





# Ecology Keys

## Welcome to Ecology Keys!

This course is designed to provide you with a basic knowledge of ecological theory and application: the 'keys' you will need to prepare you for more specialised and in-depth study of pure and applied ecology at Masters level and beyond.

It is designed to be useful in the following situations:

- a comprehensive primer for those who have had little, or no formal training in ecology;
- a useful revision for those who have already studied ecology at high school and university, but who have forgotten some of the key principles and need a refresher;
- for those who are trained in ecology but looking to improve their scientific skills in English.

The course follows a logical progression from beginning to end; however each chapter stands alone and you can read them in any order.

Each chapter is divided into sub-sections and a list of reading materials and online resources is provided for further study on the topics covered. There is a Quiz to test your knowledge on each chapter, so make sure you read carefully!

We hope you enjoy Ecology Keys and welcome your feedback so we can improve it!



#### **Chapter 1- Introduction to Ecology**

- 1.1 Ecology as a Discipline
- 1.2 History of Ecology
- 1.3 Relevance today
- 1.4 Resources



#### **Chapter 2- The Scientific Method**

- 2.1 Introduction
- 2.2 Defining Research Questions
- 2.3 Formulating Hypotheses
- 2.4 Sampling Design
- 2.5 Collecting Data
- 2.6 Analyses and Interpretation
- 2.7 Write-up
- 2.8 Follow-up
- 2.9 Resources



#### **Chapter 3- Genetics and Evolution**

- 3.1 From molecules to meiosis
- 3.2 Inheritance and variation
- 3.3 Relatedness
- 3.4 Evolution
- 3.5 Take-home messages
- 3.6 Resources



#### **Chapter 4-Adaptations**

- 4.1 Internal Regulation
- 4.2 Adaptive traits
- 4.3 Island Adaptations
- 4.4 Co-adaptation
- 4.5 Resources



#### **Chapter 5- Populations**

- 5.1 Population structure
- 5.2 Population growth
- 5.3 Population genetics
- 5.4 Methods in Population Ecology
- 5.5 Resources



#### **Chapter 6- Behaviour**

- 6.1 Social organisation
- 6.2 Group living and cooperation
- 6.3 Mating systems
- 6.4 Sexual selection
- 6.5 Foraging behaviour
- 6.6 Anti-predator behaviour
- 6.7 Evolutionary Stable Strategies
- 6.8 Plant behaviour
- 6.9 Resources



#### **Chapter 7- Communities**

- 7.1 Community structure
- 7.2 Ecological Niches
- 7.3 Island communities
- 7.4 Ecological Succession
- 7.5 Predator-prey relationships
- 7.6 Competition
- 7.7 Symbiosis
- 7.8 Resources



#### **Chapter 8- Ecosystems**

- 8.1 Energy flow and trophic levels
- 8.2 Ecosystems in context
- 8.3 Water cycling
- 8.4 Biomass and productivity
- 8.5 Nutrient cycling
- 8.6 Ecosystem services
- 8.7 Ecosystem health
- 8.8 Resources



#### **Chapter 9- Human Impacts**

- 9.1 Human impacts in the Pleistocene
- 9.2 The Anthropocene
- 9.3 Human consumption
- 9.4 Habitat and Biodiversity loss
- 9.5 Pollution
- 9.6 Climate change
- 9.7 What can we do?



#### **Chapter 10- Applications**

- 10.1 Science in society
- 10.2 Global Priorities
- 10.3 Stakeholders and beneficiaries
- 10.4 Species conservation
- 10.5 Protected area management
- 10.6 Natural Resource Management
- 10.7 Environmental Restoration
- 10.8 Resources

# Acknowledgements

This course was funded by I-SITE MUSE under the action "Projets Pedagogiques innovants" for the Project "Ecology Keys for EUR MUSE". The project was directed by Dr Arnaud Martin and the course content was prepared and written by Dr Kathryn Jeffery.

Chapter icons from surang, freepik, pretty cons at <a href="https://www.flaticon.com">www.flaticon.com</a>



