

<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 114L / 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 114L / 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			
		BIOL 304L / Lab practicals	Answer key	70% received C or higher	Faculty files
		BIOL 305/ case	Rubric	70% received C or	Faculty files

		studies, lab reports		higher	
		BIOL 309 1. presentation on cellular basis of disease 2. Class Discussions of primary literature papers.	1. grading rubric 2. Participation and quality of class discussions on primary literature.	80% receive C or higher	Faculty files
		BIOL 310L lab reports	answer key	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	Rubric	70% received C or higher	Faculty files

		paper presentations			
		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 lab report, wildflower lab report	Rubrics	70% received C or higher	Faculty files
		BIOL 226L Dihybrid Lab, RNAi Lab	Rubrics	70% received C or higher	Faculty files
		BIOL 305/ lab experiment	Rubric	70% received C or higher	Faculty files
		BIOL 310L/ lab activities- antibiotic testing	Answer key	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 /	Rubric	70% received C or	Faculty files

		Lab activities		higher	
		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 lab, wildflower lab	Rubric	70% received C or higher	Faculty files
		BIOL 226L Dihybrid lab,	Rubric	70% received C or higher	Faculty files

		Serratia lab, RNAi Lab			
		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 Dihybrid Lab, Forensic Lab	Rubric	70% received C or higher	Faculty files

		BIOL 310L Antibiotic testing lab	Answer Key	80% received C or higher	Faculty files
		BIOL 312L- lab projects- CRISPR lab, GMO lab, Protein Evolution Lab	Rubric	70% received C or higher	Faculty files
		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 226L lab reports	Rubric	70% received C or higher	Faculty files
		BIOL 304L / Species papers	Rubric	70% received C or higher	Faculty files
		BIOL 309 / cellular basis of disease posters and class discussions	Rubric, evaluation of discussion participation of quality	70% received C or higher	Faculty files
		BIOL 310L / disease reports	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	Rubric	70% received C or higher	Faculty files
		Research posters			
		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	Faculty files
		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 114L / 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 309 / poster presentations	rubric	70% received C or higher	Faculty files

		BIOL 310L / research paper presentations; microbes in the news presentations	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 114L	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 / Dybrid lab, Serratia, Lab, Forensics lab, RNAi Lab	Rubric	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 Cellular basis of disease posters	rubric	70% received C or higher	Faculty files
		BIOL 310L all labs- students work in pairs	rubric	70% received C or higher	Faculty files

		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 Micro Life Lab project	rubric	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 114L / History presentations	Rubric	70% received C or higher	Faculty files
		BIOL 226L Cloning essay; genetic counseling exercise	rubric	70% received C or higher	Faculty files
		BIOL 305/ Natural History article	Summary	70% received C or higher	Faculty files
		BIOL 310L Microbes in the news presentation	NA	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	Rubric	70% received C or higher	Faculty files

		presentations			
		Topics presentations			
		CHEM 107L			
		CHEM 108L			
<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 RNAi lab, Forensics Lab	rubric	70% received C or higher	Faculty files
		BIOL 310L Enterotube 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
		CHEM 107L			
		CHEM 108L			
		CHEM 213L			
		CHEM 214L			

<b>5.3 Students will learn explore their role as scientists in society.</b>	Students are professional in their career explorations during internships where they are mindful that they are representing Wells College in society.	ENVR 340/Field Trips to Farms	Graded Participation	70% received C or higher	Faculty files
		BCS 290/390/Reflection essay and poster presentation	Supervisor evaluation	80% received S	Faculty files