What competencies do earth and ocean sciences students gain?

Earth and Ocean Sciences

Program-specific competencies

**Competencies** are the skills, knowledge and attributes gained through every work, educational, volunteer and life experience. UVic students in the Earth and Ocean Sciences program develop the following program-specific competencies.

**Earth and ocean sciences**

*Understands the underpinning earth science theory that supports professional scientific practice and applies this to own area of interest*

- Understands the origin and structure of the oceans and atmosphere and the dynamic processes that drive ocean and atmosphere circulation, weather patterns and global climate change
- Examines the internal and external processes that shape the earth and its landscapes, nature of tectonic forces, earthquakes, volcanoes, rocks and minerals and mountain building
- Understands the physical, chemical and biological nature of sediments at sea and on the land
- Explores geometric, kinematic and dynamic analysis of deformation structures in rock bodies
- Applies an understanding of the fundamental principles and concepts of mineralogy and optical mineralogy
- Studies natural hazards including earthquakes, volcanoes, tsunami, landslides, flooding, extreme weather, and meteor impacts
- Explores the scientific basis of current topics and issues affecting the world’s oceans
- Applies understanding of earth science to explore and develop own interests in areas such as Geoscience, Geophysics, Ocean-Atmosphere, Geochemistry, Life on Earth or Ocean Science

**Scientific method**

*Understands and uses the principles of the scientific method*

- Gathers empirical and measurable evidence through observation and experimentation
- Analyzes data, defines research problem and predicts the outcome
- Uses inductive reasoning and deductive methods to formulate testable, falsifiable hypothesis
- Designs an approach/experiment to test and evaluate hypothesis
- Observes and records the results of the research
- Analyzes results using chemistry knowledge and mathematical techniques
- Draws conclusions
- Communicates the results and/or conducts further research

**Computation**

*Develops and uses scientific software to support research endeavors*

- Creates and modifies scientific software
- Utilizes discipline specific software effectively
- Develops and uses computation modeling as a proxy for physical experimentation
- Develops and uses computational methods to analyze large data sets
Field work

*Conducts research in the field*

- Observes behavior/properties of subjects/phenomena of interest in situ
- Makes measurements of the subjects/phenomena or their environment
- Identifies and collects samples for analysis
- Operates and uses equipment/tools/machinery appropriately

Laboratory work

*Utilizes practical and safe techniques within a laboratory setting*

- Takes precise and accurate measurements
- Follows methods and techniques relevant to chemistry
- Develops and optimizes methods and techniques relevant to chemistry
- Analyzes, synthesizes, purifies, modifies and/or characterizes compounds, samples, or devices
- Uses instrumentation appropriately
- Calibrates instrumentation
- Maintains instrumentation
- Troubleshoots instrumentation
- Troubleshoots procedures
- Utilizes safe and careful practices at all times

Education and training

*Instruct co-workers in scientific procedure*

- Teaches scientific concepts and knowledge at a level appropriate to the audience
- Assesses achievement of learning outcomes
- Trains and supervises others to perform scientific/laboratory procedures

*UVic Co-op and Career worked with the School of Earth and Ocean Sciences to develop this competency document.*