

I. COURSE DESCRIPTION:

This course examines six topics of science that are fundamental to an understanding of the role of research and the relationship of biology and chemical interaction to natural resource management. Topics include Science and the Scientific Method, The Hierarchy of Matter, The Species in an Evolutionary Context, The Cell as the Fundamental Unit of Life, Water as a Medium for Life and Chemical Interactions in the Environment.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain and apply the scientific method to natural resource problem solving.

Potential Elements of the Performance:

- distinguish between science and technology
- describe the steps in the scientific method
- using the scientific method demonstrate how you would solve a given natural resource problem
- prepare a technical report to describe the results of a lab analysis of waste recycling at Sault College
- describe the organization and purpose of each section of a technical report

2. Explain the Hierarchy of Matter.

Potential Elements of the Performance:

- show the connectivity and increasing complexity of nature from atomic particles to the total ecosphere
- demonstrate the dependence of all levels of nature on chemical interaction
- show how chemistry, biology and ecology are inter-related through the hierarchy of matter

3. Explain the relationship of species to evolutionary process.

Potential Elements of the Performance:

- describe the various criteria used to determine species status
- explain the basis for classifying living organisms

- categorize select examples of specimens from the field into their respective taxonomic groups
- correctly use the binomial system of classification
- give examples of morphological, anatomical, physiological, behavioral and ecological characteristics used to distinguish species

4. **Demonstrate life as a cellular function.**

Potential Elements of the Performance:

- identify the fundamental components of a living cell and explain their functions
- characterize and provide examples of the 4 basic life molecules: sugars, proteins, lipids and nucleic acids
- explain how cells obtain nutriment
- summarize the processes of photosynthesis, respiration, diffusion, protein synthesis and exchange of genetic information
- demonstrate division of function in multicellular organisms

5. **Explain various characteristics of water as they relate to life systems.**

Potential Elements of the Performance:

- describe various chemical and physical properties of water including: density, viscosity, polarity, surface tension, specific heat, solubility and pH
- determine the dissolved oxygen concentration of water using a titration method
- determine the alkalinity of water using a titration method
- determine the pH of water using a titration method and a pH meter
- explain thermal stratification of lakes and lake turnover

6. **Demonstrate the relationships of chemical interactions to important global environmental issues**

Potential Elements of the Performance:

- explain bio-magnification
- describe the causes for and impacts of the following global environmental problems:
 - i) acid deposition
 - ii) ozone depletion
 - iii) global warming
 - iv) eutrophication
 - v) toxic pollution

7. Develop use of the compound microscope.Potential Elements of the Performance:

- use a compound microscope to observe and draw cellular material
- measure size of microscopic materials
- calculate the scale of drawings
- demonstrate proper care and handling of the microscope

8. Develop safe and correct lab technique with respect to chemical handling and instrument use.Potential Elements of the Performance:

- discuss and apply safe lab procedures including handling of dangerous chemicals
- demonstrate knowledge of the Workplace Hazardous Materials Information System
- demonstrate use of balances, pH metre, glassware including pipettes and burettes, hot plates, fume hoods
- prepare solutions
- conduct titration procedures

III. TOPICS:

1. **Science and the Scientific Method**
2. **The Hierarchy of Matter**
3. **The Species in an Evolutionary Context**
4. **The Cell as the Fundamental Unit of Life**
5. **Water as a Medium for Life**
6. **Chemical Interactions in the Environment**

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Science & Nature Lab Manual, Science & Nature Study Guide, Lab Coat

V. EVALUATION PROCESS/GRADING SYSTEM:

3 Unit Tests	60%
6 Labs	40%
TOTAL	100%

Late lab assignments and report values will be reduced at a rate of 10% per day for a maximum period of 5 days after the due date. After 5 days the lab assignment/report value will be zero.

All lab assignments and reports must be submitted regardless of lateness to pass the course.

Failure to attend a test without medical or severe personal reasons will result in a zero and no opportunity to make up the test will be offered.

Course re-writes are not offered.

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual – Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.	

VI. SPECIAL NOTES:Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.