Department of Chemistry
Annual Assessment Report
2020/2021

Based on the Chemistry Department's Student Assessment Plan (SAP), the following learning goals and associated assessment measures were scheduled for assessment during the 2020/2021 academic year:

Learning Goal #1: Acquire fact-based knowledge necessary to understand chemistry as citizens and practice it as scientists

- Direct Assessment Measures: the DUCK exam, standardized exams for individual courses, senior capstone paper rubric (see Appendix C, rubric assessment "C", "D", "H", and "I"), and professional plans of graduates
- Indirect Assessment Measures: Senior Survey (see Appendix D; 1. Likert Scale Question: I feel the Hendrix College Chemistry Curriculum has given me an opportunity to develop a strong background in: Organic, Physical, Analytical, Biological, Inorganic, Lab procedures, and Lab safety; 2. Likert Scale Question: I feel the Hendrix College Chemistry curriculum has taught me to acquire knowledge necessary to practice chemistry as a scientist)

Learning Goal #6: Assess the ethical implications of their work and its impact on our society and environment

- Direct Assessment Measures: senior capstone paper rubric (see Appendix C, rubric assessment "C" and "E") and independent research papers
- Indirect Assessment Measures: Senior Survey (1. Likert Scale Question: I feel the Hendrix College Chemistry curriculum has taught me to understand what green chemistry is; 2. Likert Scale Question: I feel the Hendrix College Chemistry curriculum has taught me to explain what green chemistry is to a non-scientist; 3. Likert Scale Question: I feel the Hendrix College Chemistry curriculum has taught me to explain how green chemistry is applied in a chemical laboratory; 4. Likert Scale Question: I feel the Hendrix College Chemistry curriculum has taught me to consider chemical hazards as part of experimental design)

In preparation for our annual assessment meeting, the chemistry department met on February 16th, 2021 to review our assessment goals and tools for the 2020/2021 academic year and to assign data collection tasks. The meeting lasted one hour and all department members were present, including Drs. Hales, Kett, Hicks, Gunderson, Gron, Caro, and Scott, as well as departmental staff, Linda Desrochers and Shelly Bradley. Due to COVID and the online (fall) and hybrid (spring) nature of the academic year, our standard direct assessment tools, including the DUCK exam and other standardized exams for specific sub-disciplines were not used during 2019/2020 and 2020/2021 academic year. The department decided to use the following direct assessment tools sans the past two years of standardized exams.

LG#1 Direct Assessment Measures for 2020/2021:

- 2011-2019 DUCK exam scores (American Chemical Society ACS Diagnostic of Undergraduate Chemistry Knowledge)
- Capstone Paper Rubric (attached)

LG#1 Direct Assessment Measures:

- Identified components of the Capstone Paper grade as outlined in the attached rubric

The Senior Survey was used as the indirect assessment measure as outlined above.

Data and Analysis (LG#1 and LG#6)

A three-hour Chemistry Department Spring Retreat was held on May 4th 2021 and all department members were in attendance, including Drs. Hales, Kett, Hicks, Gunderson, Gron, Caro, and Scott, as well as departmental staff, Linda Desrochers and Shelly Bradley.

Learning Goal #1: Acquire fact-based knowledge necessary to understand chemistry as citizens and practice it as scientists

