

LDC Annual Assessment and Reassessment Report 2021-2022

Overview

The purpose of SAC-level assessment at PCC is to identify the levels of student achievement of course- or program-level outcomes in the name of improving those levels of achievement. The second part of that process is the reassessment of an outcome that has been assessed in a previous year.

In an initial assessment of an outcome, a SAC should identify any areas of student achievement of an outcome that could be improved. The SAC should then target those areas with a teaching strategy appropriate to its discipline during the reassessment year. The reassessment of the outcome then determines if the strategy was effective by measuring any changes to student achievement. This process, of assessing, analyzing, creating a teaching strategy, and reassessing, is called "closing the loop." It is how assessment can be useful for instructors and, by extension, for students.

Note that questions marked with an asterisk* indicate that the accompanying [help document](#) includes information relevant to that question.

The planning section that follows is to be completed and submitted in Fall Term. If your SAC is unable to complete it in fall, please fill out the planning section when completing the final report in spring.

Submission checklist

Due by November 30, 2021:

- Planning section of report
- On completion of the planning section, please email it to learningassessment@pcc.edu.

Due by June 24, 2022:

- Full report
- Numerical results (disaggregated data or raw data) and data analysis as an appendix.
- On completing the full report, please email it to learningassessment@pcc.edu.

Planning Section: To be completed and submitted in Fall Term

SAC Assessment Contact:

<i>Name</i>	<i>e-mail</i>
Patty Maazouz	patty.maazouz@pcc.edu

1. What SAC do you represent?

Chemistry

2. Is this plan for an initial assessment or a reassessment?

Initial Note: The Chemistry SAC planned to complete this project in the 2020-2021 academic year, but revised the assignment to better align with the rubric instead. This will be the initial assessment of the revised signature assignment.

3. What course(s) will your assessment/reassessment focus on?

CH100

4. In what term(s) will you collect student work?

Winter 2022

5a. How will you sample student work? If this is a reassessment, did this change from previous years?*

We plan to randomly collect artifacts from each CH100 instructor based on the Gen Ed assessment calculation model.

5b. Will the student work be part of the regular graded assignments for the course(s)? Please describe how the student work you plan to collect is integrated into the course(s)*

Yes. All CH 100 Winter 2022 courses will use this assignment, as it is the signature assignment for this Gen Ed course.

6. How will you redact student work (i.e. make it anonymous)?*

Instructors will redact student info before submitting the artifacts to a shared google folder.

7. Explain how your project is a direct assessment. If designing an indirect or exploratory assessment please share your rationale. (Include an explanation if relevant.) If this is a reassessment, did this change?*

This project is a direct assessment of students' work. Student's will respond to a series of questions provided in the signature assignment. Once the redacted artifacts are collected, the SAC will score the artifacts according to the developed Sci/CS/M DSAC rubric.

8. Briefly describe the purpose or goal of this project. In other words, what are you hoping to learn? If this is a reassessment, did this change?*

We hope to learn if the CH 100 students are meeting the Quantitative Literacy/Reasoning outcome at the level 2 benchmark for the entire DSAC rubric.

9. In general terms, describe the assessment project for the year. What steps will you take in carrying out the project? If this is a reassessment, please describe any modifications to instruction. *

- 1) Implement assessment in all CH 100 courses during the winter term.
- 2) Collect the appropriate number of redacted student artifacts from each CH 100 course to meet the sample total needed. Store in shared SAC google drive.
- 3) Assemble a SAC scoring team.
- 4) Conduct a norming session.
- 5) Assign random anonymous artifacts to members of the scoring team making sure to double up on all artifacts for inter-rater reliability.
- 6) Compile scores to determine the SAC's averages for each dimension.
- 7) Provide instructor scores to each participating member for comparative analysis.
- 8) Analyze the results and make conclusions.
- 9) Discuss possible changes in course level instruction based on results.
- 10) Implement changes beginning Fall 2022 in CH 100 courses.

