

<b>Goal 1 - Students will learn and apply the fundamental principles of biology</b>					
<b>Objective</b>	<b>Outcome</b>	<b>How Outcome is Measured</b>	<b>Measurement Tool</b>	<b>Success Criteria</b>	<b>Data Location</b>
<b>1.1 Students will demonstrate that they understand basic biological principles.</b>	Students' working knowledge of basic principles is assessed through exams, projects, case studies, problem sets and laboratory reports.	BIOL 214L / Exams	Answer keys	70% received C or higher	Faculty files
		BIOL 119L/ Exams, lab reports	Answer keys and rubrics	70% received C or higher	Faculty files
		BIOL 130L Exams/ lab reports	Answer keys and rubrics	70% received C or higher	Faculty files
		BIOL 226L/ Exams	Answer Keys	70% received C or higher	Faculty files
		BIOL 304L / Exams	Answer keys	70% received C or higher	Faculty files
		BIOL 305/ case studies, exams	Answer keys and rubrics	70% received C or higher	Faculty files
		BIOL 309/ Exams	Answer keys	80% received C or higher	Faculty files
		BIOL 310L/ Exams	Answer keys	80% received C or higher	Faculty files
		BIOL 312L/ Case studies and	Answer keys	80% received C or higher	Faculty files

		Exams			
		BIOL 324L / Exams	Answer keys	70% received C or higher	Faculty files
		BIOL 330L / Exams	Answer keys	70% received C or higher	Faculty files
		BIOL 331 / Exams	Answer keys	70% received C or higher	Faculty files
		BIOL 363/ Final paper	Rubric	70% received C or higher	Faculty files
<b>1.2 Students will apply basic biological principles in classroom and lab settings.</b>	Students will use principles learned through courses to make informed conclusions in class discussions and lab activities.	BIOL 214L / Lab activities	Rubric	70% received C or higher	Faculty files
		BIOL 119L/ case studies, lab reports	Rubric	70% received C or higher	Faculty files
		BIOL 130L /case studies, lab reports	Rubric	70% received C or higher	Faculty files
		BIOL 226L / post lab questions			
		BIOL 304L / Lab practicals	Answer key	70% received C or higher	Faculty files
		BIOL 305/ case studies, lab reports	Rubric	70% received C or higher	Faculty files

		BIOL 309 / Questions about primary literature papers.	Rubrics	80% receive C or higher	Faculty files
		BIOL 310L / post- lab questions	answer keys	80% receive C or higher	faculty files
		BIOL 312L lab reports	answer key	80% receive C or higher	faculty files
		BIOL 324L / Lab activities  Current event paper presentations	Rubric	70% received C or higher	Faculty files
		BIOL 330L / Lab practicals	Answer key	70% received C or higher	Faculty files
		BIOL 331 / Current event paper presentations	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Final paper	Rubric	70% received C or higher	Faculty files
		ENVR 340/Exams	Answer key	70% received C or higher	Faculty files

<b>Goal 2 - Students will use the scientific method to understand the natural world.</b>					
<b>Objective</b>	<b>Outcome</b>	<b>How Outcome is Measured</b>	<b>Measurement Tool</b>	<b>Success Criteria</b>	<b>Data Location</b>
<b>2.1 Students will learn to make informed hypotheses about the natural world.</b>	Students will design testable studies in lab activities and term papers.	BIOL 119L/ Hemlock lab report, pillbug lab report	Rubrics	70% received C or higher	Faculty files
		BIOL 130L / photosynthesis/ <i>Daphnia</i> lab report, wildflower lab report	Rubrics	70% received C or higher	Faculty files
		BIOL 305/ lab experiment	Rubric	70% received C or higher	Faculty files
		BIOL 309/ Homework and take home exam questions	Answer Keys and rubrics	70% receive C or higher	Faculty files
		BIOL 312L/ lab projects- CRISPR lab, GMO lab, Protein Evolution Lab	Rubric	70% receive C or higher	Faculty files
		BIOL 324L / Lab activities	Rubric	70% received C or higher	Faculty files

		Independent research projects			
		BIOL 363/ Final paper	Rubric	70% received C or higher	Faculty files
		CHEM 107L Lab Activities	Answer Key	70% received C or higher	Faculty files
		CHEM 108L Lab Activities	Answer Key	70% received C or higher	Faculty files
		CHEM 213L Lab Activities	Answer Key	70% received C or higher	Faculty files
		CHEM 214L Lab Activities	Answer Key	70% received C or higher	Faculty files
		MATH 151	Homework and projects	70% received C or higher	Faculty files
		MATH 251	Homework and projects	70% received C or higher	Faculty files
<b>2.2 Students will execute studies about the natural world.</b>	Students will conduct primary, directed research projects.	BIOL 119L/ Hemlock lab study, pillbug lab study	Rubric	70% received C or higher	Faculty files
		BIOL 130L / photosynthesis/ <i>Daphnia</i> lab, wildflower lab, birding lab	Rubric	70% received C or higher	Faculty files
		BIOL 310L / Independent Project	Rubric	70% received C or higher	Faculty files

