SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program Name (no acronyms): Neuroscience	Department: Biology/Psychology Interdisciplinary
Degree or Certificate Level: B.S.	College/School: Arts & Sciences
Date (Month/Year): September 2022	Assessment Contact: Judy Ogilvie/Tony Buchanan
In what year was the data upon which this report is based collected? 2021-22	
In what year was the program's assessment plan most recently reviewed/updated? 2021	

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

3. Students will be able to communicate neuroscientific information in a clear, reasoned manner, both verbally and in writing.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe and identify the course(s) in which these artifacts were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

Our assessment plan calls for collecting information from three sources to assess Learning Outcome #3:

- NEUR 3550: Neuroscience Lab: Two sections of this lab course were taught in Fall 2021 with 23 students per section, 46 total. The course is required for all Neuroscience majors, usually taken in their junior year. One student was a Biology major; their in-class presentation data was included in the analysis since they were a member of a group with 3 Neuroscience majors. Dr. Alaina Baker-Nigh collected data and artifacts from this course that included written papers and oral presentations.
- NEUR 4900: Neuroscience Seminar: One section of this course was taught in Fall 2021 and three sections in Spring 2022 with approximately 13 students in each section, 51 total. All students were Neuroscience majors in their Senior year. Dr. Judy Ogilvie collected data and artifacts from this course that included written papers and oral presentations.
- Senior survey: students were asked a series of self-assessment questions about how much they gained in their ability to communicate about neuroscience, both in oral and written form.

The courses were taught in person in the Saint Louis campus only. Madrid courses are not applicable to this assessment report.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (do not just refer to the assessment plan).

Both direct (rubrics for class assignments; see attached assignments and rubrics) and indirect (self-assessment via survey) assessment methods were used.

For NEUR 3550 Neuroscience Lab: Students performed an independent project and gave a presentation on their results. The instructor, Dr. Baker-Nigh, developed a rubric to assess student performance (see attached). Dr. Baker-Nigh collected, assembled, and analyzed the data. Students in both sections had the same instructor and were given the same assignment so results were combined.

Three rubric categories ("Procedure," "Data Presentation," and "Conclusions & Future Directions") were identified as most relevant to Program Learning Outcome #3. Results from the 12 student lab groups were averaged to assess competency. The "Procedure" category assessed experimental design, as students described the original experiments

they had carried out in each independent project. The "Data Presentation" category assessed hypothesis formulation as well as research engagement, as students stated the hypothesis that their experiment was designed to test and then described and interpreted the results of each project. The "Conclusions & Future Directions" category assessed experimental design, as students described original follow-up experiments that could be conducted in response to each project's results.

For NEUR 4900 Neuroscience Seminar: Two specific assignments, one written reflection and one oral presentation, related to this learning outcome. The instructor, Dr. Ogilvie, developed a rubric to assess student performance for each assignment (see attached). Dr. Ogilvie collected, assembled, and analyzed the data. Students in all sections had the same instructor and were given the same assignment so results were combined.

For the Senior Survey: Students were asked for self-assessment about their gain of skills. They were also asked which courses were most beneficial for attaining the specified skills. A link to the Senior Survey was posted in the Canvas course site for NEUR 4900 prior to the last class period in the Spring term. Before the conclusion of the last class period, the instructor explained the importance of the survey, allowed class time for students to complete the survey. Fall term students were contacted by email with the link to the survey; spring term students were sent a reminder via email in case they did not complete the survey during class. Drs. Buchanan and Ogilvie were involved in writing the survey questions, collecting the data, and analysis. The questions used for this assessment are attached.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

For NEUR 3550: Assessment is based on group presentations following two experimental modules in which each student lab group formulates independent experiments. The first involves cell culture neurite growth, while the second examines behavior and physiological responses in crayfish. Students worked in groups of 3-4. Student performance was assessed based on the attached rubric. Scores were based on student presentation of laboratory procedures and data, as well as on organization, grammar, accuracy, and overall quality.

