

Goals of the USC Biology Undergraduate Curriculum

By graduation students will:

- 1. Demonstrate a Base of Knowledge**
 - a. Possess a conceptual framework that identifies the relationships between the major domains in the field of biology.
- 2. Demonstrate understanding and use of scientific reasoning and process (students should be able to “think like a scientist”)**
 - a. Identify assumptions
 - b. Create and evaluate hypotheses
 - c. Create abstract models of data
 - d. Design experiments relevant to the questions and models
 - e. Analyze qualitative and quantitative data
 - f. Assess validity of work, identify gaps in knowledge
 - g. Evaluate the results of the analyses and experiments and decide on next step
 - h. Learn from “mistakes” (identify unintended results as opportunities for discovery)
 - i. Learn new concepts and integrate them with current knowledge
- 3. Demonstrate information literacy and technological fluency**
 - a. Locate and evaluate information needed to make decisions, solve problems, design experiments, understand scientific data
 - b. Work effectively with common technologies in biology
 - c. Read primary literature and evaluate validity (on an appropriate level)
 - d. Evaluate and use biological databases (literature and public datasets)
- 4. Effectively communicate within a scientific context**
 - a. Be able to simplify and explain scientific concepts and results of experiments to a non-biologist (requires sufficient understanding to avoid jargon, half-answers, etc.)
 - b. Display and explain scientific results clearly and persuasively to peers both verbally and in writing (includes the ability to graph data appropriately and accurately).
- 5. Demonstrate independent and collaborative learning skills**
 - a. Be able to learn independently and then share that knowledge with others
 - b. Work collaboratively to leverage greater learning than if working alone
- 6. Articulate the Nature of Science and its Interface with other Disciplines**
 - a. Appreciate the role of creativity in science
 - b. Understand the recursive nature of science (how new results continually modify and push forward previous knowledge)
 - c. Be able to explain the role of peer review in science as a quality control mechanism
 - d. Be able to distinguish the normal level of discussion that occurs at the cutting edge of research from true dissent or controversy over the validity of scientific results.

- e. Have a broad appreciation of the interesting questions, state of knowledge in the field of biology (molecular to ecosystems levels of complexity)
- f. Understand the social and natural context of knowledge (role of science in society, influence of society on science)
- g. Be able to debate the ethical implications of science (difference between our abilities and our values).
- h. Develop an appreciation for the history of ideas and the development of the major fields of biology