Direct Assessment Data: LG#1

The DUCK

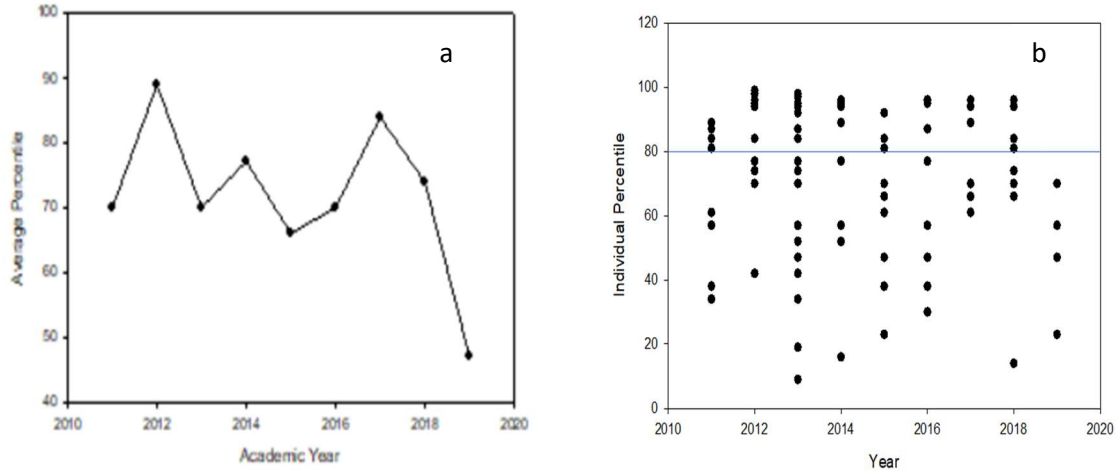

Figure 1. Direct assessment data showing (a) average national percentile score on the ACS DUCK exam from 2011-2019 and (b) individual student DUCK

Prior to showing and discussing the data, the department discussed where we would like to be relative to national norms, which is what is reported as the normative percentile DUCK exam score. The department discussed setting a benchmark of 50th percentile (the national average) as acceptable/good, but indicated the desire for scores closer to 60-70% based on national norms. That is, we would ideally want to have our graduating

students score an average percentile of 70%, suggesting an excellent program where 70% of the chemistry majors in the US score below our students.

Additionally, in the evaluation by the department faculty as a whole, particular attention will be given to cases where ACS exam scores fail to achieve the benchmark in three successive years. The department faculty may require that further statistical analysis of exam results be performed in order to determine appropriate modifications in course format, content, and/or content emphasis. This additional information may include (but is not limited to) the percentages of students scoring above the 75th national percentile and below the 25th national percentile, statistically valid trending of high, low, average, and median exam scores, and a correlation of exam question topics with course topics and subsequent compilation of student exam performance in each topic area. The department chair will coordinate any further exam analyses with assistance from course instructors as needed.

As is shown in the historical DUCK results (Fig. 1), the average percentile score from 2011-2019 was 72%ile; well above our benchmark for performance on "Chemistry Knowledge". Excluding the 2019 results where the average DUCK exam score was 47%, the students performed on average at the 75th percentile, indicating only 25% of all chemistry majors in the US scored higher than our Hendrix chemistry majors. This data is clear evidence that our department is exceeding expectations in this particular learning goal based on direct assessment measures.

The department discussed the 2019 results, and compared the DUCK scores to our archived capstone grades and individual course grades for our 2019 graduates. The lower than benchmark average of this particular cohort was consistent across the DUCK, capstone grades, GPA in major, and in individual courses, suggesting a particularly weak cohort of students in this particular year. It was also addressed that results from this particular cohort of students would not reflect consequences from recent curricular changes in the major as they would have graduated under the previous curriculum, same as those majors graduating 2011-2018. It is important to continue to monitor this data as more students begin graduating based on our revised major in the coming years to determine if these changes influence the department's history of success on the ACS DUCK exam.

Historical records of individual sub-disciplinary course ACS standardized exam scores were also discussed, two of which are shown in Fig. 2. As shown, both Biochemistry (CHEM 330) and Analytical Chemistry (CHEM 280) results were well above the 50th percentile based on national averages, often achieving 70th percentile nationally.

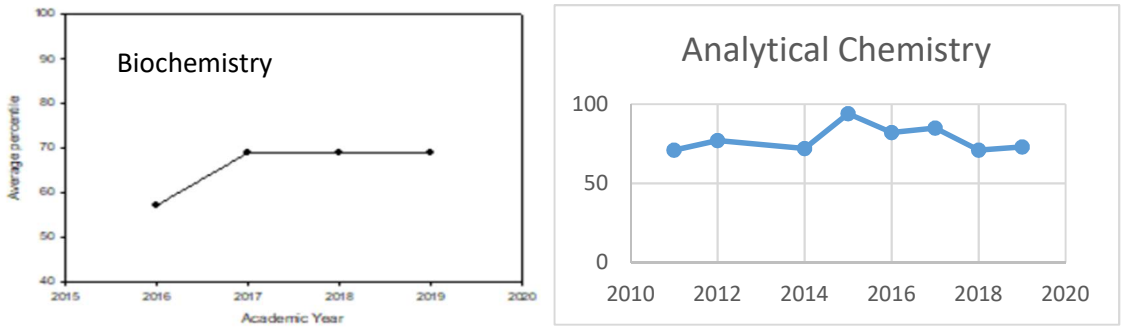

Fig. 2 Standardized ACS average exam scores by year for Biochemistry and Analytical Chemistry course exams.