Group performance on the selected rubric items averaged across both experiments was between 87% and 99%, with a class average and median score of 93% (see Table 1 for additional details). Scores presented below are normalized to the point value of each category within the rubric, where a value of 1.0 represents 100% of available points scored. Average and median scores among the 24 student presentations evaluated (6 groups, 2 presentations per group) as well as the range from low to high scores for each rubric category are shown, and total scores within groups (representing summed scores across both presentations for 12 groups) below.

Table 1	**Combined presentations rubric items**			
Scores (n=24)	**Procedure**	**Data Presentation**	**Conclusions/ Future Directions**	
Average	0.99	0.88	0.92	
Median	1.00	0.90	0.93	
Range	0.95-1.00	0.75-1.0	0.60-1.00	
Standard Deviation	0.38	1.79	1.47	
Group totals (n=12)	**Procedure**	**Data Presentation**	**Conclusions/Future Directions**	***Total***
Average	0.99	0.88	0.92	*0.93*
Median	1.00	0.88	0.93	*0.93*
Range	0.98-1.00	0.78-0.98	0.80-1.00	
Standard Deviation	0.49	2.60	2.07	*4.60*

Table 2 below shows the average, median, and ranges of scores for the two presentations separately, and then a

comparison showing the difference in scores between presentation 1 and presentation 2.

Table 2	Presentation 1: Cell Culture		
Score (n=12)	**Procedure**	**Data Presentation**	**Conclusions/ Future Directions**
Average	0.99	0.86	0.90
Median	1.00	0.88	0.93
Range	0.95-1.00	0.75-1.00	0.60-1.00
	Presentation 2: Crayfish		
Score (n=12)	**Procedure**	**Data Presentation**	**Conclusions/ Future Directions**
Average	1.00	0.90	0.93
Median	1.00	0.90	1.00
Range	0.95-1.00	0.75-1.00	0.73-100
	Improvement		
Score (n=12)	**Procedure**	**Data Presentation**	**Conclusions/ Future Directions**
Average	+0.01	+0.04	+0.03
Median	+0.00	+0.03	+0.07

Since the students complete two presentations within the semester, the "Improvement" section of Table 2 above indicates that student performance was scored as more proficient for the second presentation compared to the first. This was particularly notable in the "Conclusions/Future Directions" rubric item, which requires the most critical thinking among these categories, as it encompasses interpretation of results as well as hypothesis generation for the next logical experiments based on the data gathered. Note that the scores for the "Procedure" item were high (scoring ranges of 95-100% for both presentations) so minimal (average 1%) improvement in this area may be attributable to a ceiling effect. Junior and senior Neuroscience majors enrolled in the course appear to be already proficient in this area, and while description of experimental procedures requires effective communication of the details of the work carried out, it entails less critical thinking and analysis than the other two items.

For NEUR 4900 Neuroscience Seminar: Two assignments were assessed. First, all students gave an individual oral presentation on a current topic in Neuroscience. Specifically, students identified a neuroscientific study reported in the popular press, compared it to the original research publication, and presented both the research and their critical analysis of the different presentations of the information. A rubric (attached) was used to assess student presentations with an overall ranking of 4.79 ± 0.17 on a five-point scale (5 = distinguished, 4 = proficient, 3 = developing, 1/2 = novice/unacceptable). This was broken down to 4.77 ± 0.19 for presentation content and 4.82 ± 0.16 for preparation and delivery. Individually, 100% of students achieved proficiency (defined as 3.75 or 75% on this scale) with the lowest score at 4.375.