10a. What are the benchmarks (minimum acceptable level of student outcome achievement) and how have they been determined?*

Level 2 on every prompt on the DSAC rubric

10b. What percentage or frequency of students do you hope to see achieve the benchmarks?*

100%

11. Describe the tools (e.g. rubrics, checklists, standardized exams) you will use in the project to evaluate student work. If this is a reassessment, please describe any changes from previous years. [Note: Significant changes to the assessment tools constitutes a new assessment.]

We will use the DSAC rubric.

12. Describe how the SAC will ensure that the evaluation of student work is consistent. If using a rubric, please describe how the SAC will norm to the rubric, and verify inter-rater reliability. If this is a reassessment, please describe any changes from previous years.*

We will conduct a norming session. We will have two separate members of our SAC score each anonymous artifact to verify inter-rater reliability.

13. Different SACs and individuals have different training in assessment. Your LAC coach is available to help with any step. What might you need help with moving forward?

Ensuring our norming session is completed correctly.

STOP This concludes the planning portion of the form.

Please save this document and submit it to learningassessment@pcc.edu by November 30, 2021.

In the spring, complete the reporting section that continues on the next page.

Annual Assessment and Reassessment Report 2021-2022

The purpose of SAC-level assessment at PCC is to identify the levels of student achievement of course- or program-level outcomes in the name of improving those levels of achievement. The first part of that process is the initial assessment of an outcome.

On completing the form, please email it to learningassessment@pcc.edu.

Note that questions marked with an asterisk* indicate that the accompanying help document includes information relevant to that question.

If your SAC was unable to complete the planning section, above, during Fall Term, please fill that section out before completing the following end-of-year report.

14. Were any changes made to the assessment plan submitted in Fall Term? If so, please briefly describe them.

There were no major changes to the assessment plan. However, there were some minor changes:

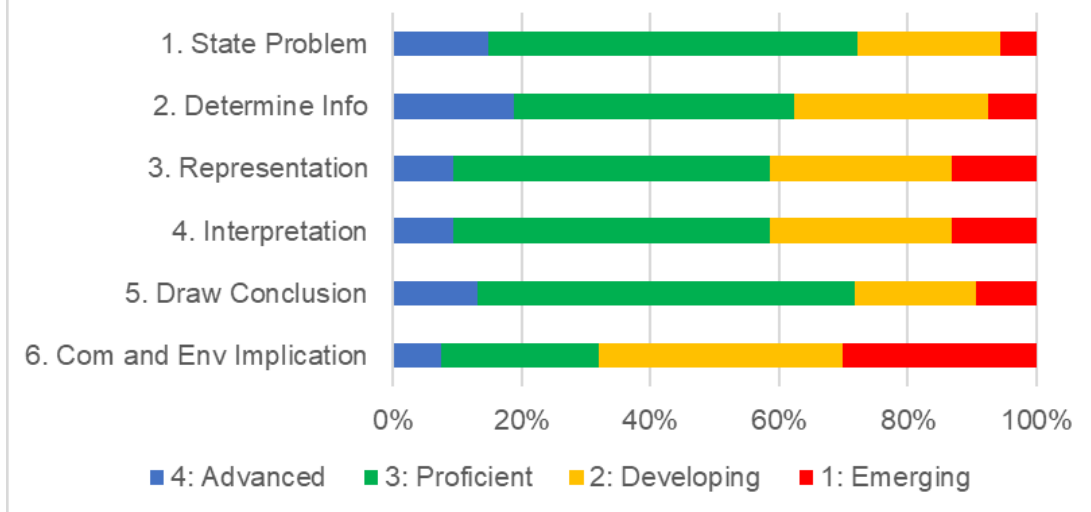
As stated in Question #9 of the plan, we expected to provide instructor scores to each participating member for comparative analysis. Due to the anonymity of the artifacts, we did not compile these scores for each instructor.

In Question #12 of the plan we expected to have two separate members of our SAC score each anonymous artifact to verify inter-rater reliability. However, due to a better understanding of the normalization process, we determined that after normalization, each evaluator would independently score 10 artifacts.

15. Please provide an executive summary of your results; include only key data points and your overall findings regarding student learning.