		BIOL 312L/ lab projects- CRISPR lab, GMO lab, Protein Evolution Lab	Rubric	80% receive C or higher	Faculty files
		BIOL 324L	Independent research projects	70% received C or higher	Faculty files
		BIOL 363/ final paper	Rubric	70% received C or higher	Faculty files
		CHEM 213L Beta Carotene Isolation Lab Post lab assignment	Key	70% received C or higher	Faculty files
<b>2.3 Students will learn to evaluate data collected about the natural world.</b>	Students will use evaluation techniques (such as statistics) to make an informed conclusion about their collected data.	BIOL 119L / Graveyard lab, other field studies	Rubric	70% received C or higher	Faculty files
		BIOL 130L / Excel lab, other lab studies	Rubric	70% received C or higher	Faculty files
		BIOL 226L / C- Fern lab Biochemical pathway lab	Answer Keys	70% received C or higher	Faculty files
		BIOL 310L / Epidemiology lab	Answer Key	80% received C or higher	Faculty files
		BIOL 312L / lab projects- CRISPR	Rubric	70% received C or higher	Faculty files

		lab, GMO lab, Protein Evolution Lab			
		BIOL 324L / Independent research projects	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Final paper	Rubric	70% received C or higher	Faculty files
		MATH 151 / Homework and projects	Answer keys and rubrics	70% received C or higher	Faculty files
		Math 251 / Homework and projects	Answer keys and rubrics	70% received C or higher	Faculty files

<b>Goal 3 - Students will communicate scientific work in a clear, coherent manner in both written and oral form.</b>					
<b>Objective</b>	<b>Outcome</b>	<b>How Outcome is Measured</b>	<b>Measurement Tool</b>	<b>Success Criteria</b>	<b>Data Location</b>
<b>3.1 Students demonstrate effective written communication.</b>	Students use, evaluate, and appropriately cite the scientific literature to communicate the results of scientific investigations in papers and posters.	BIOL 119L/ lab reports	Rubric	70% received C or higher	Faculty files
		BIOL 130L / lab reports	Rubric	70% received C or higher	Faculty files
		BIOL 304L / Species papers	Rubric	70% received C or higher	Faculty files
		BIOL 309 / Popular Science article	Rubric	70% received C or higher	Faculty files
		BIOL 310L / Independent Project Introduction	Rubric	70% received C or higher	Faculty files
		BIOL 312L / case studies	Answer Keys	70% received C or higher	Faculty files
		BIOL 324L / Literature reviews Research posters	Rubric	70% received C or higher	Faculty files
		BIOL 331 / Topic summaries	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Final paper	Rubric	70% received C or higher	Faculty files
			ENVR 340/Research Paper	Grading Guidelines	70% received C or higher



		CHEM 107L	Answer Key	70% received C or higher	Faculty files
		CHEM 108L	Answer Key	70% received C or higher	Faculty files
		CHEM 213L Lab Reports	Rubric	70% received C or higher	Faculty files
		CHEM 214L Lab Reports	Rubric	70% received C or higher	Faculty files
		BCS 403 / Propositional	Rubric	70% received C or higher	Faculty files
<b>3.2 Students demonstrate effective oral communication.</b>	Students orally present the results of their scientific studies to their peers and the public.	BIOL 214L / History presentation	Rubric	70% received C or higher	Faculty files
		BIOL 119L/ Hemlock presentations	Rubric	70% received C or higher	Faculty files
		BIOL 130L / Great Phylum Day presentations	Rubric	70% received C or higher	Faculty files
		BIOL 304L / Species presentations	Rubric	70% received C or higher	Faculty files
		BIOL 310L / Group presentation	Rubric	70% received C or higher	Faculty files
		BIOL 331 / Topics presentations	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Poster presentations	Rubric	70% received C or higher	Faculty files

		ENVR 340/Oral presentations on research paper topics	Grading Guidelines	70% received C or higher	Faculty files
		CHEM 214L Presentations on independent projects	Rubric	70% received C or higher	Faculty files
		BCS 403 / Propositional	Rubric	70% received C or higher	Faculty files

