

# PROGRAM-SPECIFIC COMPETENCIES - EARTH AND OCEAN SCIENCES

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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. We worked with the Department of Earth and Ocean Sciences to develop this document.

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## 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, tsunamis, 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