The results of the analysis for the CH100 Signature Assignments support that most students are successfully meeting the PCC Quantitative Reasoning outcome by applying the concepts for the Scientific Method to an independent project.

2021-2022 CH100 Assessment Results for Quantitative Reasoning



The stacked bar chart illustrates the student achievement for each of the 6 dimensions using the Quantitative Reasoning Rubric. More than 87% of all assessed students achieved the desired level 2 or higher for the first 5 dimensions of the rubric as evidenced by the combination of the blue, green, and yellow bars. Surprisingly, more students scored at a level 3 for dimensions 1-5, as indicated by the larger green bar compared to the other colors for each dimension. For dimensions 3 and 4 more than 10% of the students did not meet the desired level 2, which corresponds to students creating a graph of the experimental data and interpreting the results of the graph. Only 70% of the assessed students met level 2 or higher for Dimension 6: Community and Environmental Implications, which will be addressed below.

It is also important to note that the scorers did not distinguish between students who did not answer an assignment question and the students who attempted an answer, but received a score of 1. If this assessment is repeated, the scorers will add a level 0 for students who did not attempt an answer for the evaluated question.

Overall, the majority of CH100 students are successfully learning Quantitative Reasoning skills with the implementation of the Scientific Method Signature Assignment. In order to improve the accuracy of the assessment, the following were identified as necessary improvements to the signature assignment questions to help improve student success.

- Although 94% of the students met Dimension 1: State the Problem or Question at level 2--the wording of the assignment questions do not provide students with an opportunity to provide context or the reason they are interested in investigating the particular question. Students successfully identified the question investigated for the assignment, but many students did not explain **why** they were interested in the specific question.

- A possible reason that more than 10% of the students did not meet level 2 for Dimensions 3 and 4 includes the timing for students to complete the assignment. Since the assignment was completed by most students earlier in the term (before Week 5), then the students may not have had a lot of in-class instruction or practice with making and interpreting graphs. The SAC may consider having students complete the assignment after Week 5 to ensure that students have more practice and feedback with graphing skills.
- The assignment questions need to be revised for Dimension 5: Draw Conclusions to provide students with the opportunity to qualify their conclusions and to consider the limitations of the information. Students successfully made valid conclusions based on their individual experimental results, but many students did not identify or consider the limitations of their conclusion.
- Dimension 6: Community and Environmental Implications was not met by 30% of the assessed students.
 - The assignment needs to instruct students that their answer to the community and environmental implication question does not require a direct relationship to their independent experiment.
 - The report sheet for the assignment did not provide enough space for the students to provide a thorough and complete answer for this dimension.
 - The Dimension 6 questions on the Signature Assignment report sheet varied between the faculty due to some faculty members using an older version of the assignment report sheet. Although the assignment was updated, approved by the SAC during the Fall 2021 SAC Meeting, and linked in the assessment instruction email, some CH100 faculty members did not realize that they were using an older version of the signature assignment when they copied their D2L shell for the Winter Term. This resulted in variation in the student questions and subsequent answers that did not map consistently to the rubric.
 - The questions that map to Dimension 6 need to include specific questions asking for the hypothesis statement and to identify dependent, independent, and dependent variables.

16. Please accompany your report with the numerical results (disaggregated data or raw data) and data analysis of your project as an appendix (i.e. along with this report, send the project results themselves as a spreadsheet or document) if possible. If that is not possible, please explain.*

https://docs.google.com/spreadsheets/d/1_7VgBoZEpnTtxWTXTAhcysjKB5W35T0j3OSI-6kaolw/edit?usp=sharing

17a. What were the benchmarks levels (minimum acceptable level of student achievement of the outcome) for the project?*

For each dimension on the DSAC rubric, the minimum acceptable level for student achievement is Level 2: Developing (PCC Benchmark).

17b. What percentage or frequency of students achieved the benchmark levels?*

The percent of students who met each dimension of the rubric with the PCC Benchmark score of 2 or higher is shown in parentheses next to the corresponding dimension.

