






BIOL 102 Biology: Current Issues and Applications - Fall 2022





ESSENTIAL SKILLS:


The essential (skills) learning outcomes (ELOs) are considered necessary for the success of students in higher education. While the list is not inclusive of all the skills that employers value, the list represents the most frequently identified qualities supported by research and advocated by the American Association of Colleges and Universities (AAC&U), the Quality Assurance (QA) Commons, and National Association of Colleges and Employers (NACE), among others.

Students in the BIOL 102 lecture course and the **corresponding lab course (BIOL 104)** will participate in activities and be assessed on several of the ELOs. Some ELOs are better addressed in other courses in the Cardinal Core (General Education).

Essential Learning Outcome (ELO)	Class Activity	Assessment Strategy
<p>1. Communicate effectively. Graduates will develop their ability to communicate effectively by listening, weighing influencing factors, and responding accurately and professionally. They will learn to express their thoughts coherently in writing, orally, and in formal presentations.</p> 	<p>Presentations on Human Diseases Associated with Malfunctioning Organelles Students work in groups on an assigned cellular organelle (see also ELO #8). They use PubMed search engine to find review articles related to a genetic disease associated with their organelle (see also ELO#10). Students use a PowerPoint template file to construct their project and examples of past successful projects. Most of the preparation occurs in class. Presentations are presented in a modified-gallery style, where some students travel the room to visit others and some students stay with the projector screen to present.</p> <p>Perusal Articles As a summative assessment, students are assigned scientific articles at the end of each of the four units. They communicate their ideas about the reading and comment on their classmates' posts as well.</p>	<p>The instructor grades the projects based on a rubric the students have received with the template and instructions.</p> <p>Ungraded component - Students peer-evaluate by traveling around the room to hear presenters that had the same organelle, but possibly a different disease. They vote for two favorites with post-it notes. Then they report back to the entire class what they valued in their classmates' presentations compared to their own on the same topic. For example, students that presented on mitochondria also evaluate the other projects about mitochondria. The students that present on lysosomes, evaluate other lysosome-projects and so on.</p> <p>The Perusal grading algorithm is altered to maximize commenting on all pages of the article.</p>
<p>2. Think critically in order to solve problems and create new ideas and solutions. Graduates will develop their ability to think critically by evaluating assumptions and assessing information to make informed conclusions. They will also learn to think creatively by combining ideas in original ways or developing new ways of addressing issues.</p> 	<p>Exploratory Learning Students are given biology "puzzles" without a pre-lecture to the topic. They work in groups but may not use outside resources. Afterwards they receive a lecture explaining the solution to the puzzle.</p> <p>Hypothesis Driven Scientific Inquiry Students develop and test hypotheses in the BIOL 104 laboratory course.</p>	<p>Exploratory learning is followed by a Blackboard reflection questionnaire and an assessment that covers both content knowledge and new application-based problems.</p> <p>Lab reports are graded based on a rubric students receive with assignment instructions.</p>

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<p>3. Apply quantitative reasoning skills to analyze and solve numerical problems. </p> <p>Graduates will hone their ability to provide solutions guided by data and choosing the best methodologies for arriving at informed conclusions.</p>	<p>Antibiotic Resistance Activity Students learn about natural selection by doing a simulated antibiotic resistance activity. They graph and interpret the results. If aberrant results are plotted, students have opportunity to re-plot the data or even repeat the activity (collecting new data). Students then determine the type of selection occurring, i.e. directional, diversifying, or stabilizing.</p> <p>Homeostatic Mechanisms They also analyze figures of homeostatic mechanisms (e.g. reproductive hormone regulation of sperm and egg production).</p>	<p>Worksheets with the graphed data and student interpretations are graded. Follow-up polling questions on similar graphs of natural selection are used to ensure students can interpret multiple graph outputs.</p> <p>Figures of homeostatic mechanisms are assessed qualitatively by students drawing them on whiteboards and they are graded on questions delivered by iClicker.</p>
<p>4. Interact effectively with people from diverse backgrounds. </p> <p>Graduates will reflect on their own cultural identities, appreciate cultural and intellectual differences, and effectively interact with people from diverse backgrounds. They will have multiple opportunities to collaborate, communicate and work respectfully with people with different perspectives, ideas and cultural beliefs.</p>	<p>Active Learning in the BAB Every day students work in groups of 3, 7 or even 9 persons. The tables in the Belknap Academic Building (BAB) facilitate this interaction because students face each other instead of an instructor's podium. Students often have diverse opinions about evolution, biotechnology, and contraceptives. Students learn to work together to problem solve and answer questions for class participation. Students take quizzes both individually and as a team.</p>	<p>Class participation grading by iClicker.</p> <p>Quizzing scores from individual and team rounds are averaged to encourage accountability, i.e. preparation before the quiz.</p>
<p>5. Adapt to changing circumstances while leading and supporting others. </p> <p>Graduates will have learned how to accept change and find effective ways to work and thrive in different settings. They will learn to motivate others in the pursuit of a common goal and to coach others in the pursuit of this goal.</p>	<p>This class is taught with a variety of teaching methods. Students do significant pre-class preparation and do most of the graded work in class. On some days whiteboards are used for drawing homeostatic mechanisms and for other days manipulatives are used for counting. Almost every day multiple forms of technologies are employed, e.g. Blackboard, iClicker, Perusall, and library databases. Some students will experience Wi-Fi drops and other tech glitches. They will have to persevere.</p>	<p>Students adapt to the various lesson plans (scoring is explained in other ELOs and in the Graded Assessments table in the course syllabus).</p> <p>There are numerous "drop grades" to deal with the inevitable technology failures that students will experience. They are used to getting every point in high school and have to learn that 80% is the target minimum score for iClicker to ultimately get 100%.</p> <p>Leading is not assessed in this course, but leaders are rotated in the table groups. Fun ice breakers are used to select a daily leader, e.g. today your table leader is the one with the longest socks. They act a speaker for the table and others are expected to support them by discussing the topics before they are called upon.</p>