Other courses utilizing ACS standardized exams had incomplete data and could not be assessed. The department discussed the need to resume collecting sub-disciplinary standardized exams upon return of in-person classes to assess individual courses as well as instances in which our benchmark for the ACS DUCK exam is not met over three consecutive years, as noted previously. These standardized exams, including the DUCK, will be implemented again in the 2021/2022 academic year.

Capstone Rubric

The Capstone Paper Rubric (attached), revised and implemented this academic year was used to assess LG#1. The purpose of this assessment was two-fold:

- Determine if the Capstone Paper and associated rubric is an appropriate direct assessment tool
- Determine if individual student paper outcomes showed students are achieving Department LG#1.

Students were assessed on a four-point scale and were classified to have achieved the level of "Capstone" if the average for the learning goal was 3.50 or above, "Milestone" if it was between 2.50 and 3.49, and "Benchmark" if it was 2.49 or below. Table 1 shows the quantitative results from this assessment for LG#1, with an average level of 3.6 on a 4 pt. scale. Thus, this tool indicates that, for the 2020/2021 academic year, that our average graduate (out of 10 students assessed) had achieved "Capstone" status. These results were consistent with a strong cohort, academically, based on average major GPA and capstone grades with the strongest students hitting capstone at every level of the paper rubric. Thus, the results suggest the capstone paper is an appropriate supplementary assessment tool for LG#1. The department decided to continue the use of the capstone rubric for the next three years and to revisit its usefulness for assessing

Table 1. LG#1 assessment results from Chemistry Department Senior Capstone Paper departmental learning goals.

Paper Rubric	No. Students Achieving Capstone Level (%)	No. Students Achieving Milestone Level (%)	No. Students Achieving Benchmark Level (%)	No. Students Not Achieving Benchmark Level (%)
LG 1	6 (60 %)	4 (40 %)	0 (0 %)	0 (0%)

Indirect Assessment Data: LG#1

Senior Survey results are shown in Table 2 and Table 3. Indirect assessment of LG#1 was achieved by looking at the cumulative results from student responses from 2014-2019 for a specific question and the survey (Table 2) and self-reporting of how well the department prepared students in each of the major areas of chemistry. Approximately

Table 2. Senior Survey response to LG#1 from 2014-2019 I feel Hendrix College Chemistry curriculum has taught me to:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA	# of participants	% of total (4+5)
	1	2	3	4	5	6		
Cumulative Results (2014-2019)								
Learning Goal #1: Acquire fact-based knowledge necessary to understand chemistry as citizens and practice it as scientists								
Acquire knowledge necessary to practice chemistry as a scientist	0	0	1	10	30	0	41	97.56

98% of responses suggested that the department curriculum taught students to "*Acquire knowledge necessary to practice chemistry as a scientist.*" No student disagreed, suggesting that, overall, the department is doing very well at achieving this learning goal.

Table 3 shows that over 90% of respondents agreed or strongly agreed that the department has provided students with a strong background in lab procedures and

Table 3. Senior Survey response to LG#1 for sub-disciplines from 2014-2019 I feel Hendrix College Chemistry curriculum has given me the opportunity to develop a strong background in:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA	# of participants	% of total (4+5) Excluding N/A
	1	2	3	4	5	6		
Cumulative Results (2014-2019)	1	2	3	4	5	6		
Organic Chemistry	0	2	2	14	22	1	41	**90.0**
Physical Chemistry	1	0	2	21	17	0	41	**92.7**
Analytical Chemistry	0	1	3	10	23	4	41	**89.2**
Biological Chemistry	0	1	9	10	14	7	41	**70.6**
Inorganic Chemistry	0	1	4	13	23	0	41	**87.8**
Laboratory Procedures	0	0	0	8	33	0	41	**100.0**
Laboratory Safety	0	0	1	6	34	0	41	**97.6**

safety as well as Organic and Physical chemistry, 88 and 89% for Inorganic and Analytical chemistry, respectively, and 71% for Biochemistry. The core required courses (Organic and Physical chemistry) produce strong results, the electives had strong, but slightly lower responses; which is to be expected since not all students take all electives. These results will continue to be monitored after the major revision to determine the effectiveness of curricular changes over the next few years.

