

Department of Biological Sciences  
Plan for Writing Across the Curriculum  
(For: Biology BA, Biology BS, and Zoology BS)

**Goals:** At the completion of degree requirements, Biology or Zoology graduates will be able to

- **Summarize** in their own words literature that they have read.
- **Synthesize Information** from a number of sources, make judgments about points of agreement and disagreement, and develop hypotheses regarding apparent trends and/or contradictions.
- Understand the **vocabulary of science** (e.g. scientific notation, taxonomic terms, terms for processes, and descriptive adjectives and adverbs for scientific terms) and to use that vocabulary appropriately.
- Write a **detailed protocol**, such as technical instructions for performing an experiment.
- Take accurate and sufficient **field or laboratory notes** on observations in the field or on a planned laboratory sequence such as an experiment.
- Write a **lab report, or technical report**, detailing the **purpose** of an experiment or experiments, **the procedures, the results, and the conclusions** that can be drawn from the experiment.
- **Present data in graphical form** (photographs, tables, graphs, charts, diagrams, models) and correlate the graphical presentation with a narrative discussion of the data, to include comparisons, trends, and processes.
- **Formulate testable hypotheses** regarding biological processes.
- Write a **substantive essay** supporting a particular position or point of view, using scientific facts.
- **Document sources of information** appropriately, including citation of authors of ideas, techniques, and verbal quotes.
- **Assess the scientific value** of articles in newspapers, magazines, books, and scientific journals.

**Objectives:** Each student in the Biology or Zoology major will write frequently as part of their Biology or Zoology coursework, and will receive constructive criticism of their writing, with some opportunity for rewriting earlier drafts.

**A. Behavior: Specific Writing Experiences**

Each student will engage in a variety of writing experiences that include but are not limited to, journal writing, writing reports, taking field notes, writing a review article in which they synthesize information from a number of sources, writing a research article reporting on experiments or research they have carried out, and writing essays in which they present an argument substantiated by scientific evidence.

**B. Conditions:** Students should be provided with examples of the kind of writing expected, such as review articles and research papers and style books or specific instructions for each kind of writing assignment.

**C. Criteria for Writing Experiences:** Each student must take five courses that have a substantive writing component. Each of the five courses must be included in one of the following three types (introductory, writing to learn, and advanced). The total must include one course of type 1 and one of type 3. The remaining courses may be of type 2 or of type 3. At least three courses must be chosen from the list of approved writing courses taught in the Department of Biological Sciences (approved courses listed below). The other two may be chosen from the lists of approved writing courses offered by other departments that have also been approved by the Department of Biological Sciences for Biology and Zoology majors.

**1. Introductory Writing Course:** In this course, students review the basic elements of writing: e.g., sentence structure, subject, verb, independent and dependent clauses. This material might be taught in a course embodying critical thinking skills and, in which logic and critical reading, listening and viewing are emphasized. Students are required to write essays that are critiqued by the instructor and returned with extensive feedback and an opportunity to rewrite for evaluation. The introductory course in the Department of Biological Sciences (BIO 120) currently addresses critical thinking skills in lecture, and students are required to hand in lab reports which introduce and train students in each of the types of writing listed in Goals (above).

**2. Courses Emphasizing Writing to Learn:** These are courses in the major in which students are required to write journals, essays, lab reports, papers and/or argumentative essays, and in which 25% or more of their mastery of the course content is evaluated in terms of their ability to present their knowledge of the material learned in their own written words. The remainder of the evaluation for these courses may be by other means, such as objective exams.

**3. Advanced Level Course:** In this course, students are required to write one of the following: a) a term paper including extensive critical review of the recent literature on a topic (with appropriate citation) or b) a research paper based on the student's own research, in which the literature is critically reviewed, a hypothesis is generated, the student describes materials and methods employed in their research, results (including graphical representation and statistical analysis of their findings if appropriate), discussion of their results, and conclusions. Students are required to write a first draft of their paper that is critiqued by the instructor and returned with extensive feedback and an opportunity to rewrite for a higher grade.

**III. Courses:** Specific courses that would fulfill the writing requirement for the Department of Biological Sciences would fall under three categories:

**A. Level 1—Introductory:** A course embodying critical thinking skills, and a strong writing component [1 required (or evidence of similar experience at a previous college for transfer students, or at another college, with off-campus approval)] Students are required to write essays that are critiqued by the instructor and returned with extensive feedback and an opportunity to rewrite for evaluation.

BIO 120 – Cellular and Molecular Foundations  
BIO 322 – Microscopy and Imaging Techniques

**B. Level 2—Writing to Learn:** Courses in which writing to learn is a substantial component (as described in #2 above), but not necessarily including a term paper: [intermediate level writing courses may also be satisfied by courses that have been approved as writing to learn courses in other departments for any student or from a previous college for transfer students, subject to the approval of the department].

BIO 200 – Human Impacts on the Environment  
BIO 303 – Conservation and Ethical Treatment of Non-Human Primates  
BIO 304 – Insects and People  
BIO 309 – Cellular Physiology  
BIO 310 – Microbiology  
BIO 311 – Ecology of Host-Microbe Interactions  
BIO 316 – Laboratory in Genetics  
BIO 320 – Introductory Ecology  
BIO 324 – Population Biology  
BIO 325 – Behavioral Biology  
BIO 340 – The Plant Kingdom  
BIO 341 – Plants and Society  
BIO 342 – Fungal Biology  
BIO 357 – Plant Systematics  
BIO 358 – Plant Ecology  
BIO 381 – Immunology  
BIO 440 – Developmental Plant Biology  
BIO 460 – Conservation Biology  
BIO 474 – Parasitology  
ZOO 340 – Vertebrate Zoology  
ZOO 360 – Animal Physiology  
ZOO 370 – Comparative Anatomy  
ZOO 373 – Animal Development  
ZOO 384 – Mammalogy  
ZOO 389 – Animal Ecology  
ZOO 405 – Limnology  
ZOO 440 – Ichthyology

**C. Level 3—Intensive Writing:** At least one course in which students are required to write a term paper of 10 or more pages, based on either a review of the scientific literature on a subject, a research project of the student's own design, or both. Students are required to write a first draft of their paper that is critiqued by the instructor and returned with extensive feedback and an opportunity to rewrite for a higher grade.

BIO 399 – Independent Study (with advisor's approval)  
BIO 400 – Ecosystems and Society  
BIO 421 – Winter Ecology  
BIO 425 – Evolution  
BIO 439 – Molecular Biology

BIO 492 – Research

BIO 497 – Senior Honors Thesis

BIO 498 – Internship in Biology (with advisor's approval)

BIO 499 – Independent Study in Biology (with advisor's approval)

ZOO 399 – Independent Study in Biology (with advisor's approval)

ZOO 497 – Problems in Zoology (with advisor's approval)

ZOO 498 - Internship in Zoology (with advisor's approval)