2015-2016
Annual Assessment Report Template

For instructions and guidelines visit our **website**
or **contact us** for more help.

Report: BS Geology

Question 1: Program Learning Outcomes

Q1.1.
Which of the following Program Learning Outcomes (PLOs) and Sac State Baccalaureate Learning Goals (BLGs) **did you assess?** [**Check all that apply**]

- ☐ 1. Critical Thinking
- ☐ 2. Information Literacy
- ☐ 3. Written Communication
- ☐ 4. Oral Communication
- ☐ 5. Quantitative Literacy
- ☐ 6. Inquiry and Analysis
- ☐ 7. Creative Thinking
- ☐ 8. Reading
- ☐ 9. Team Work
- ☑ 10. Problem Solving
- ☐ 11. Civic Knowledge and Engagement
- ☐ 12. Intercultural Knowledge and Competency
- ☐ 13. Ethical Reasoning
- ☐ 14. Foundations and Skills for Lifelong Learning
- ☐ 15. Global Learning
- ☐ 16. Integrative and Applied Learning
- ☐ 17. Overall Competencies for GE Knowledge
- ☑ 18. Overall Competencies in the Major/Discipline
- ☐ 19. Other, specify any assessed PLOs not included above:

a.
b.
c.

Q1.2.
Please provide more detailed background information about **EACH PLO** you checked above and other information such as how your specific PLOs are **explicitly** linked to the Sac State BLGs:

We assessed three PLOs for our undergraduate programs this semester:

1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.
2. Students will be proficient in solving geologic problems
3. Students will be proficient in understanding and producing geologic maps

These align with the BLGS as shown:

Program Learning Outcomes (PLOs)	University Baccalaureate Learning Goals (BALGs)
1. Students will master a set of fundamental earth science concepts essential to understanding and solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World
2. Students will be proficient in solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Integrative Learning,
3. Students will be proficient in introductory skills of understanding and producing geologic maps	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Personal and Social Responsibility Integrative Learning

Q1.2.1.
Do you have rubrics for your PLOs?

- ○ 1. Yes, for all PLOs
- ◉ 2. Yes, but for some PLOs
- ○ 3. No rubrics for PLOs
- ○ 4. N/A
- ○ 5. Other, specify:

Q1.3.
Are your PLOs closely aligned with the mission of the university?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q1.4.
Is your program externally accredited (other than through WASC Senior College and University Commission (WSCUC))?

- ○ 1. Yes
- ◉ 2. No (skip to **Q1.5**)

○ 3. Don't know (skip to **Q1.5**)

Q1.4.1.
If the answer to Q1.4 is **yes**, are your PLOs closely aligned with the mission/goals/outcomes of the accreditation agency?

○ 1. Yes
○ 2. No
○ 3. Don't know

Q1.5.
Did your program use the *Degree Qualification Profile* (DQP) to develop your PLO(s)?

◉ 1. Yes
○ 2. No, but I know what the DQP is
○ 3. No, I don't know what the DQP is
○ 4. Don't know

Q1.6.
Did you use action verbs to make each PLO measurable?

◉ 1. Yes
○ 2. No
○ 3. Don't know

(**Remember**: Save your progress)

Question 2: Standard of Performance for the Selected PLO

Q2.1.
Select **ONE(1)** PLO here as an example to illustrate how you conducted assessment (be sure you *checked the correct box* for this PLO in Q1.1):

Problem Solving

Q2.1.1.
Please provide more background information about the **specific PLO** you've chosen in Q2.1.

2. Students will be proficient in solving geologic problems

We define problem solving as the ability to use geologic skills and knowledge to solve problems that a working geologist might face. Geologists often work with conflicting or missing evidence and a high level of uncertainty. We are evaluating our student's ability to evaluate a problem, deal with this uncertainty and draw reasonable conclusions.

Q2.2.
Has the program developed or adopted **explicit** standards of performance for this PLO?