Overall, multiple assessment measures suggest that we are meeting and exceeding achievement of LG#1.

Learning Goal #6: Assess the ethical implications of their work and its impact on our society and environment

LG#6 is addressed in individual courses, including General Chemistry (Green-SWAT) lab program, CHEM 280: Environmental Analysis, and CHEM 497: Senior seminar (new course). Most of the assignments associated with this learning goal within the curriculum have been implemented this past academic year (2020/2021). The data below represents direct and indirect assessment of graduating seniors and thus may not represent students who have completed these new chemical and professional ethics activities.

Direct Assessment Data: LG#6

Capstone Paper Rubric

Students were assessed on LG#6 using the senior capstone paper rubric on a four-point scale and were classified to have achieved the level of "Capstone" if the average for the learning goal was 3.50 or above, "Milestone" if it was between 2.50 and 3.49, and "Benchmark" if it was 2.49 or below. Assessment is based solely on the paper conclusions and whether students addressed the ethical implications of their capstone topics. Below is the data from the 2020/2021 academic year:

Paper Rubric	No. Students Achieving Capstone Level (%)	No. Students Achieving Milestone Level (%)	No. Students Achieving Benchmark Level (%)	No. Students Not Achieving Benchmark Level (%)
LG 6	6 (60 %)	3 (30 %)	1 (10 %)	0 (0%)

Results from the 2019/2020 academic year are shown below:

Paper Rubric	No. Students Achieving Capstone Level (%)	No. Students Achieving Milestone Level (%)	No. Students Achieving Benchmark Level (%)	No. Students Not Achieving Benchmark Level (%)
LG 6	4 (66.7 %)	1 (16.7 %)	1 (16.7 %)	0 (0%)

The above two tables suggest that the average chemistry graduate over the past two years has achieved a level of Capstone (Avg. = 3.5), which we thought was very good.

However, this was the first time the department has officially assessed LG#6 using this tool, so much discussion centered around whether the paper rubric was an appropriate assessment tool for LG#6. The department agreed that students do not specifically have to, nor are told to, discuss the ethical implications of their capstone topic within the capstone paper and that only the conclusions are used to assess this LG. We concluded that we need to

1. implement a strategy within our foundational course (General Chemistry) that defines "Ethics"
2. develop a better direct assessment tool
3. map aspects of our definition of chemical ethics to specific assignments and activities that address chemical and professional ethics.

Indirect Assessment Data: LG#6

Senior Survey

The existing senior survey addresses ethics with three distinct questions, as shown in

Table 4. Senior Survey results on chemical ethics and green chemistry.

I feel Hendrix College Chemistry curriculum has taught me to:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA	# of participants	% of total (4+5)
	1	2	3	4	5	6		
Cumulative Results (2014-2019)								
Learning Goal #6: Assess the ethical implications of their work and its impact on our society and environment								
Consider chemical hazards as part of experimental design	0	1	1	7	32	0	41	**95.12**
Appreciate the importance and practice of chemical ethics	0	0	2	0	7	0	9	**77.78**
Understand what green chemistry is	0	0	1	8	32	0	41	**97.56**

Table 4. These questions address chemical safety, chemical ethics, and green chemistry. While the students self-reported that they feel the department has taught them to consider chemical safety and green chemistry in their work, chemical ethics results were slightly lower. This is likely due to the lower number of participants responding to this question as it was added to the senior survey in spring 2019 in preparation for the current assessment cycle. The department discussed the need for

1. revising the questions associated with "ethics" in the senior survey and

2. continued development of activities and curricula that address ethics, conduct, and professionalism within our courses and labs.

This should be a focus of curricular development throughout the chemistry curriculum in the coming years.

Other Assessment Activities

Senior Capstone Paper Rubric

The chemistry department again assessed the senior capstone paper rubric to determine whether grading uncertainty could be reduced using a common rubric. The common rubric was introduced in its first form in the spring of 2018 and has undergone three full revisions since. The assessment data are reported below in the form of a pooled standard deviation. A lower pooled standard deviation indicates reduced uncertainty in the paper grades.