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<p>6. Perform professionally within their chosen field of study or occupation. </p> <p>Graduates will have learned the importance of adhering to the code of ethics in their chosen profession and acting with honesty and fairness. They will have many opportunities to prioritize their tasks, manage their time, take initiative, and demonstrate accountability and reliability.</p>	<p>Team quizzes are closed note and require individual preparation accountability. Using outside resources like websites on their phones is prohibited and would constitute academic dishonesty. ELO#4 also discusses team quizzes.</p> <p>Perusall notations (see ELO #1) Are to be written in their own words.</p> <p>PowerPoint presentations (see ELO #1) Are to be original works. Also sources must be cited.</p> <p>Online homework Students watch videos, take notes and answer questions.</p>	<p>Quizzes are proctored.</p> <p>Perusall is monitored by Google search as needed.</p> <p>PowerPoint files are scanned by Turnitin for originality. Students do Indiana University's Plagiarism tutorial as part of this assignment.</p> <p>Students have daily pre-class assignments, which requires time management. These assignments support the active learning (see ELO #4) that happens every day in class.</p>
<p>7. Engage in civic life to improve society. </p> <p>Throughout their college careers, students will learn from opportunities to engage in political, social and other activities to address issues that benefit society.</p>	<p>Citizen Scientists BIOL 102 students contribute to the International Student Carbon Footprint Challenge (ISCFC) database. Students learn about the "Neutral Gator" initiative, where the University of Florida has created carbon offsets for their athletic program. BIOL 104 students contribute to additional databases (e.g. tree data).</p> <p>Students are also introduced to data from the WHO showing vaccine hesitancy is one of the top-ten global health threats. \</p>	<p>Students reflect and report on a Google Doc what new things they can do as individuals to reduce their carbon footprint. Students also visit UofL's Sustainability website and state what projects are being done besides recycling (which they are already aware of).</p> <p>Students are asked in anonymous iClicker polling questions about their plans to take an upcoming vaccine (e.g. flu, covid, etc.)</p>
<p>8. Collaborate and work in teams. </p> <p>Graduates will have had numerous opportunities to collaborate with colleagues, become effective team members, and manage conflict.</p>	<p>Antibiotic Resistance Activity (described in ELO #3 above)</p> <p>Active Learning in the BAB (described in ELO #4 above)</p>	<p>Assessments described with ELO #3 and ELO #4 above.</p>
<p>9. Apply academic knowledge, skills, and abilities to their chosen career. </p> <p>Graduates will be able to articulate and apply the theoretical content of their academic preparation with relevant knowledge and abilities essential to their chosen career.</p>	<p>Discipline specific knowledge benefits pre-Nursing, pre-Dental Hygiene, Exercise Science, Public Health, and other majors.</p>	<p>Quizzes are used to assess content knowledge including the application questions involving new scenarios not previously covered in class.</p>

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<p>10.  Use information for decision making. Graduates will be able to identify, evaluate, and responsibly use information needed for decision making.</p>	<p>Presentations on Human Diseases Associated with Malfunctioning Organelles Students use a database of peer reviewed literature, PubMed (described in ELO#1 above).</p>	<p>Presentations are graded with a rubric. Students must use at least one review article found on PubMed.</p>