The focus of the written assignment was a 4-5-page reflection on how the diverse electives for the Neuroscience major relate to the core concepts of neuroscience, with each student focusing on their own elective choices. Students submitted a first draft to a small group of classmates for peer review. Peer review comments and the writer's responses were submitted with the final paper. Only the final reflection was used for this assessment as that was determined to be the appropriate measure of each student's written communication skills. A rubric (attached) assessed papers on clarity, interconnection, relevance, and analysis on the same five-point scale used for presentations. Students average score was 4.90 ± 0.08. Individually, 100% of students achieved proficiency (defined as 3.75 or 75% on this scale) with the lowest score at 4.5.

For the Senior Survey: Self-assessment questions from the senior survey asked how much students gained in oral and written communication ability from their coursework and laboratory experience (see Table 3 for details). Thirty-nine of the 51 graduating students completed the survey in 2022.

2022 senior survey results:

Verbal/oral communication: 100% of graduating Neuroscience majors reported some gain in their ability to **verbally** communicate neuroscientific information in a clear, reasoned manner. Specifically, the majority of students (56%) reported a large or very large gain in their ability to verbally communicate neuroscientific information in a clear, reasoned manner, with 21% reporting moderate and 3% (1 student) reporting a small or no gain in communication ability.

Written communication: 100% of graduating Neuroscience majors reported some gain in their ability to communicate neuroscientific information in a clear, reasoned manner in **written** form. Specifically, the majority of students (70%) reported a large or very large gain in their ability to verbally communicate neuroscientific information in a clear, reasoned manner, with 25% reporting moderate and 5% reporting a small or no gain in communication ability.

We consider these results to be well above the 'proficient' level of competency (defined as 75% correct performance).

Table 3

Your ability to verbally communicate neuroscientific information in a clear, reasoned manner.

Answer	%	Count
no gain or very small gain	0.00%	0
small gain	2.56%	1
moderate gain	20.51%	8
large gain	43.59%	17
very large gain	33.33%	13
Total	100%	39

Mean	Std Deviation
4.08	0.8

Which of these courses were most beneficial in regard to your ability to verbally communicate neuroscientific informat a clear, reasoned manner? (select all that apply)

Answer	%	Count
General Psychology (PSY 1010)	0.90%	1
Principles of Biology I & II (BIOL 1240/1260)	0.90%	1
Cellular Biochemistry & Molecular Biology (BIOL 3020)	3.60%	4
Cellular Structure & Function (BIOL 3040)	6.31%	7
Foundations of Research Methods & Statistics (PSY 2050)	9.91%	11
Brain, Mind, & Society (PSY 3100)	9.01%	10
Neuroscience Laboratory (NEUR 3550)	23.42%	26
Introduction to Neuroscience: Cellular, Molecular, & Systemic (NEUR 3400)	10.81%	12
Other courses? (enter course names below)	16.22%	18
Introduction to Neuroscience: Behavioral & Cognitive (NEUR 3500)	18.92%	21
Total	**100%**	**111**

Other courses mentioned: Neuroscience Seminar (10 responses), Neurobiology of Disease (3), PHIL 4280: Biology and Mind (1), Genetics (1), Exercise Physiology (1), Neurophysiology lab (1)

Your ability to communicate written neuroscientific information in a clear, reasoned manner.

Answer	%	Count
no gain or very small gain	0.00%	0
small gain	5.00%	2
moderate gain	25.00%	10
large gain	40.00%	16
very large gain	30.00%	12
Total	100%	40

Mean	Std Deviation
5	3.95

Which of these courses were most beneficial in regard to your ability to communicate written neuroscientific information in a clear, reasoned manner? (select all that apply)

Answer	%	Count
General Psychology (PSY 1010)	1.80%	2
Principles of Biology I & II (BIOL 1240/1260)	1.80%	2
Cellular Biochemistry & Molecular Biology (BIOL 3020)	3.60%	4
Cellular Structure & Function (BIOL 3040)	4.50%	5
Foundations of Research Methods & Statistics (PSY 2050)	11.71%	13
Brain, Mind, & Society (PSY 3100)	9.91%	11
Neuroscience Laboratory (NEUR 3550)	20.72%	23
Introduction to Neuroscience: Cellular, Molecular, & Systemic (NEUR 3400)	13.51%	15
Other courses? (enter course names below)	14.41%	16
Introduction to Neuroscience: Behavioral & Cognitive (NEUR 3500)	18.02%	20
Total	**100%**	**111**

