Biology

Program-specific competencies

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.

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