

**Biology Department Assessment of GE learning outcomes  
in PLNU General Education lab courses (BIO 101, 103, 105, 130, 210 & 211)  
2014-2015**

**Learning Outcomes:**

*GELO 1a. Written: Students will be able to effectively express ideas and information to others through written communication.*

*GELO 1d. Critical Thinking: Students will be able to examine, critique and synthesize information in order to arrive at reasoned conclusions. (This GELO is the “assigned” GELO to be assessed by these courses.)*

*GELO 1e. Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature.*

**Outcome Measure:**

BIO 101, 103, 105, 210, 211 Signature Assignment: Individual Lab report (each year)

BIO 130 Signature Assignment: Motor unit activity (each year)

**Criteria for Success (if applicable):**

70% of students will score at “developed” or higher on rubric

**Longitudinal Data:**

Semester	Course	N	% of students achieving “developed” or higher on written skills	% of students achieving “developed” or higher on critical thinking	% of students achieving “developed” or higher on quantitative reasoning
Fall 2014	101	33	85%	71%	75%
Fall 2014	103	43	62%	79%	69%
Fall 2014	105	36	67%*		
Fall 2014	130	171	ND	34%	ND
Fall 2014	210	72	76%	61%	59%
Fall 2014	211	38	83%	80%	83%
Spring 2015	101	34	92%	80%	83%
Spring 2015	103	35	83%	68%	83%
Spring 2015	105	13/6	66% (n=6)	83% (n=13)	30% (n=6)
Spring 2015	210	64	84%	71%	67%
Spring 2015	211	44	79%*		

\*Data reported was cumulative, not broken down by specific GELO

ND= No data collected

Shading indicates below criterion (orange = slightly below, red = far below)

**Conclusions Drawn from Data:**

For most groups, the criterion of 70% at or above “developed” was met or nearly met, however students tended to perform less well on critical thinking and quantitative reasoning than on written skills. Differences between students in the same class (i.e. Fall vs Spring BIO 210), but in different semesters, is worth extra consideration.

**Changes to be Made Based on Data:**

- 1) Because there are so many instructors and TA’s involved in assessing the students’ work, we need to make sure that there is some training on the rubric each year so that we can be confident in the results across the department. Minimal rubric training was done this year.
- 2) Have all instructors enter rubric data on Live Text via Canvas so that reports can be run easily.
- 3) BIO 210 instructors could link the students’ major with the rubric results so that we could determine possibly interesting differences in performance of exercise science majors vs. biology majors, etc. This data was not collected this year.
- 4) The poor performance by BIO 130 students in critical thinking and the 105 students in quantitative reasoning will need to be investigated further to determine if these are real areas for improvement, or if there is some kind of disconnect between the signature assignment, the rubric, and the use of the rubric.

**Rubric used:**

Appendix A for BIO 101, 103, 105, 210, and 211

Appendix B for BIO 130

**Biology Department Assessment of GE learning outcomes  
in PLNU General Education non-lab courses (BIO 102 and 104)  
2014-2015**

**Learning Outcomes:**

GELO 1a. Written: Students will be able to effectively express ideas and information to others through written communication.

GELO 1c. Information Literacy: Students will be able to access and cite information as well as evaluate the logic, validity, and relevance of information from a variety of sources.

**Outcome Measure:**

BIO 102 and 104 Signature Assignment: Research paper (each year)

**Criteria for Success (if applicable):**

70% of students will score at “developed” or higher on rubric

**Longitudinal Data:**

Semester	Course number	N	% of students achieving “developed” or higher on written skills	% of students achieving “developed” or higher on Information literacy
Fall 2014	102	19	79%	47%
Spring 2015	104	31	77%	77%

Shading indicates below criterion (orange = slightly below, red = far below)

**Conclusions Drawn from Data:**

Student performance met the stated criteria for written skills, however, students in BIO 102 were far below the criteria for information literacy.

**Changes to be Made Based on Data:**

No change to program regarding written skills.

The poor performance by BIO 102 students in Information Literacy will need to be investigated further to determine if this is a real area for improvement, or if there is some kind of disconnect between the signature assignment, the rubric, and the use of the rubric since this was the first time that the rubric was used.

