

PROGRAM-SPECIFIC COMPETENCIES - BIOLOGY

Competencies are the skills, knowledge and attributes gained through every work, educational, volunteer and life experience.

UVic students in the [Biology](#) program develop the following program-specific competencies. We worked with the Department of Biology to develop this document.

BIOLOGY KNOWLEDGE

Acquires knowledge and skills to obtain a professional position or pursue graduate/professional training in biology

- + Acquires knowledge base of facts about biological diversity of plants and animals including analysis at the levels of genes, cells, organs, individuals, interactions of individuals, populations, and ecosystems
- + Develops an understanding of the principles of genetics and the mechanisms leading to diversity (Mendelian, molecular and population genetics)
- + Uses genetic analysis on a biological problem
- + Applies the principles of evolutionary theory and the mechanisms involved (natural selection) in creating diversity
- + Acquires knowledge about plant and animal structure and function.
- + Integrates an understanding of biological problems at the genetic, molecular, developmental, organismal and ecological levels of analysis
- + Uses knowledge of mathematical, chemical and physical science to understand biology by the concepts and tools used in these disciplines
- + Understands the history of ideas in biology and comprehends the frontiers of knowledge in biology
- + Considers the larger role of biology in society

RESEARCH SKILLS

Understands and uses the principles of the scientific method and the application of experimental techniques to solve specific problems

- + Uses effective literature search strategies and critically evaluates the scientific literature
- + Applies knowledge and understanding to new and emerging concepts
- + Gathers empirical and measurable evidence through observation and experimentation
- + Uses inductive reasoning and deductive methods to develop a testable, falsifiable hypothesis and predict expected results
- + Designs quantitative approaches/experiments to test and evaluate hypothesis
- + Observes and records the results of the research
- + Uses mathematical and statistical methods and analytical tools to evaluate the data
- + Draws conclusions
- + Communicates results and ideas clearly and effectively into scientific reports, papers and oral presentations
- + Demonstrates an excellent level of understanding of the research by proposing future steps required to further the goals of the experiment

FIELD SKILLS

Uses practical and safe techniques to conduct research in the environment

- + Predicts, plan and pack for extended trips
- + Navigates accurately in the environment
- + Sets up camp
- + Cooks, clean and sleep in a remote location
- + Practices safety at all times (animal awareness, weather prediction, good judgment, and problem solving in emergencies)
- + Maintains and operate field equipment (GPS, data loggers, sampling devices)
- + Observes the natural environment
- + Identifies species by parameters (sight, sound, scat, footprint)
- + Handles organisms and collects data (sex, length, weight, height, tissue, blood)
- + Keeps accurate records in the field
- + Conducts proper field sampling protocol(s)
- + Breaks camp with no trace, organizes and re-packs equipment
- + Drives safely (boats, 4W drive, ATVs, snowmobiles) with valid license, as required by laws/regulations

LABORATORY SKILLS

Uses practical and safe techniques within a laboratory setting

- + Uses safe and careful practices at all times
- + Keeps accurate laboratory records
- + Practices good sterile and aseptic techniques
- + Practices good pipetting technique
- + Practices basic skills associated with performing laboratory experiments in biochemistry and microbiology by following standard methods and procedures
- + Takes precise and accurate measurements and gains appreciation of potential sources of error associated with laboratory measurements
- + Troubleshoots and optimizes methods and techniques
- + Develops methods and procedures
- + Analyzes, synthesizes, purifies, modifies and/or characterizes compounds, samples, or devices
- + Uses instrumentation appropriately
- + Calibrates, maintains and troubleshoots instrumentation
- + Gains experience critically evaluating data generated