- 1. State the Problem (94%)
- 2. Determine Information Needed (92%)
- 3. Representation (87%)
- 4. Interpretation (89%)
- 5. Conclusions (91%)
- 6. Community and Environmental Implications (70%)

18. How was student work redacted (i.e. made anonymous)?*

After the files were uploaded into the SAC assessment folder, the SAC co-chair randomly renamed every file as Artifact # (Artifact 1.pdf, Artifact 2.pdf, ... Artifact 56.pdf) and removed all names (student and instructor) within the document using Adobe Acrobat editor. These anonymous files were uploaded into the 2022 Anonymous Artifacts Google Drive folder and shared with the assessment team for evaluation.

19. If the SAC used a rubric, please describe any changes to the norming and scoring process described in the plan (question 12). Share the inter-rater reliability score below.

These changes were made from the original plan: In the norming session, three anonymous artifacts were scored independently by five members of the chemistry SAC. A spreadsheet was used to calculate the inter-rater reliability based on whether the benchmark was met or not for each dimension of the rubric. If the inter-rater reliability score for a dimension was below 70%, that dimension was discussed in detail to reconcile differing scores. After scoring three artifacts in this manner and achieving >80% inter-rater reliability, the balance of the artifacts were scored independently.

20. In general terms, describe the level of SAC involvement in the project (e.g. were both PT and FT faculty involved in contributing and/or scoring student work? Did all instructors or a representative sample of instructors contribute student work to be evaluated?)

All PT and FT faculty were invited to participate in contributing and/or scoring student work. All faculty (7 PT and 1 FT) who taught CH100 in the W2022 term contributed 7 artifacts from their class. The artifacts were scored by 3 FT faculty, 1 PT faculty, and 1 academic professional who teaches as a PT faculty in the chemistry SAC.

21. Identify any barriers to participation in learning assessment within the SAC. Describe any external factors that got in the way of learning assessment this year -- for example, funding, time constraints, cancelled courses, faculty workload, etc.

The greatest barrier for faculty to participate in the 2021-2022 assessment was the limited options for everyone to meet for a 3 hour work session due to teaching schedules and other commitments.

22. What potential benefits to student learning were identified as a result of the assessment project? How will the SAC use the information during the reassessment of the outcome in the future (i.e. “closing the loop.”)*

As a result of this project the Chemistry SAC learned that the majority of students (>70%) enrolled in CH100 are meeting Level 2 for all 6 dimensions.

The potential benefits to student learning as a result of the assessment project include the ability to apply the Scientific Method to many different problems. The signature assignment required students to identify a problem, design an experiment to investigate the problem, collect the data, represent the data in a table and as a graph, interpret the results, and draw valid conclusions. This process is utilized in most science labs and scientific inquiry.

Even with the edits we will make to the question that is used to score dimension six, in the future we could also help our students practice ways in which the scientific method can be used to investigate community issues outside the confines of the science lab. This can be accomplished by the addition of a class exercise in which students are asked to read a news article about a particular issue in the community, brainstorm in small groups, and then discuss ways the scientific method could be used to understand the issue and to find solutions.

23. If the results of the project indicate a need for additional instruction on the outcome in the future (i.e. during the reassessment year), what are the possible steps the SAC might take to help students improve outcome achievement?*

Since the majority of the assessed students (>87%) are meeting the Quantitative Reasoning outcome at Level 2 or higher for dimensions 1-5, it does not appear that additional instruction is required for this outcome. Instead, the SAC will revise some questions in the assignment report sheet to improve the mapping to the rubric. By improving the wording of the questions, the students should be able to improve the achieved level. In addition, having students complete the assignment later in the term may allow for more students to achieve level 2 or higher for dimensions 3 and 4 (making and interpreting a graph).

In order to help students improve outcome achievement for dimension 6, the instructors can implement an assignment to address a particular issue in the community. Allowing for student discussion of how the scientific method can be applied to a specific community issue can help more students achieve level 2.

The Chemistry SAC created a subcommittee to revise the signature assignment during the Fall 2022 term for implementation in the Winter 2023 term. The subcommittee will use the results and feedback from this assessment and the signature assignment feedback provided from the instructors who utilized the assignment in the 2021-2022 academic year.