**Rubric used: Appendix C**



## APPENDIX A

**Rubric for lab reports completed in PLNU General Education lab courses (BIO 101, 103, 105, 210, and 211) for assessment of GELO's 1a, 1d, and 1e:**

*GELO 1a. Written: Students will be able to effectively express ideas and information to others through written communication.*

*GELO 1d. Critical Thinking: Students will be able to examine, critique and synthesize information in order to arrive at reasoned conclusions.*

*GELO 1e. Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature.*

Component	Initial	Emerging	Developed	Highly Developed
<b>Introduction and hypothesis (Written)</b>	<ul style="list-style-type: none"> <li>No indication of purpose of the research</li> <li>Provides no background information</li> <li>Hypothesis is missing</li> </ul>	<ul style="list-style-type: none"> <li>Some indication of purpose of the research</li> <li>Provides some background information, but some is inaccurate or irrelevant</li> <li>Provides the hypothesis, but the hypothesis is unclear /confusing</li> </ul>	<ul style="list-style-type: none"> <li>Clearly articulates the purpose of the research</li> <li>Provides some accurate and relevant background information</li> <li>Clearly identifies the hypothesis</li> </ul>	<ul style="list-style-type: none"> <li>Clearly articulates the purpose of the research, beyond the narrow topic</li> <li>Provides excellent background information</li> <li>Clearly identifies the hypothesis and makes a prediction</li> </ul>
<b>Methods and Materials</b>	<ul style="list-style-type: none"> <li>Methods are unclear and incomplete and materials are not sufficiently identified</li> <li>No variables correctly identified</li> </ul>	<ul style="list-style-type: none"> <li>Methods are basically explained, but incomplete with some materials not included</li> <li>Some variables correctly identified</li> </ul>	<ul style="list-style-type: none"> <li>Explains methods and materials, but missing some details</li> <li>Most variables correctly identified</li> </ul>	<ul style="list-style-type: none"> <li>Clearly and completely explains methods and materials</li> <li>All variables correctly identified</li> </ul>
<b>Results (Quantitative reasoning)</b>	<ul style="list-style-type: none"> <li>Graphs and tables are poorly/inaccurately done</li> <li>No mention of tables/graphs in text</li> <li>Many opinion statements</li> </ul>	<ul style="list-style-type: none"> <li>Graphs and tables are inaccurate/missing labels with some errors</li> <li>Summarizes tables and graphs in text</li> <li>No clear reference to specific tables/graphs in text</li> <li>Obvious opinion statements</li> </ul>	<ul style="list-style-type: none"> <li>Graphs and tables are adequate but some labels/titles missing</li> <li>Generally accurately summarizes the tables and graphs in text</li> <li>Clear reference to some tables/graphs in the text</li> <li>Some opinion statements</li> </ul>	<ul style="list-style-type: none"> <li>Graphs and tables are well done and accurately labeled and titled</li> <li>Accurately summarizes the tables and graphs in text</li> <li>Clear reference to all tables/graphs in the text</li> <li>No opinion statements</li> </ul>
<b>Conclusion(s) (Critical thinking)</b>	<ul style="list-style-type: none"> <li>Fails to identify conclusions, or conclusion is a simplistic summary with no connection to original hypothesis</li> <li>No mention of problems with the study</li> <li>No consideration of future research</li> </ul>	<ul style="list-style-type: none"> <li>Identifies conclusions and refers to some specific pieces of evidence, but no connection to original hypothesis</li> <li>Minimal consideration of problems with the study</li> <li>Minimal mention of future research</li> </ul>	<ul style="list-style-type: none"> <li>Clearly links evidence with the conclusion</li> <li>Some consideration of problems with the study</li> <li>Some mention of possible future research</li> </ul>	<ul style="list-style-type: none"> <li>Clearly links evidence with the conclusion and the original hypothesis</li> <li>Thorough consideration of problems with the study</li> <li>Several ideas for possible future research</li> </ul>
<b>Writing quality (Written)</b>	<ul style="list-style-type: none"> <li>No sections labeled</li> <li>Simplistic and/or unclear writing</li> <li>Consistent use of present or future tense</li> <li>Many errors</li> </ul>	<ul style="list-style-type: none"> <li>Some sections clearly labeled</li> <li>Unclear writing</li> <li>Mostly uses present or future tense</li> <li>Some errors</li> </ul>	<ul style="list-style-type: none"> <li>Most sections clearly labeled</li> <li>Clear writing</li> <li>Sometimes uses past tense</li> <li>Few errors</li> </ul>	<ul style="list-style-type: none"> <li>All sections clearly labeled</li> <li>Clear and sophisticated writing using advanced vocabulary; enjoyable to read</li> <li>Consistently uses past tense</li> <li>No errors</li> </ul>

## APPENDIX B

**Rubric for short answer question completed in PLNU General Education lab course (BIO 130) for assessment of GELO 1d:**

*GELO 1d. Critical Thinking: Students will be able to examine, critique and synthesize information in order to arrive at reasoned conclusions.*

GELO	Initial	Emerging	Developed	Highly Developed
<b>Critical thinking</b>	Answer to one of the questions is partially factually accurate	Answer to both questions is factually accurate, but student doesn't demonstrate the ability to apply knowledge to a new situation	Answer to both questions is factually accurate and student demonstrates some ability to apply knowledge to a new situation	Answer to both questions is factually accurate and student demonstrates full ability to apply knowledge to a new situation.

