**University of the Philippines Manila**

**College of Arts and Sciences**

**Department of Biology**

**BS Biology**

**Biology 160**

**Ecology**

**STUDY GUIDE: WEEK 1**

**INTRODUCTION:**

Welcome to the online Ecology course! Since this will be our first week in the course, it is very important that you should know what ecology really is and how does it differ markedly with other biology courses that you have taken so far. Ecology’s major task is to complete the biology curriculum by dealing with the higher levels of biological organization, starting with the individual level, followed by population, then community and the ecosystem. Whereas other courses are dealing heavily on the structure and function of cells and subcellular organelles, tissues, organs, and organs systems, ecology focuses on the levels beyond. This is the only field in biology that (1) investigates how organisms interact with each other and with the abiotic factors in the environment and (2) describes the habitat (address) as well as the niche (profession) of organisms in the community where they belong. The metabolic processes and physiology of all organisms is shaped by where they live and in particular what role they play in an ecosystem. In order to fully understand how organisms survive and optimally function, it is important to understand their interaction with their animate and inanimate environment. The ultimate goal of ecology, therefore, is to understand and explain the patterns of survival, distribution and abundance of organisms in the physical environment. So why study ecology? This is so to complete your biological journey.

For this week, you should be able to know more about ecology including its history, etymology, emerging definitions, significance, subdivisions, and its distinction from environmentalism (or environmental science). You will also get to know the famous scientists that have shaped this field as well as the approaches and research methodologies that have been used to understand ecology.

At the latter part of the week, you will start learning the concept of adaptability of the organism and the first set of abiotic factors such as temperature and light that affect the morphology, physiology and behavior of both plants and animals.

**Learning Objectives**

At the end of this week, you should be able to:

1. Describe the significance of ecology as a biological discipline.
2. Trace the history of ecology and enumerate some personalities that have shaped this field of study.
3. Discuss the emerging definitions of ecology through the years.
4. Differentiate between ecology and environmentalism
5. Examine the various levels in the study of ecology and how ecologists do research
6. Explain how the concept of niche and limiting factors affect the distribution of organisms
7. Explain how temperature and light affect morphology, physiology and behavior of organisms.

**Activity 1**

Begin by watching the recorded lecture Lecture 1. Introduction to Ecology. The link is provided in the VLE. The outline of the lecture is shown below:

**Lecture 1: Introduction to General Ecology**

1. Definition of Ecology
2. Derivation of the word
3. Various definitions of ecology
4. History of Ecology
5. How interest in ecology started
6. What disciplines are involved
7. Branches of Ecology
8. Autecology
9. Synecology
10. Objectives of Ecological Studies
11. Ecology vs. Environmentalism
12. Classification of Ecology
13. Based on Habitat
14. Based on Advances
15. Approaches in Ecology
16. Organismal
17. Population
18. Community
19. Ecosystem
20. Biosphere
21. Preview of the Ecosystem

**Additional learning resources:**

<https://www.youtube.com/watch?v=OfV3VNgjpvw> (Ecology introduction/Ecology/Khan Academy)

<https://www.youtube.com/watch?v=WI2ylWg5qK0> (Introduction to Ecology, Creative Commons Attribution license).

**Activity 2** After watching Lecture 1 Introduction to Ecology, try to answer the questions:

1. Why is ecology a complex science?
2. What current problems can be explained by ecology?
3. Differentiate ecology from environmentalism

**Activity 3.** Watch the second video lecture on Lec 2. The Organism and its Environment: Temperature. The link is provided in the VLE. The outline of the lecture is shown below:

**Lecture 2: Organisms and the Abiotic Environment: Adaptations and range of tolerance: Temperature**

1. Three Components of the Abiotic Portion of the Ecosystem
2. Inorganic
3. Organic
4. Climate regime
5. Effect of Abiotic factors
6. Range of conditions survived by organisms
7. Concept of the Niche
8. Coexistence of species
9. Fundamental niche vs. realized niche
10. Concept of limiting factors
11. Zones of stress
12. Limits of tolerance
13. Range of tolerance
14. The law of limiting factors
15. Temperature as an important abiotic factor
16. Effects of organisms
17. Temperature regulation by plants
18. Temperature regulation in animals

**Activity 4** After watching the video for Lecture 2, try to answer the following questions.

1. How can we use the concept of the niche and the law of limiting factors to explain the distribution of animals and plants? Why are there species are restricted to certain locations?
2. How do plants and animals differ in their temperature regulation?
3. What are the advantages and disadvantages of poikilothermy and homiothermy?

**Activity 5** Study the powerpoint presentation for Lecture 3 Organisms and Abiotic Environment: Light. The link to this presentation is in the VLE. The outline of the presentation is shown below. Please be aware of the notes that are attached to every slide that provide further explanation or clarification.

**Lecture 3: Organisms and the Abiotic Environment: Adaptations and range of tolerance: Light**

1. Light as an Abiotic Factor
2. Effect of Light on Organisms

A. On Plants

B. On Animals

C. On Aquatic Life

1. Rhythmic Behavior Caused by Light
2. Biological Rhythm
3. Photoperiod

**Activity 6** After going over the powerpoint presentation for Lecture 3, try to answer the following questions .

1. How important is light as an abiotic factor?
2. In what way are plants affected by light?
3. Explain how animals are affected by light in terms of the rhythm in their behavior.

**Checkpoint Quiz 1**: Go to your VLE and complete the quiz to test your understanding of the Lecture 1, 2 and 3 topics.

**END OF WEEK 1**