Other courses mentioned: Neuroscience Seminar (9 responses), Neurobiology of Disease (2), Neurophysiology lab (1), PSY 6190 Affective Neuroscience (2)

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

Data from NEUR 3550, NEUR 4900, and the Senior Survey all indicate student performance well above the proficient level in student ability to communicate neuroscientific information in a clear, reasoned manner, both verbally and in writing.

For student performance in the Neuroscience Laboratory, we define the 'proficient' level of competency as a score of 75% correct performance. Minimum student performance met this level in two of the three areas ("Procedure" and "Data Presentation"). For "Conclusions/Future Directions" there were two instances where student groups scored

slightly below proficiency (60% in presentation 1 and 73.3% in presentation 2; each was the minimum score obtained across both sections per presentation, and they did not occur in the same section or student group). Average and median performance was well above the proficient level of competency.

In the Senior Neuroscience Seminar, we define the 'proficient' level of competency as a score of 3.75 (or 75%) on a 5 point scale. Student performance was at 4.79 and 4.90 for oral and written communication skills, respectively, with 100% of students achieving proficiency on individual assignments. This may be suggestive of improvement in our graduating seniors compared to their performance in NEUR 3550, where most students were first-semester juniors. However, these data cannot be directly compared since the assignments and instructors were not the same.

Nevertheless, the senior survey supports this observation with 100% of graduating seniors reporting gain in communication skills. From the senior survey, we learned that students identified NEUR 3400 and NEUR 3500 (Intro to Neuroscience 1 and 2) NEUR 3550 Neuroscience Lab as the most beneficial courses for achieving these learning objectives (Table 2). Several other courses, especially NEUR 4900 Neuroscience Seminar also received a number of endorsements on this question.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

Data were shared and discussed at the first Neuroscience faculty meeting of the fall 2022 semester.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies	• Course content • Teaching techniques • Improvements in technology • Prerequisites	• Course sequence • New courses • Deletion of courses • Changes in frequency or scheduling of course offerings
Changes to the Assessment Plan	• Student learning outcomes • Artifacts of student learning • Evaluation process	• Evaluation tools (e.g., rubrics) • Data collection methods • Frequency of data collection

Please describe the actions you are taking as a result of these findings.

Overall, both indirect (self-reported) and the direct data indicate that we are successfully achieving Learning Outcome #3. We are especially pleased that our introductory course sequence, taken by sophomores and juniors, is contributing to LO3 in a meaningful way.

We are taking the following actions as a result of these findings:
-Update senior survey class options to include NEUR 4900. Omission was an oversight.
-We will make changes to our assessment plan because we now have multiple instructors for NEUR 3550 and NEUR 4900. New instructors may want to discuss modifying rubrics or data collection methods.

Adjustments will be made in the curriculum and/or the assessment process, as needed. We will discuss which courses are most successful in addressing this outcome; and whether other courses or specific assignments may be useful to advance these objectives.

If no changes are being made, please explain why.

N/A

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

The last time we assessed LO3, we included data from a psychology course (PSY 3100 Brain, Mind, & Society). In this year's assessment, we were able to focus specifically on neuroscience courses (those with a NEUR prefix).

B. How has this change/have these changes been assessed?

Focusing only on NEUR classes allows us to examine only neuroscience majors' performance (PSY 3100 is taken by students of many majors).

C. What were the findings of the assessment?

The findings are detailed above, importantly, these data are only from our neuroscience majors.

D. How do you plan to (continue to) use this information moving forward?

We plan to continue to focus on measures of assessment in our own courses, allowing us to more easily assess outcomes and make changes as needed.