24. If this was a reassessment, were any modifications to instruction implemented between the prior assessment and this one? How did the assessment methods and results compare with the prior assessment?*

N/A

25. Please explain how results have been shared, or will be shared, with members of your SAC.

The results of the assessment were shared and discussed with the Chemistry SAC at the Spring 2022 SAC In-service Meeting. The revised Signature Assignment will be discussed at the Fall 2022 SAC In-service Meeting for implementation in the Winter 2023 term.

26. What changes would you make to your assessment design, methods or process? Please comment briefly on any possible changes to your assessment process that would lead to more meaningful assessment results -- for example, increasing your sample size, or improvements to the norming process, etc.

Compared to previous years for assessment, the normalization process appeared to work very efficiently, which allowed the subsequent artifact analysis to be completed in the limited 3-hour work session. We do not see a need to change the process.

27. Based on your experience with assessment this year, are there any areas that you might want help with from your LAC coach?

No

28. Is there anything else you want to share with reviewers about your assessment project?

No

Please submit your report to learningassessment@pcc.edu by June 24, 2021.

Submission checklist:

- Full report
- Numerical results (disaggregated data or raw data) and data analysis as an appendix.

Appendix

Link to artifact scoring

https://docs.google.com/spreadsheets/d/1_7VgBoZEpnTtxWTXTAhcysjKB5W35T0j3OSI-6kaolw/edit?usp=sharing

Artifact #	Rubric 1 State Problem	Rubric 2 Determine Information	Rubric 3 Representati on	Rubric 4 Interpretation	Rubric 5 Conclusions	Rubric 6 Community
1	2.6	2.8	2.4	2.6	2.8	2.4
2	2	1.75	2.75	3.25	2.5	1.75
3	3	2.8	2.6	1.2	2.4	1
4	3	4	3	3	3	3
5	2	3	2	2	3	3
6	3	3	3	3	4	1
7	3	3	3	3	3	2
8	3	3	1	2	3	2

9	3	3	1	3	3	1
10	3	2	2	3	3	2
11	3	3	4	3	3	2
12	2	3	3	1	3	2
13	3	3	2	2	3	4
14	4	4	3	4	3	2
15	4	4	3	2	3	4
16	2	2	3	2	2	1
17	3	3	2	2	2	2
18	3	4	3	4	4	3
19	3	4	3	3	3	1
20*						
21*						
22	3	2	3	2	3	1
23	1	2	3	3	2	4
24	4	4	4	4	4	4
25	4	4	2	3	3	3
26	4	3	4	2	4	3
27	3	3	2	2	2	1
28	4	4	3	4	4	2
29	4	4	4	2	4	3
30	2	2	3	2	2	3
31	3	3	3	3	3	2
32	4	4	4	4	4	2
33	3	2	3	3	2	2

34*	3						
35	2	1	2	3	2	1	
36	2	2	3	2	2	1	
37	3	1	3	3	3	1	
38	3	3	3	3	1	2	
39	3	2	1	1	2	1	
40	2	2	2	3	3	2	
41	3	3	3	3	3	3	
42	3	2	1	1	3	2	
43	3	3	3	3	3	2	
44	3	2	2	3	3	1	
45	3	3	2	3	3	2	
46	3	3	3	3	3	3	
47	2	2	1	1	1	1	
48	3	3	3	3	3	2	
49	3	3	3	2	3	3	
50	1	1	1	1	1	1	
51	1	1	2	2	1	2	
52	2	2	1	1	1	1	
53	2	3	2	3	3	3	
54	3	3	3	3	3	3	
55	3	2	2	3	3	1	
56	2	2	2	2	3	3	
% MET	94%	92%	87%	89%	91%	70%	

*Due to various issues, three artifacts could not be scored with the rubric.

of students reaching each level for each dimension

Level	6. Com and Env Implication	5. Draw Conclusion	4. Interpretation	3. Representation	2. Determine Info	1. State Problem
4	4	7	5	5	10	8
3	13	31	26	26	23	31
2	20	10	15	15	16	12
1	16	5	7	7	4	3