- For the papers graded in **Spring 2019**, using the second version of the department rubric, the **pooled standard deviation for the data was 0.179**.
- For the papers graded in **Spring 2020**, using the third version of the department rubric, the **pooled standard deviation was 0.0261**.
- For the papers graded in **Fall 2020**, the **pooled standard deviation was 0.0581.**

The rubric was unchanged from Spring 2020 to Fall 2020.

These results suggest that grading precision was improved for the third version of the rubric (used in spring 2020 and fall 2020) compared to the previous version. Thus, it appears that the rubric is having the desired effect of reducing the grading disparity between faculty.

Senior Capstone Presentation Rubric

The complete presentation rubric was first used in fall 2020 (attached). Assessment of the new senior capstone presentation rubric focused on the ability of the rubric to reduce uncertainty among multiple graders.

Using the current version of the rubric, the **pooled standard deviation was 0.242**. This result reflects greater uncertainty among multiple graders than was observed for the senior capstone paper rubric and the department believes that the uncertainty can be reduced further. Discussion about potential rubric revisions identified areas of improvement. Revisions to the rubric will be made prior to Fall 2021 and the data will be compared to this year's results to see if the revised rubric is having the desired effect of reducing the grading disparity between faculty.

CHEM 450/460 Directed Research Assessment Work

During the 2020/2021 academic year, the department worked toward creating common learning goals and a common syllabus for the departmental *Directed Research* courses (CHEM 450/460). Table 5 shows the resulting course learning goals mapped to the departmental learning goals. As designed, the directed research learning goals hit every major department learning goal.

Additionally, the department distributed work among all department members who teach CHEM 450 to develop common assessment tools for each of the assignments completed for a grade in CHEM 450. By the end of the 2020/2021 academic year, the department had developed rough drafts of assessment tools/rubrics for each of the following:

- Participation/professionalism (25%): David and Caitlin
- Experimental work (25%): Andres
- Notebook (10%): Courtney and Latorya
- Report (20%): Peter
- Presentation (20%): Bill

Next academic year:

- these tools as well as the common CHEM 450/460 syllabus will be refined and implemented
- assessment of their use will be indirectly measured through departmental discussions at the spring 2022 department retreat
- assessment of new learning goals will be assessed using a student feedback survey distributed to all students enrolled in any of the departmental CHEM 450/460 courses.

Table 5. CHEM 450/460 Learning goals mapped to departmental learning goals.

		Department Learning Goals					
	CHEM 450/460 Learning Goals	acquire the fact-based knowledge necessary to understand chemistry as citizens and practice it as scientists	design and execute laboratory experiments	develop the critical thinking skills necessary to assess and assemble facts and data	work effectively individually and in groups	communicate chemistry effectively in written and oral forms	assess the ethical implications of their work and its impact on our society and environment
1	Select, interpret, and apply chemical information resources	**x**		**x**			
2	Communicate in oral/written format					**x**	
3	Engage in scientific experimentation		**x**				
4	Develop a professional work ethic				**x**		**x**

Hendrix College Department of Chemistry Senior Capstone Paper Grading Rubric (2020/21)

Student Name: _____

Faculty Evaluator Name: _____ Reader (circle one): 1st 2nd

Grade: _____

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
A. Topic & Title (5 %)	N/A		☐ Topic is not relevant to the field of chemistry and is not based on recent research ☐ Title is not engaging and does not reflect the paper content	☐ Topic is somewhat relevant to the field of chemistry and is based on some recent research ☐ Title somewhat reflects the paper content	☐ Topic is relevant to the field of chemistry and is based on recent research ☐ Title is interesting and largely reflects the paper content	☐ Topic is highly relevant to the field of chemistry and is based on recent research ☐ Title is engaging and accurately reflects the paper content
B. Abstract (5 %)	5		☐ Abstract is not engaging and does not answer the "what," "why," "how," and "to what end" questions	☐ Abstract is somewhat engaging and answers some of the "what," "why," "how," and "to what end" questions	☐ Abstract is engaging and mostly answers the "what," "why," "how," and "to what end" questions	☐ Abstract is highly engaging, and answers all of the "what," "why," "how," and "to what end" questions
C. Introduction & Background Information (15 %)	1, 3, 5, 6		☐ Introduction does not provide adequate description of the relevant background information and no context for the topic	☐ Introduction provides a description of some of the relevant background information and provides some context for the topic	☐ Introduction provides a detailed description of the relevant background information and provides context for the topic	☐ Introduction provides a highly detailed description of the relevant background information and provides context for the topic
D. Analysis of Information & Scientific Understanding (25 %)	1, 3		☐ Paper contains little relevant material ☐ No connections are made between information from different sources ☐ Chemical information is not accurately explained to the reader	☐ Paper contains a description of some relevant material ☐ Some connections are made between information from different sources ☐ Chemical information is sometimes accurately explained to the reader	☐ Paper contains an accurate description of a good amount of relevant material ☐ Good connections are made between information from different sources ☐ Chemical information is usually accurately explained to the reader	☐ Paper contains an accurate description of a large amount of relevant material ☐ Extensive connections are made between information from different sources ☐ Chemical information is always accurately explained to the reader