IMPORTANT: Please submit any assessment tools (e.g., rubrics) with this report as separate attachments or copied and pasted into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document.

Hot Topics in Neuroscience News Assignment:

For this assignment, you will critically read a piece of neuroscience journalism as well as the scientific article on which it is based. You will analyze how experimental research is transformed into news and what makes something newsworthy. You will then teach your classmates and instructor on this topic.

See the dates scheduled for presentations on the Course Schedule. Note that two dates are coming up soon for those who want to get this out of the way! First, determine if you **CANNOT give a talk** on any of the dates (i.e. you have a University approved excused absence such as varsity sports). Also decide whether you **STRONGLY PREFER** any of the possible dates over the other(s). This may be because you have exams or presentations in another class. The instructor will make a decision about the schedule and will make every effort to assign your preferred date, but will be limited by the choices of you and your classmates.

Next step will be to find a news story in an online or print newspaper or magazine about a specific neuroscientific study that is of interest to you.

Suggested news sources include: NPR (www.npr.org/sections/science/), New York Times, Science News (www.nytimes.com/section/science), Wall Street Journal, Science (www.wsj.com/news/science). Note that you have unlimited access to the NYT, WSJ and other news websites through the library. Some good articles may be found in long-form sources such as Wired magazine or The Atlantic, although these articles often review a large body of work rather than results from a specific journal publication. I will also consider allowing selections from podcasts that focus on recent scientific news. The journals Nature and Science have weekly podcasts that highlight articles selected to be of public interest (https://www.nature.com/nature/articles?type=nature-podcast; https://search.sciencemag.org, select "podcasts" under article type on the advanced search tool)

Your selection should be a piece of journalism that focuses on a recent finding in the broad field of neuroscience and where the journalist has done some background investigation and interviewed scientists not directly involved in the research. Several things should be avoided. **Avoid web sites or blogs that are based on press releases.** These are not always easy to identify; a good example is Science Daily, which (unlike most) clearly cites the source of the press release (https://www.sciencedaily.com). Secondly, you should look for articles that focus on one (or at most two) journal articles, not on a larger body of work or review article. Third, ideally the article will be fairly recent (1-3 years), but anything too new and novel to be included in your textbooks will be considered. Once you have found an article in the popular press, then look at the scientific research publication it references. Take a quick look at the abstract and figures to confirm that you want to present this article.

By the posted due date posted, submit the following information in Canvas (see Assignments):

1) your name,
2) your preferred date(s), conflicting date(s), or no preference, clearly indicating preferences vs. genuine conflicts,
3) the News article: title, source, and weblink,
4) the journal article citation: authors (may be abbreviated with "et al."), year, title, journal, volume, page,
5) the journal abstract and weblink.

PREPARING THE MATERIAL
Read "3 Tips for understanding science journalism," by Anna Clark. Critically read both the news article and the journal article you have selected. The following questions may guide your analysis:
Why is this a newsworthy/hot topic? What claims of significance and implication are made in the scientific publication, and how are these recast as they move into the public domain? What hopes, fears, and speculations get voiced in the popularization of the research? What limitations of the experimental setup and qualifications on the results are deleted? How do images and/or the journalistic description of the research enhance or distort the actual research presented in the scientific publication?

Your analysis should draw on ideas and concepts presented in your neuroscience coursework (i.e. make connections between the neuroscience that you are teaching and other courses that you – and most likely your classmates – have taken). You are encouraged to include discussion questions in your presentation that will spark a dialog during the Q&A.

You should understand the material you are presenting well enough to teach the class about the topic. You may find a bit of additional research helpful or may want to meet with Dr. O if you have questions about the article you are presenting. You are unlikely to have enough time to present all the figures in the article you present, so select those that most clearly support the hypothesis and conclusions.

