by understanding the evolution of various phenotypic traits with respect to *fossil species*.