ULS2208: Biodiversity and Natural History in Singapore
Final Project Essay
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What is nature? What does it mean to me? And what is my place in the natural world?

A warm humid breeze sent a leaf swirling and falling elegantly onto the Ecopond at Yale-NUS campus, creating tiny ripples that soon fused with gentle waves that swept across the pond. A young Jack Dempsey fish startled a little at the disturbance caused by the fallen leaf, but almost immediately returned to feeding on the pond sediment as it had been doing for the past ten minutes. Dozens of other fish were either nibbling at their food or swimming around slowly, enjoying this fine Sunday morning. I shifted my sight from the fish in the pond to look around the lush greenery surrounding me. Half a metre from me, several drops of morning dew were glittering like diamonds in the sunlight, rapidly evaporating under the steaming heat. In the distance, a sparrow briefly flew across the pond before disappearing into dense shrubs. This was just an ordinary observation session during my final project. Yet, it was such a magical feeling that each time I came to the pond, I would still be awe-inspired by nature in different ways. As I progressed through this project, I gradually gained a deeper understanding of nature as well as my connection to the natural world.

What is nature? Many people tend to use the term “nature” to refer to “wild” flora and fauna found in parks or nature reserves. However, over the course of this module, I have grown to appreciate that nature does not have to be limited to parks and forested areas. Nature is everywhere around us. The bird that hops around cheerfully on the pavement, the weaver ants marching towards a tree nearby, and the shrubs lining our classroom building all constitute nature, waiting for us to discover and appreciate. On a personal level, it is up to us to define what nature is. If we constantly keep an eye out for elements of life around us and derive our own meaning from them, then we can find nature all around us.

From an objective point of view, one may perceive nature to be a cold giant machine operating under a fixed set of rules defined 13 billion years ago at the moment of Big Bang. However, to me, nature is a dynamic and awe-inspiring place that is filled with fascinating contrasts. Nature is *ephemeral*. No matter how breathtakingly gorgeous a flower is, it only has a week or two to wow the world before withering away inevitably. A mayfly has only 24 hours to live its life. But nature is also *eternal*. The human civilisation is a mere blink of an eye in comparison to billions of years of evolution that nature has witnessed. Nature is *simple*. All atoms and molecules interact with each other via the same four fundamental forces. Organisms evolve under the simple laws of statistical randomness and natural selection. But nature is *complex*. Millions of species with varying complexity coexist in a delicate balance. Nature is *fragile*. An invasive species can easily upset a local ecosystem and drive a long-established native species into extinction. Yet nature is also *resilient*. When left untouched, a badly damaged forest can return to its pristine condition through generations of succession. These contrasts in nature motivate me to explore more of its wonders.

Nature also brings out the childlike wonder in me. When I was a child, I was constantly curious about everything around me and always liked to ask why things were the way they were. My

parents had to bear with my “stupid” questions about nature, such as “why do leaves fall?” and “why are birds not tired of flying?”. As I grew up, I gradually lost this childhood sense of curiosity for nature, as I became preoccupied with other matters such as standard subjects in school. Thus, I found it fortunate that I was able to slowly gain back this childlike wonder through the module and the final project. When observing the habitat and behavioural patterns of fish in the Ecopond, I would be intrigued by a lot of my observations and kept asking myself many “why’s”. This also brings back many childhood memories of my exploring nature with my parents and asking questions to satiate my curiosity. Curiosity is a great gift that nature has bestowed upon humans. We should treasure this gift and use it to unravel, investigate and appreciate more of nature’s wonders and mysteries.