◉ 1. Yes
○ 2. No
○ 3. Don't know
○ 4. N/A

Q2.3.
Please **provide the rubric(s)** and **standards of performance** that you have developed for this PLO here or in the appendix.

Problem solving is "...the process of designing, evaluating, and implementing a strategy to answer an open-ended question or achieve a desired goal" (Association of American Colleges and Universities). We used the AACU value rubric to evaluate the process of problem solving, from initial definition of the problem to final evaluation of outcomes.

Our performance standards for problem solving follow these guidelines:

- An AACU "Benchmark 1" score implies basic understanding of the problem and proposes a superficial solution that does not address all issues. We expect 100% of our students to meet this basic goal.

- An AACU "Milestone 2" score suggests ability to identify and solve a problem with a single approach. Implementation and review of the solution may not address the complexity of related issues. We expect 80% of our students to meet the Milestone 2 score.

- An AACU "Milestone 3" score indicates that the student has a more complex understanding of the problem and related issues. Solutions that the student proposes evaluate different options and related work is considered.

- An AACU "Capstone 4" score shows insight and deep comprehension of the problem. Solutions consider related issues and feasibility, and reviews and outcomes are specific and detailed.

Geology problem solving VALUE rubric 2016.doc
192 KB

No file attached

Q2.4. PLO	Q2.5. Stdrd	Q2.6. Rubric	Please indicate where you have published the **PLO**, the **standard** of performance, and the **rubric** that was used to measure the PLO:
☑	☐	☐	1. In **SOME** course syllabi/assignments in the program that address the PLO
☐	☐	☐	2. In **ALL** course syllabi/assignments in the program that address the PLO
☐	☐	☐	3. In the student handbook/advising handbook
☐	☐	☐	4. In the university catalogue
☐	☐	☐	5. On the academic unit website or in newsletters
☑	☑	☑	6. In the assessment or program review reports, plans, resources, or activities
☑	☐	☐	7. In new course proposal forms in the department/college/university
☐	☐	☐	8. In the department/college/university's strategic plans and other planning documents
☐	☐	☐	9. In the department/college/university's budget plans and other resource allocation documents
☐	☐	☐	10. Other, specify:

Question 3: Data Collection Methods and Evaluation of Data Quality for the Selected PLO

Q3.1.
Was assessment data/evidence **collected** for the selected PLO?

- ◉ 1. Yes
- ○ 2. No (skip to **Q6**)
- ○ 3. Don't know (skip to **Q6**)
- ○ 4. N/A (skip to **Q6**)

Q3.1.1.
How many assessment tools/methods/measures **in total** did you use to assess this PLO?

1

Q3.2.
Was the data **scored / evaluated** for this PLO?

- (●) 1. Yes
- ( ) 2. No (skip to **Q6**)
- ( ) 3. Don't know (skip to **Q6**)
- ( ) 4. N/A (skip to **Q6**)

Q3.2.1.
Please describe how you collected the assessment data for the selected PLO. For example, in what course(s) or by what means were data collected:

This year was a pilot effort to collect data on geologic problem solving. We considered using the VALUE rubric to evaluate group projects, but the performance standards did not align with our assignments. We eventually embedded problem solving assessment in the final exams from some of the core courses in the major. This year, we made our first attempt using an exam question in a junior level course, GEOL 103.

(**Remember**: Save your progress)

Question 3A: Direct Measures (key assignments, projects, portfolios, etc.)

Q3.3.
Were direct measures (key assignments, projects, portfolios, course work, student tests, etc.) used to assess this PLO?

- (●) 1. Yes
- ( ) 2. No (skip to **Q3.7**)
- ( ) 3. Don't know (skip to **Q3.7**)

Q3.3.1.
Which of the following direct measures were used? [**Check all that apply**]

- [ ] 1. Capstone project (e.g. theses, senior theses), courses, or experiences
- [ ] 2. Key assignments from required classes in the program
- [ ] 3. Key assignments from elective classes
- [x] 4. Classroom based performance assessment such as simulations, comprehensive exams, or critiques
- [ ] 5. External performance assessments such as internships or other community-based projects
- [ ] 6. E-Portfolios
- [ ] 7. Other Portfolios
- [x] 8. Other, specify: Exam question in core course.

