Biology, BS

All biology majors complete a chemistry/mathematics foundation and the biology core. In addition, BS students complete physics foundation courses and choose one of four tracks, while BA students choose courses from several breadth menus and have a wider selection of elective courses.

The department acquaints undergraduate students with the nature of practicing scientists' work by offering BIOL:3994 Introduction to Research (requires a Department of Biology faculty sponsor), BIOL:4898 Communicating Research (a course supporting students involved in research), and BIOL:4999 Honors Research in Biology (requires membership in the Biology Honors Program). Students associate with one of the department's research groups for experiments, discuss current research, study specialized topics, and attend research seminars.

Students interested in field biology, zoology, or botany may take varied courses in those subjects offered during the summer at Iowa Lakeside Laboratory.

Learning Outcomes

Graduates with a bachelor's degree in biology will be able to demonstrate the following.

Foundational Knowledge

Comprehension of fundamental principles and concepts of biology.

Graduates will be able to:

- explain fundamental biological principles within and across levels of organization, from molecules to ecosystem;
- apply foundational knowledge and conceptual frameworks to new situations;
- recognize the consequences of evolutionary history in contrasts between living organisms;
- appreciate the historical sequence and diversity of people who have contributed to the achievements of biological discovery; and
- evaluate new information reported in the news and/or in scientific publications against prior knowledge.

New Discovery

Scientific reasoning and experimental process in biology.

Graduates will be able to:

- perform basic laboratory procedures, including correct operation of devices;
- formulate questions about biological processes based on current knowledge;
- construct a hypothesis to guide experimental inquiry;
- design experiments, identifying variables of analysis and controls for error;
- consider appropriate strategies or technologies applicable to investigate a novel problem;
- collect, organize, summarize, and interpret biological data;
- analyze and evaluate experimental results to inform a hypothesis; and
- distinguish between necessary and sufficient causes.

Quantitative Skills

Mathematical reasoning and basic numeracy applied to biology.

Graduates will be able to:

- perform essential mathematical operations such as unit conversions, dilutions, and molarity calculations;
- apply mathematical concepts and rules of probability to make predictions;
- select and apply appropriate statistical tests to determine the significance of experimental results; and
- use mathematical and/or statistical expressions to evaluate hypotheses with experimental data.

Information Literacy

Acquisition, analysis, and summary of published biological information.

Graduates will be able to:

- locate and evaluate the relevance and credibility of information from electronic and print sources;
- navigate and obtain relevant information from public databases;
- recognize and appropriately cite sources of information;
- identify questions addressed and methodologies used; and
- assess findings reported and conclusions drawn in published scientific articles.

Communication Proficiency

Written and oral presentation of biological information.

Graduates will be able to:

- write concise scientific reports based on findings or literature searches;
- construct visual presentations of results or findings from the scientific literature; and
- orally present findings or results from the literature with appropriate media.