PREPARING YOUR TURN TEACH
What's the difference between giving a presentation and teaching? The goal of a presentation is to present information to an audience, often one that is passive. The goal of teaching is to engage the audience in such a way that they take away something new. Most students have done multiple presentations during the course of your academic career. Reflect on previous feedback you have received. Reflect on presentations and classes that you have found to be engaging and those that were not.

- Watch the Jon Oliver video clip.
- Review the "Presentation Tips" PowerPoint posted on Canvas.
- Read "How I conquered my fear of public speaking and learned to give effective presentations" by Mathilde His (link on Canvas).

These are pretty self-explanatory. Dr. His writes about presenting research rather than teaching but the key points and advice apply to teaching and should be applied in your presentation.

BEFORE CLASS:
Slides must be emailed to instructor no later than 10 am on the day of the presentation.

HOT TOPICS IN THE NEWS CLASS FORMAT
INDIVIDUAL DUE DATES TO BE ASSIGNED

Please try to arrive in class a few minutes early in order to load your presentation. You will have 22 minutes to teach the class about your topic. You may choose to use most of this time to lecture on the topic or to use some of the time for class discussion, but you must allow 3 minutes for Q&A (i.e. 19 minutes maximum for presentation). You should be well prepared and rehearsed in advance so as to fit in the allotted time.

NEUR 4900: Making Connections Assignment

"One important way experts' and novices' knowledge organizations differ is in the number or density of connections among the concepts, facts, and skills they know…. [For example, students might] absorb the knowledge from each lecture in a course without connecting the information to other lectures or recognizing themes that cut across the course as a whole…. if students lack a strongly connected network their knowledge will be slower and more difficult to retrieve…. Moreover, if students do not make the necessary connections among pieces of information, they may not recognize or seek to rectify contradictions."

From Ambrose et al. (2010) *How Learning Works: Seven Research-Based Principles for Smart Teaching,* pp. 49-50

Making Connections: Assignment #2

- In your paragraphs, you have reflected on your neuroscience elective courses. The next step is to identify which of these is LEAST connected to your neuroscience knowledge base for a deeper reflection.
- Find a review article linking some aspect of the course with neuroscience. The review article should be from within the past five years, but older articles will be considered since these may be broad topics.
    - Among the best sources of reviews for this assignment are *Trends in Neurosciences* and *Trends in Cognitive Sciences*, available electronically from the SLU library, or other journals in the Cell Press Trends Review series.
    - You may go directly to the journal website but to access the articles, you will need to log in to the library at http://lib.slu.edu.
    - Other journals in the series that may be appropriate for specific courses are listed here at this website: https://www.cell.com (scroll to the bottom to see "Trends Review Journals").
    - This is independent work. Find something of interest to YOU.
    - Enter the following information on Canvas in the assignment text box (don't upload a file):
        - Your name
        - The name and course number for the elective you've selected for your reflection
        - Article with full citation and link to article
    - **Get approval for your article choice from Dr. O before proceeding to Assignment #3.** The sooner you submit your choice, the more time you will have for writing.

Making Connections: Assignment #3

- Write a reflection that focuses on how your selected elective course relates to broader aspects of neuroscience and and how this has significance for you. Some things you may want to ponder include are listed below, but this is your reflection and should highlight your perspective, thoughts, and insights.
    - Was the course relevant to neuroscience considering some of these approaches: physical, anatomical, functional, physiological, genetic, evolutionary, clinical, or societal connections?
    - How did your reading change your understanding of the material from the course?
    - Reflect on how knowledge and/or skills (e.g. presentations, reading primary literature) from the course are relevant to you or may have relevance in fulfilling future career goals.
    - What new questions do you have?
- Your reflection should be 4-5 pages long (12 point Times Roman, 11 pt Arial or equivalent; 2x spacing), plus references. Note: references do not need to be a separate page. They may be any standard format, but should be consistent.
- **On the due date, bring copies of your reflection to distribute for peer review (two or three for groups of three or four respectively. *Please be sure to allow enough time to print before class!***
- The instructor's final assessment will take into account the assessment criteria in the rubric on the back.