<b>Goal 4 - Students will understand the importance of diversity in the practice of science through collaborative learning where different perspectives are valued and evaluated.</b>					
<b>Objective</b>	<b>Outcome</b>	<b>How Outcome is Measured</b>	<b>Measurement Tool</b>	<b>Success Criteria</b>	<b>Data Location</b>
<b>4.1 Students learn to recognize and to appreciate the diversity of the natural world and the interconnectedness of disciplinary approaches towards studying it.</b>	Students work in groups, allowing them to appreciate the importance of different perspectives and ideas to solving scientific problems.	BIOL 214L	Lab activities	70% received C or higher	Faculty files
		BIOL 119L/ Hemlock lab study	Rubric	70% received C or higher	Faculty files
		BIOL 130L / Photosynthesis study	Rubric	70% received C or higher	Faculty files
		BIOL 226L F2 corn lab, Biochemical pathway lab, Mitosis lab	Answer Keys	70% received C or higher	Faculty files
		BIOL 304L	NA		
		BIOL 305/ Plant collections	Group project rubric	70% received C or higher	Faculty files
		BIOL 309 Journal club - small group discussions	Participation and quality of class discussions on primary literature	All students participate in 80% of discussions	Faculty files
		BIOL 310L all labs- students	rubric	70% received C or higher	Faculty files

		work in pairs			
		BIOL 312L All labs- student work in pairs	rubric	70% received C or higher	Faculty files
		CHEM 107L			
		CHEM 108L			
		CHEM 213L			
		CHEM 214L			
<b>4.2 Students learn about the biodiversity of the natural world.</b>	Students work to identify the species, populations and communities found in various ecosystems.	BIOL 119L/ all field activities and in class case studies		70% received C or higher	Faculty files
		BIOL 130L / Great phylum collection	Rubric	70% received C or higher	Faculty files
		BIOL 304L / Species papers	Rubric	70% received C or higher	Faculty files
		BIOL 305/ Plant collection project	Rubric	70% received C or higher	Faculty files
		BIOL 310L Diversity homework assignments, Microbes all around us lab, Unknown bacteria identification	Rubric and Answer Keys	70% received C or higher	Faculty files

		BIOL 324L / Zoo project	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Research projects	Rubric	70% received C or higher	Faculty files

<b>Goal 5 - Students will think critically and quantitatively about global issues, including the ethics of science, the use and appropriateness of new technologies, and their role as global citizens.</b>					
<b>Objective</b>	<b>Outcome</b>	<b>How Outcome is Measured</b>	<b>Measurement Tool</b>	<b>Success Criteria</b>	<b>Data Location</b>
<b>5.1 Students will demonstrate the ability to analyze ethical considerations in their work.</b>	Students consider the ethics of science in society through case studies and real world scenarios that explore different ethical viewpoints.	BIOL 119L / Ethics in Ecology Reading	Rubric (not yet developed)	70% received C or higher	Faculty files
		BIOL 226L Haitian cholera case study, ethical issue written assignment	Rubrics	70% received C or higher	Faculty files
		BIOL 305/ Natural History article	Summary	70% received C or higher	Faculty files
		BIOL 310L Designer virus post-lab	Answer Key	70% received C or higher	Faculty files
		BIOL 312L CRISPR and GMO ethics exercises.	rubric	70% received C or higher	Faculty files
		BIOL 324L / Zoo project	Rubric	70% received C or higher	Faculty files

		BIOL 331 / Current events presentations	Rubric	70% received C or higher	Faculty files
		Topics presentations			
		BIOL 214L / History presentations	Rubric	70% received C or higher	Faculty files
<b>5.2 Students will learn new technologies and how they can be applied.</b>	Students work with new technologies in lab, analyze their use in term papers, and discuss their usefulness in senior seminar.	BIOL 226L Genotyping lab, Bioinformatics lab	Answer Key	70% received C or higher	Faculty files
		BIOL 310L EnteroPluri Lab	Answer Key	70% received C or higher	Faculty files
		BIOL 312L CRISPR Lab, Protein Evolution and the Western Blot Lab	Rubric	70% received C or higher	Faculty files
		BIOL 331 / Current event presentations	Rubric	70% received C or higher	Faculty files
		BIOL 363/ Field based research	Rubric	70% received C or higher	Faculty files
<b>5.3 Students will learn explore their role as</b>	Students are professional in	ENVR 340/Field Trips to Farms	Graded Participation	70% received C or higher	Faculty files

<b>scientists in society.</b>	their career explorations during internships where they are mindful that they are representing Wells College in society.				
		BCS 290/390/ Reflection essay and poster presentation	Supervisor evaluation	80% received S	Faculty files