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
E. Conclusion (5 %)	5, 6		☐ Conclusion does not summarize the information presented in the paper ☐ Conclusion does not defend a position, and does not discuss possible future directions for the research	☐ Conclusion summarizes some of the information presented in the paper ☐ Conclusion suggests a position, and/or discusses some possible future directions for the research	☐ Conclusion summarizes most of the information presented in the paper ☐ Conclusion defends a position, and/or discusses some possible future directions for the research	☐ Conclusion accurately summarizes all of the information presented in the paper ☐ Conclusion defends a position, and discusses possible future directions for the research
F. Paper Organization (15 %)	5		☐ Paper is disorganized and does not include informative headings and sub-headings ☐ The guidelines on formatting and paper length are not met	☐ Paper is somewhat organized with some use of informative headings and sub-headings ☐ Some of the guidelines on formatting and paper length are met	☐ Paper is organized with good use of informative headings and sub-headings ☐ Most of the guidelines on formatting and paper length are met	☐ Paper is well-organized with extensive use of informative headings and sub-headings ☐ All of the guidelines on formatting and paper length are met
G. Grammar & Syntax (15 %)	5		☐ Text is riddled with grammatical errors and shows no evidence of editing and proofreading ☐ Sentence and paragraph structure are poor and show little organization ☐ None of the relevant scientific terms and abbreviations are defined	☐ Text is grammatically correct some of the time and shows some evidence of editing and proofreading ☐ Sentence and paragraph structure are sometimes clear and well-organized ☐ Some of the relevant scientific terms and abbreviations are clearly defined	☐ Text is usually grammatically correct and shows evidence of editing and proofreading ☐ Sentence and paragraph structure are clear and usually well-organized ☐ Most of the relevant scientific terms and abbreviations are clearly defined	☐ Text is grammatically correct throughout and shows evidence of careful editing and proofreading ☐ Sentence and paragraph structure are always clear and well-organized ☐ All of the relevant scientific terms and abbreviations are clearly defined
H. Figures (5 %)	1		☐ Figures are not relevant, do not support the major points presented, and are not discussed within the text of the paper ☐ None of the figures include descriptive captions and appropriate references	☐ Some of the figures are relevant, support the major points presented, and are discussed within the text of the paper ☐ Some of the figures include descriptive captions and appropriate references	☐ Most of the figures are relevant, support the major points presented, and are discussed within the text of the paper ☐ Most of the figures include descriptive captions and appropriate references	☐ All figures are relevant, support the major points presented, and are discussed within the text of the paper ☐ All figures include descriptive captions and appropriate references

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
I. References (5 %)	1		☐ Paper indicates that literature search was not performed and appropriate peer-reviewed and primary literature sources are not used ☐ References are absent and/or not correctly cited within text and bibliography	☐ Paper indicates that a literature search was performed and appropriate peer-reviewed, primary literature sources sometimes are used ☐ References are sometimes correctly cited within text and bibliography	☐ Paper indicates that a broad literature search was performed and appropriate peer-reviewed, primary literature sources are mostly used ☐ References are usually correctly cited within text and bibliography	☐ Paper indicates that an extensive literature search was performed and appropriate peer-reviewed, primary literature sources are used ☐ References are always correctly cited within text and bibliography
J. Deadlines & Participation (5 %)	N/A		☐ Student met none of the deadlines and was not engaged with the reading and writing process ☐ Feedback provided to the student was not incorporated in to the next version of the paper	☐ Student met some of the deadlines and was somewhat engaged with the reading and writing process ☐ Feedback provided to the student was sometimes incorporated in to the next version of the paper	☐ Student met most of the deadlines and was engaged with the reading and writing process ☐ Feedback provided to the student was usually incorporated in to the next version of the paper	☐ Student met all the deadlines and was fully engaged with the reading and writing process ☐ Feedback provided to the student was always incorporated in to the next version of the paper