Through this module and the final project, I have also grown to appreciate nature as a source of wonder and a place of discovery. Before taking this module, although I kept hearing words like “biodiversity” and “evolution” being thrown around in different contexts, I rarely paused and pondered what they mean in the real world. Through the various readings, lectures and field trips, I learned how diverse Singapore’s flora and fauna are. The various plants and animal species I have been exposed to in this module never failed to make me marvel at the extraordinary power of evolution. Every species has developed its own peculiarities through millions or even billions of years of evolution. I was amazed at many of their ingenious “design” aiming to help themselves as well as their species survive through generations. During my project, I noticed that there was a large population of guppies in the pond. Despite the fact that each individual of them is very tiny (around 3 cm), they were present in such large numbers. Upon further research, I learned that guppies are extremely adaptable and they are even able to thrive in polluted water bodies. I was intrigued to know what evolutionary advantages they possess. It turns out that guppies reproduce very rapidly and they reach maturity faster than others. Males constantly try to mate with females. The pressure to attract mating partners explains why male guppies are so colourful as compared to the females. This is merely one example of nature’s ingenuity. The fact that the simple mechanism of natural selection and the power of statistical chance can create such a diverse world filled with creatures with their own “special powers” is really fascinating to me.

The final project gave me ample opportunity to contemplate nature. I feel that nature can help broaden my perspectives and give me new lenses to look at the world. By *feeling* nature through my senses in a mindful way, I can connect the scientific world of nature with my spiritual self. Journaling down my observations and feelings in my nature journals made me pay more attention to the little intricacies found in the natural world, and link them to the bigger picture. The fact that nature exists from a microscopic level to the cosmic scale really broadens the way I think. The Ecopond occupies a small area of land in the midst of unfavourable environment conditions (urbanised concrete jungle with high human traffic). Yet, it has so much biodiversity concentrated all in one place. It is largely self-sustaining and enclosed, so most of the organisms inside spend their entire lives in their own small world. This made me think that, in fact, our planet Earth is just like the Ecopond, isolated in the vast ocean of the cosmos. We humans are just like the fish in the pond, trapped in a small and yet astonishingly diverse sanctuary of life together with other creatures.

In addition, nature is a great place for me to seek peace and tranquillity from. As perennial urbanites, we have most of our daily activities confined to the concrete jungle that we live in.

The fast-paced urban lifestyle coupled with heavy workload in university inevitably results in much stress. Fortunately, nature provides an easily accessible and effective channel for us to take a breather and recharge. When being outdoors and immersed in nature, I felt relaxed and reinvigorated. Focusing my attention on the flora and fauna of nature is an inexplicably calming experience, especially after a long day of studying. Nature has its special healing power. Focusing my mind on various elements of nature around me, such as a bird chirping in the distance or a damselfly perched on lemongrass by the pond, allows my mind to pause and settle. Simply watching the fish swim carefreely in the pond had the magical power of unloading worries off my mind. Nature enables me to let go of my stress and enjoy the tranquillity that natural elements bring to my mind. My interactions with nature have further inspired me to go out and experience nature more often, and incorporate nature into my lifestyle.

To me, nature is also a source of infinite knowledge and novel ideas. Here, I am not just talking about natural sciences. Rather, wisdom from nature can impact many other disciplines of studies as well. As a Computer Science student, I can find many interesting intersections between nature and my major. There is an emerging field called Nature-Inspired Computing, where computer scientists develop new computing techniques by observing how nature solves complex problems. For example, by studying how eusocial creatures like ants behave in a colony, researchers created *swarm intelligence* algorithms that solve a complex problem using a large number of simple agents that interact locally. Advancements in neural networks, reinforcement learning, and evolutionary algorithms all benefit from learning from nature. Nature can bring so much inspiration to our pursuit of knowledge in interesting and unexpected ways.

To me, nature is everywhere around me in my everyday life. Nature is a wondrous place filled with contrasts and harmony. It evokes my childlike wonder and keeps me curious about discovering more of its marvels. Interacting with and pondering nature broadens my horizons and gives me new perspectives to view the world. Moreover, nature is where I turn to for tranquillity and peace of mind. Last but not least, nature provides inspiration for novel ideas that can propel our intellectual pursuits. Over the course of the module and the final project, I have become a *participant* in nature instead of a mere *passer-by*. I have learned so much from interacting with and reflecting on nature, and I hope to inspire more people around me to explore, discover and appreciate nature.

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To access my final project deliverable, you may click on the following link:
https://www.figma.com/proto/4DsofIXfPsFBgltOUlWNz8/Ecopond-Field-Guide?node-id=2%3A2&scaling=scale-down&page-id=0%3A1
Best viewed on a PC (i.e. not mobile) browser such as Chrome, in full-screen mode.