

Environmental Chemist

Snapshot Overview

- i** Snapshot Overview provides a quick look at some of the most important aspects of this career.

Job Description

Environmental chemists work to improve environmental health and quality through the study of chemistry. They also investigate environmental contamination and monitor procedures for compliance with government regulations.

Education/Requirements

The minimum requirement for this occupation is a bachelor's degree in chemistry, biochemistry, biology or a related subject. A post-graduate degree in environmental chemistry is recommended. It may be beneficial to complete additional courses in toxicology, ecology, waste treatment, mathematics, and computer science. A doctorate degree is required for research and post-secondary teaching positions. Those with a bachelor's degree may qualify for high school teaching positions.

Specialized training in proper laboratory practices and safety procedures for hazardous chemicals and biological hazards is recommended.

Some consulting and management positions require training in environmental research. Knowledge of current legislation and industrial processes and their impacts is beneficial for most positions.

Working Conditions

Work involves a mix of indoor and outdoor activities. Indoor work takes place in laboratory and office settings and in classrooms. Outdoor work takes place in the field in varying weather conditions. Fieldwork may be performed in remote locations.

Those working at research facilities, industrial plants or hospitals have varying working hours depending on assigned shifts. Fieldwork may involve long hours.

Most duties are performed in a team environment.

Where to Work

- Public organizations and private firms
- Educational institutions
- Federal, provincial/territorial, regional, and civic government departments involved in environmental monitoring and regulations
- Industrial, commercial, and agricultural chemical manufacturers
- Self-employment in the consulting or service industry

Job Duties

i Job Duties describe the activities you will perform in this career.

- Study soil, water, and air samples, hazardous waste, and commercial chemical and product formulations for regulatory compliance or remediation purposes
- Assist with remediation of contaminated sites including extraction and cleanup techniques
- Analyze and interpret data resulting from the use of a wide range of simple and complex analytical instrumentation and techniques
- Conduct research in environmental science and protection including pollution and corrosion control and the impacts of agriculture, petrochemical, and other industries
- Develop and implement monitoring programs to detect and assess the significance of trends in pollution by organic chemicals, including persistence of organic pollutants (POPs)
- Prepare proposals and reports for grant applications and projects
- Prepare and deliver scientific presentations and draft scientific papers for publication.
- Develop new materials for the chemical, pharmaceutical, electronics, metals, food and agriculture and other industries.
- Other types of duties include teaching, marketing, and sales of chemical products and services and assisting in criminal investigations

Career Path

i Career Path provides an overview of how responsibilities and educational requirements progress throughout this career.

Junior Level

A junior level environmental chemist is responsible for performing laboratory procedures for various experiments. Other responsibilities include calibrating and standardizing chemical instruments and assisting with research.

Education/Requirements:

- A bachelor's degree in chemistry, biochemistry, biology or a related subject

A junior level position entails task-oriented knowledge and an ability to function in the local working environment. In the environmental sector, this also implies an awareness of Canadian environmental regulations.

Intermediate Level

The responsibility of an intermediate level environmental chemist advances from performing laboratory procedures to developing monitoring programs that monitor compliance with industry and government standards. Other responsibilities include supervising junior staff, managing "upset conditions" at industrial sites, reporting on monitoring and remediation program results, and publishing research findings.

Further Education/Requirements:

- An intermediate level position requires two to ten years of relevant experience.

An intermediate level position calls for experience in administration and human resources management within a local working environment. Experience in client or stakeholder relations is required, as is familiarity with project management and budgeting. In the environmental sector, this level requires a detailed understanding of Canadian environmental regulations and reporting requirements.

Senior Level

The responsibility of a senior level environmental chemist advances from developing programs to developing, supervising, and evaluating research projects. Other responsibilities include obtaining research funding and assisting with policy and regulation development.


Further Education/Requirements:

- A senior level position requires more than ten years of relevant experience.

Integrated practice and knowledge of Canadian environmental regulations, reporting requirements, standards, and codes of practice are essential in senior level work. A senior level professional must be able to integrate experience, resources, skills, and networks to successfully direct project financing,

future business development, and public relations within a Canadian business context.

Essential Skills

 Essential Skills list some of the soft skills you are encouraged to have for this career.

Research & Analytical

- Data collection, compilation, and analysis
- Observing and recording observations
- Using analytical instruments and techniques to determine presence, quantity, and characterization of constituents

Information Management

- Data classification and cataloguing
- Critical thinking: evaluating data
- Self-learning - assimilating and applying new knowledge

Project Management

- Innovating, designing and developing, concepts, inventions, technologies, etc.
- Developing project/program proposals
- Developing project schedules and budgets
- Dealing with unexpected/critical events (trouble-shooting)
- Implementing Quality Assurance and Quality Control processes
- Assessing/estimating the value, quality and significance of projects

Public Relations

- Interacting within a team environment
- Instructing, training and educating others

Problem-solving

- Recognizing one's own technical limitations and seeking specialists when needed

Written Communication

- Technical or scientific writing

Verbal Communication

- Interpreting and presenting information to suit the target audience

Computer

- Word Processing (MS Word, Word Perfect, etc.)
- Spreadsheet (MS Excel, etc.)
- Presentation design (MS PowerPoint, etc.)
- Internet and e-mail (IE, Netscape, Outlook, Eudora, etc.)

Environmental Competencies

i This is the set of environmental competencies you will likely develop while performing this job.

Sampling and Analytical Work Related to Environmental Activities

- Develop environmental sampling and measuring/monitoring programs and procedures: - determine frequency of sampling - determine optimum locations for installing continuous monitors or taking discreet samples - determine data capture systems - determine procedures to ensure chain of custody - determine quality assurance and quality control methods (QA/QC).
- Process analytical data using appropriate computer software, statistical analysis, databases (etc.) and prepare tables, charts and plans to present results of analysis
- Prepare reports and disseminate analytical results as required through technical reports, scientific journals, oral presentations (communicating for example smog ratings to the community).

Environmental Research

- Define the strategy and objectives for specific environmental research projects and programs.
- Define scope of the environmental research project.
- Develop the framework to test the proposed research model or hypothesis.
- Develop a research action plan (e.g. establish budget, deliverables, timelines and human resource needs).
- Establish and communicate the scientific rationale behind the environmental research project.
- Collect original data for input into research model (e.g. surveys, field samples, lab analysis).
- Conduct literature searches and investigate other sources of existing data.
- Coordinate research activities with scientists and other parties doing similar work within and outside of the organization.

- Analyze research findings, develop and document observations and conclusions.
- Develop recommendations for technological changes or improvements based on research findings.
- Develop communications plan to inform research community about the program (e.g. speak at conferences, seminars, journals, scientific papers)
- Write and disseminate reports on research findings.