Paper Strengths:

Paper Weaknesses:

Assessment of Department Learning Goals:

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
C. Introduction & Background Information (15 %)	1, 3, 5, 6		☐ Introduction does not provide adequate description of the relevant background information and no context for the topic	☐ Introduction provides a description of some of the relevant background information and provides some context for the topic	☐ Introduction provides a detailed description of the relevant background information and provides context for the topic	☐ Introduction provides a highly detailed description of the relevant background information and provides context for the topic
E. Conclusion (5 %)	5, 6		☐ Conclusion does not summarize the information presented in the paper ☐ Conclusion does not defend a position, and does not discuss possible future directions for the research	☐ Conclusion summarizes some of the information presented in the paper ☐ Conclusion suggests a position, and/or discusses some possible future directions for the research	☐ Conclusion summarizes most of the information presented in the paper ☐ Conclusion defends a position, and/or discusses some possible future directions for the research	☐ Conclusion accurately summarizes all of the information presented in the paper ☐ Conclusion defends a position, and discusses possible future directions for the research

The purpose of this rubric is to provide grading consistency among the faculty, and to assess how well our students are doing at meeting the department learning goals (DLGs). The four learning goals of the Hendrix College Chemistry Department that are relevant to the Capstone paper are:

6. assess the ethical implications of their work and its impact on our society and environment.

Based on the presentation alone, mark the degree to which the student has achieved the departmental learning goals:

Department Learning Goal	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
6					

Grade Calculation:

$$0.05 \times (A)\_\_\_\_ + 0.05 \times (B)\_\_\_\_ + 0.15 \times (C)\_\_\_\_ + 0.25 \times (D)\_\_\_\_ + 0.05 \times (E)\_\_\_\_ + 0.15 \times (F)\_\_\_\_ + 0.15 \times (G)\_\_\_\_ + 0.05 \times (H)\_\_\_\_ + 0.05 \times (I)\_\_\_\_ + 0.05 \times (J)\_\_\_\_ = \_\_\_\_\_$$

$\boldsymbol{A}$: 4.00 − 3.84, $\boldsymbol{A^-}$: 3.83 − 3.50, $\boldsymbol{B^+}$: 3.49 − 3.17, $\boldsymbol{B}$: 3.16 − 2.84, $\boldsymbol{B^-}$: 2.83 − 2.50, $\boldsymbol{C^+}$: 2.49 − 2.17, $\boldsymbol{C}$: 2.16 − 1.84, $\boldsymbol{C^-}$: 1.83 − 1.50, $\boldsymbol{D^+}$: 1.49 − 1.17, $\boldsymbol{D}$: < 1.16

Hendrix College Department of Chemistry Senior Capstone Talk Grading Rubric (2020/21)

Student Name: _____

Faculty Evaluator Name: _____

Grade: _____

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
A. Introduction of Topic & Presenter (5 %)	1, 3		☐ No introduction of presenter or topic	☐ Presenter introduced, topic somewhat introduced	☐ Presenter and topic introduced	☐ Presenter and topic introduced; significance emphasized
B. Background Information & Theory (15 %)	1, 3		☐ Little background information and/or theory provided	☐ Some background information and/or theory provided	☐ A good amount of background information and/or theory provided	☐ Detailed background information and/or theory provided
C. Conclusions (5 %)	1, 3		☐ Conclusion does not summarize the information presented	☐ Conclusion summarizes some of the information presented	☐ Conclusion summarizes most of the information presented	☐ Conclusion accurately summarizes all of the information presented
D. Subject Knowledge (20 %)	1, 3		☐ Presenter demonstrates little knowledge or understanding of topic ☐ Presenter rarely introduces, defines, and correctly uses technical language throughout ☐ Presenter does not make connections between different studies reviewed in talk	☐ Presenter demonstrates some knowledge and understanding of topic ☐ Presenter sometimes introduces, defines, and correctly uses technical language ☐ Presenter makes few connections between different studies reviewed in talk	☐ Presenter demonstrates good knowledge and understanding of topic ☐ Presenter generally introduces, defines, and correctly uses technical language ☐ Presenter makes some connections between different studies reviewed in talk	☐ Presenter demonstrates excellent, in-depth knowledge and understanding of topic ☐ Presenter introduces, defines, and correctly uses technical language throughout ☐ Presenter connects each study reviewed in talk
E. Use and Quality of Visual Aids (15 %)	3		☐ Slides or visual aids are not appropriate / do not reinforce what is being discussed / do not engage the audience ☐ Slides or visual aids are not easy to read nor attractive	☐ Slides or visual aids somewhat appropriate and occasionally engage the audience and reinforce what is being discussed ☐ Some slides or visual aids are easy to read / attractive	☐ Slides or visual aids largely appropriate, engage the audience, and generally reinforce what is being discussed ☐ Most slides or visual aids are easy to read /attractive	☐ Slides or visual aids are appropriate throughout, engage the audience, and reinforce what is being discussed ☐ All slides or visual aids are easy to read and attractive

