**Essential Student Outcomes at the End of the Introductory Biology Experience**

**1. Explain how evolution by natural selection accounts for similarities and differences in diversity of life.**

**2. Generate testable hypotheses and design experiments to test them.**

**3. Explain how cells use information to maintain their internal environments and respond to external environments.**

**4. Describe mechanisms and processes of energy flow at different scales**

**5. Explain interactions and synergisms at multiple levels.**

**6. Form a scientific model.**

**7. Test a scientific model.**

**8. Present and interpret data.**

**9. Investigate relevant literature (find and evaluate information).**

**10. Make a scientific agreement with evidentiary support (scientifically appropriate).**

**11. Students can see the relevance of biology to real life.**

**12. Students can interpret data, synthesize ideas and use knowledge (problem-solving/critical thinking)**

**13. Communication skills---oral and written**

**14. Evidence-based decisions making.**

**15. Experience science research process**

**16. Appreciate science in a social context**

**17. Quantitative reasoning**

**18. Well-reasoned and developed science communication skills**

**19. Evolution happens**

**20. Independent Thinkers---get students to figure out answer**

**21. Value learning—make students appreciate and value the “learning” process**

**22. Connect across disciplines---help them get the big picture**

**23. Nature and Process of Science---value evidence critical evaluation**

**24. Evolution as a basic theme**

**25. Conveyance of biological information**

**26. Know about and value biological diversity and commonalities**

**27. Making connections between topics**

**28. Working in teams**

**29. Communicating within discourse of science**

**30. Close correlation between lecture and laboratory components of the course.**

**31. Skills---Quantitative competency, problem-solving skills, critical thinking skills, become independent thinkers, moving across scales, ability to deal or work with scientific representations, communicate science**

**32. Behavior/Affect---appreciate science as an empirical way of knowing, appreciate science in social context, aware of and value biological diversity, value learning/develop life-long learners**

**33. Content---understand evolution by natural selection, information flow through biological systems, connect ideas between science disciplines and biological sub-disciplines.**

**34.  Analyze / interpret data in context of hypothesis or model**

**35. Experimental design - Nature of evidence whether experimental or observational**

**36.  Oral and written communication skills     Scientific argumentation using evidence**

**37. Use / interpret standard forms of presentation of scientific data**

**38. Core understanding of  core principles - evolution, information flow, energy and synthesis and interactions.  Transfer of ideas across specific models or examples**