## APPENDIX C

**Rubric for lab reports completed in PLNU General Education non-lab biology courses (BIO 102, 104) for assessment of GELO's 1a and 1c:**

GELO 1a. Written: Students will be able to effectively express ideas and information to others through written communication.

GELO 1c. Information Literacy: Students will be able to access and cite information as well as evaluate the logic, validity, and relevance of information from a variety of sources.

Component	Initial	Emerging	Developed	Highly Developed
<b>Effective and responsible use of information from a variety of sources (INFO LITERACY)</b>	<ul style="list-style-type: none"> <li>• Inadequate number of sources</li> <li>• No variety of sources</li> <li>• No sources appropriately paraphrased</li> </ul>	<ul style="list-style-type: none"> <li>• Low number of sources</li> <li>• Minimal variety of sources</li> <li>• Some sources appropriately paraphrased, but many verbatim quotes</li> </ul>	<ul style="list-style-type: none"> <li>• Sufficient number of sources</li> <li>• Adequate variety of sources</li> <li>• Most sources appropriately paraphrased, not quoted verbatim</li> </ul>	<ul style="list-style-type: none"> <li>• High number of sources</li> <li>• Excellent variety of sources</li> <li>• All sources appropriately paraphrased, not quoted verbatim</li> </ul>
<b>Citation of sources (INFO LITERACY)</b>	<ul style="list-style-type: none"> <li>• No statements in paper supported by in-text statements.</li> <li>• No references cited in consistent citation style</li> <li>• Many errors</li> </ul>	<ul style="list-style-type: none"> <li>• Some statements in paper supported by in-text statements</li> <li>• Some references cited in consistent citation style</li> <li>• Some errors</li> </ul>	<ul style="list-style-type: none"> <li>• Many statement sin paper well supported by in-text citations</li> <li>• Most references cited in consistent citation style with no errors</li> <li>• Few errors</li> </ul>	<ul style="list-style-type: none"> <li>• All statements in paper well supported by in-text citations</li> <li>• All references cited in consistent citation style</li> <li>• No errors</li> </ul>

<b>Organization of paper (WRITTEN)</b>	<ul style="list-style-type: none"> <li>• No indication of purpose/thesis of the paper</li> <li>• Most of paper appears to be based on opinion</li> </ul>	<ul style="list-style-type: none"> <li>• Some indication of purpose/thesis of the paper</li> <li>• Purpose/thesis of paper is far too broad or narrow</li> <li>• Much of paper appears to be based on opinion</li> </ul>	<ul style="list-style-type: none"> <li>• Purpose/thesis of the paper stated but not clear</li> <li>• Purpose/thesis of paper is slightly too broad or narrow</li> <li>• Some opinion stated without clear identification as opinion</li> </ul>	<ul style="list-style-type: none"> <li>• Clearly articulates the purpose/thesis of the paper</li> <li>• Purpose/thesis of paper is concise and focused</li> <li>• No opinion stated, or clearly identified as opinion</li> </ul>
<b>Writing quality (WRITTEN)</b>	<ul style="list-style-type: none"> <li>• Simplistic and/or unclear writing</li> <li>• Many grammatical or spelling errors</li> </ul>	<ul style="list-style-type: none"> <li>• Unclear writing</li> <li>• Some grammatical or spelling errors</li> </ul>	<ul style="list-style-type: none"> <li>• Clear writing</li> <li>• Few grammatical or spelling errors</li> </ul>	<ul style="list-style-type: none"> <li>• Clear and sophisticated writing using advanced vocabulary; enjoyable to read</li> <li>• No grammatical or spelling errors</li> </ul>
<b>Use of course content</b>	<ul style="list-style-type: none"> <li>• No use of course content in paper</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate use of course content in paper</li> <li>• Inaccurate use of course content in paper</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate use of course content in paper</li> <li>• Mostly accurate use of course content in paper with few errors</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive use of course content in paper</li> <li>• Accurate use of course content in paper with no errors</li> </ul>