	DLG	Grade	Poor (Grade D, 1.0)	Satisfactory (Grade C, 2.0)	Good (Grade B, 3.0)	Excellent (Grade A, 4.0)
F. Organization of Talk (5 %)	5		☐ Talk poorly organized; no clear narrative, audience unable to follow along	☐ Talk somewhat organized; some narrative, audience can follow along	☐ Talk logically organized; clear narrative, relatively easy for audience to follow along	☐ Talk very logically organized; very clear narrative, easy for audience to follow along
G. Answers to Audience Questions (15 %)	1, 5		☐ Does not answer or engage with questions ☐ Answers demonstrate little knowledge of topic	☐ Gives reasonable answers to questions ☐ Answers demonstrate some knowledge of topic	☐ Gives good answers to questions ☐ Answers demonstrate a good knowledge of topic	☐ Gives detailed answers to questions ☐ Answers demonstrate excellent knowledge of topic
H. Engagement with Audience (20 %)	5		☐ Presenter does not maintain eye contact with audience during the talk, reads from notes throughout ☐ Voice not clear / not audible	☐ Presenter maintains eye contact with audience for some of the talk, frequently returns to notes ☐ Voice sometimes clear / somewhat audible	☐ Presenter maintains eye contact with audience during most of the talk, and uses notes from time-to-time ☐ Voice usually clear/ mostly audible	☐ Presenter maintains eye contact with audience throughout the talk, infrequently returns to notes ☐ Voice always clear / audible to whole audience

Talk Strengths:

Talk Weaknesses:

Assessment of Department Learning Goals:

The purpose of this rubric is to provide grading consistency among the faculty, and to assess how well our students are doing at meeting the department learning goals (DLGs). The three learning goals of the Hendrix College Chemistry Department that are relevant to the Capstone talk are:

1. acquire the fact-based knowledge necessary to understand chemistry as citizens and practice it as scientists,

3. develop the critical thinking skills necessary to assemble facts and data, and

5. communicate chemistry effectively in written and oral forms.

Based on the presentation alone, mark the degree to which the student has achieved the departmental learning goals:

Department Learning Goal	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
1					
3					
5					

Grade Calculation:

$$(0.05 \times (A)\ \_\_\_\_) + (0.15 \times (B)\ \_\_\_\_) + (0.05 \times (C)\ \_\_\_\_) + (0.20 \times (D)\ \_\_\_\_) + (0.15 \times (E)\ \_\_\_\_) + (0.05 \times (F)\ \_\_\_\_) + (0.20 \times (G)\ \_\_\_\_) + (0.15 \times (H)\ \_\_\_\_) = \_\_\_\_\_$$

$\boldsymbol{A}$: $4.00 - 3.84$, $\boldsymbol{A^-}$: $3.83 - 3.50$, $\boldsymbol{B^+}$: $3.49 - 3.17$, $\boldsymbol{B}$: $3.16 - 2.84$, $\boldsymbol{B^-}$: $2.83 - 2.50$, $\boldsymbol{C^+}$: $2.49 - 2.17$, $\boldsymbol{C}$: $2.16 - 1.84$, $\boldsymbol{C^-}$: $1.83 - 1.50$, $\boldsymbol{D^+}$: $1.49 - 1.17$, $\boldsymbol{D}$: < 1.16