NEUR 4900: Assessment Rubric for Student Reflections

	Distinguished	Proficient	Apprentice	Novice/Unacceptable
Clarity	The language is clear and expressive. Abstract concepts are explained accurately. Explanation of concepts makes sense to an uninformed reader.	Minor, infrequent lapses in clarity and accuracy, including spelling or grammar.	There are frequent lapses in clarity, accuracy, spelling and/or grammar.	Language is unclear and confusing throughout. Concepts are either not discussed or are presented inaccurately.
Interconnection	The reflection demonstrates connections between material from elective courses and facets from the broad field of Neuroscience, bolstered by the choice of review article.	The reflection demonstrates connections between material from elective courses and facets from the broad field of Neuroscience, bolstered by the choice of review article.	There is little attempt to demonstrate connections between material from elective courses, the chosen review article, and the field of Neuroscience.	No attempt to demonstrate connections to Neuroscience.
Relevance	The reflection demonstrates how the elective course is relevant to Neuroscience and meaningful to the student.	The reflection demonstrates how the elective course is relevant to Neuroscience and meaningful to the student.	Student makes attempts to demonstrate relevance, but the relevance is unclear to the reader.	Most of the reflection is irrelevant to Neuroscience and/or to the student.
Analysis	The reflection moves beyond simple description of the connections to an analysis of how the material contributes to student understanding of connections.	The reflection demonstrates student attempts to analyze the connections but analysis lacks depth.	Student makes attempts at applying the review article to the elective course concepts but fails to demonstrate depth of analysis.	Reflection does not move beyond description of the elective course.

Neuroscience Laboratory Cell Culture Neurite Growth **Oral Presentation**	**Name(s):** **Date:**

	Points (100 total)					
Category						**Total**
Introduction (15 points)	• Description of the cell type we used in this lab (5 points)_____ • Why would your experimental variable impact neurite growth? (5 points)_____ • Previously published data relevant to the treatment selected; properly cited (5 points)_____					
Procedure (20 points)	• Description of the cell culture system we used in this lab (5 points)_____ • Includes variables used (5 points)_____ • What concentrations were chosen/details of exposure (5 points)_____ • Rationale for treatment (time period, dose) (5 points)_____					
Data Presentation (20 points)	• Statement of hypothesis (5 points)_____ • Interpretation of data/results is logical (5 points)_____ • Labeled images/well-described behavior (5 points)_____ • Appropriate comparisons (5 points)_____					
Conclusions & Future Experiments (15 points)	• What conclusions can be made from results? (5 points)_____ • What future experiments could be performed? (5 points) _____ • How would you have improved the experiment you designed? (5 points) _____					
Organization & Powerpoint Expertise (15 points)	• Well organized presentation (5 points) _____ • Concise slides (not too much information) (5 points) _____ • Easy to interpret slides (5 points) _____					
Grammar/ Punctuation/ Spelling (5 points)	**5** No grammar, punctuation, or spelling errors	**4** 1-2 grammar, punctuation, or spelling errors	**3** 3-4 grammar, punctuation, or spelling errors	**2** 5-6 grammar, punctuation, or spelling errors	**1** > 6 grammar, punctuation, or spelling errors	
Scientific Accuracy (5 points)	No errors in scientific accuracy	1-2 scientific errors	3-4 scientific errors	5-6 scientific errors	> 6 scientific errors	
Quality of Presentation (Eye contact, speaking presence) (5 points)	Excellent -Little to no reading directly from notes -Exceptional comfort and confidence exhibited	Very good -Little to no reading directly from notes -Comfort and confidence exhibited	Adequate -Some reading directly from notes -Some comfort and confidence exhibited	Poor -Reading mostly from notes -Little comfort or confidence exhibited	Very poor -Reading entirely from notes -No comfort or confidence exhibited	
					TOTAL POINTS	