EFFECTIVE: JANUARY 2006
CURRICULUM GUIDELINES

A.	Division:	**Academic**	Effective Date:		**January 2006**		
B.	Department / Program Area:	**Science and Technology**	Revision	**X**	New Course		
			If Revision, Sect				

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Course Objectives/Learning Outcomes

Upon completion of this course, the student will be able to:

1. Describe the structure of the Earth's atmosphere and name its various regions.

2. Describe the general chemical composition and the trends in temperature of the various regions of the atmosphere.

3. Outline the composition and chemistry of the stratospheric ozone layer.

22. Discuss the process of aerobic decomposition of organic matter in natural waters.

23. Discuss the process of anaerobic decomposition of organic matter in natural waters.

24. Describe the theory which underlies the measurement of biological oxygen demand (BOD) and chemical oxygen demand (COD) and qualitatively describe how these measurements are made.

25. Discuss the acid-base chemistry of natural waters due to the CO_2/carbonate system and include appropriate chemical equilibrium equations.

26. Discuss the impact of various sources of acidic disposition on the acid-base chemistry of natural waters and various strategies for mitigating this impact.

27. Qualitatively describe the process of acid mine drainage (use appropriate chemical equations) and discuss its impact on natural waters.

28. State the major chemical/biological constituents in Canadian drinking water whose maximum concentrations are controlled.

29. Describe the major source(s) of the drinking water contaminants described above.

30. Describe the various strategies used for purification of Canadian drinking water; include the chemicals involved and thT376

9. Toxic Organic Chemicals in the Environment
   Pesticides and insecticides, organochlorine insecticides: chemistry and environmental impact, other important insecticides, herbicides and wood preservatives: chemistry and the dioxin/difuran, problem, polychlorinated biphenyls (PCBs): chemistry and environmental impact, toxicology of PCBs and dioxins/difurans, polynuclear aromatic hydrocarbons: chemistry and environmental impact, toxic organic waste disposal: issues and case studies.

10. Heavy Metals in the Environment
    Heavy metals: definition, toxicity and bioaccumulation, four heavy metals with significant environmental impact (Hg, Pb, Cd, As): chemistry and environmental impact, heavy metals in soils, sewage and sediments.

Laboratory Content
A selection of labs from the following list will be performed during the laboratory period:

1. Analysis of phosphate in water.
2. Effects of Heavy Metal Ions on Growth of Microorganisms
3. Determination of Nitrate in Water
4. Acidity and Alkalinity in Drinking Water
5. Sampling of NO_x ($NO+NO_2$) and particulates in Air
6. Salts (Ionic Compounds) in Water – Gravimetric Analysis
7. Measurement of Dissolved O_2, BOD and Rate of O_2 Absorption
8. Preparation and Properties of Ozone
9. Detection of Fuel Components by Gas Chromatography
10. Copper and Arsenic in Treated Wood
11. Ion Selective Electrodes
12.

3. Term Project and Field Trips (about 10%)
In consultation with the instructor, each student will choose a term project involving a chemistry related environmental issue. The project will involve literature research, collection and analysis of appropriate samples and preparation (and presentation) of a term paper. Guidelines and requirements for the term project will be distributed by the instructor.

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