Q3.3.2.
Please **explain** and **attach** the direct measure you used to collect data:

Students answered the following question on the final exam for Geology 103 (sedimentology and stratigraphy):

18) Could a sedimentary deposit be compositionally immature *and* texturally mature? Explain your answer and give examples. Discuss grain types or mineral types, distance to source, transporting agents or depositional environments to support your answer. (10 points)

This question outlines an apparent discrepency between compositional and texural maturity. A "Capstone" response on the Value rubric requires a deep understanding of the concepts and review of several related options and issues.

The final exam used to collect this information is attached.

Geol 103 final exam Spring 2016.doc
34.5 KB

No file attached

Q3.4.
What tool was used to evaluate the data?

- ○ 1. **No** rubric is used to interpret the evidence (skip to **Q3.4.4.**)
- ○ 2. Used rubric developed/modified by the faculty who teaches the class (skip to **Q3.4.2.**)
- ○ 3. Used rubric developed/modified by a group of faculty (skip to **Q3.4.2.**)
- ○ 4. Used rubric pilot-tested and refined by a group of faculty (skip to **Q3.4.2.**)
- ◉ 5. The VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 6. Modified VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 7. Used other means (Answer **Q3.4.1.**)

Q3.4.1.
If you used other means, which of the following measures was used? [**Check all that apply**]

- ☐ 1. National disciplinary exams or state/professional licensure exams (skip to **Q3.4.4.**)
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.) (skip to **Q3.4.4.**)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.) (skip to **Q3.4.4.**)
- ☐ 4. Other, specify: _____ (skip to **Q3.4.4.**)

Q3.4.2.
Was the **rubric** aligned directly and explicitly **with the PLO**?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q3.4.3.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the rubric**?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q3.4.4.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the PLO**?

- ◉ 1. Yes
- ○ 2. No

- ○ 3. Don't know
- ○ 4. N/A

Q3.5.
How many faculty members participated in planning the assessment data **collection** of the selected PLO?

2

Q3.5.1.
How many faculty members participated in the **evaluation** of the assessment data for the selected PLO?

1

Q3.5.2.
If the data was evaluated by multiple scorers, was there a norming process (a procedure to make sure everyone was scoring similarly)?

- ○ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ◉ 4. N/A

Q3.6.
How did you **select** the sample of student work (papers, projects, portfolios, etc.)?

All students in the class.

Q3.6.1.
How did you **decide** how many samples of student work to review?

All students in the class.

Q3.6.2.
How many students were in the class or program?

28

Q3.6.3.
How many samples of student work did you evaluated?

Q3.6.4.
Was the sample size of student work for the direct measure adequate?

- (•) 1. Yes
- ( ) 2. No
- ( ) 3. Don't know

(**Remember**: Save your progress)

Question 3B: Indirect Measures (surveys, focus groups, interviews, etc.)

Q3.7.
Were indirect measures used to assess the PLO?

- ( ) 1. Yes
- (•) 2. No (skip to **Q3.8**)
- ( ) 3. Don't Know (skip to **Q3.8**)

Q3.7.1.
Which of the following indirect measures were used? [**Check all that apply**]

- [ ] 1. National student surveys (e.g. NSSE)
- [ ] 2. University conducted student surveys (e.g. OIR)
- [ ] 3. College/department/program student surveys or focus groups
- [ ] 4. Alumni surveys, focus groups, or interviews
- [ ] 5. Employer surveys, focus groups, or interviews
- [ ] 6. Advisory board surveys, focus groups, or interviews
- [ ] 7. Other, specify:

Q3.7.1.1.
Please explain and attach the indirect measure you used to collect data:

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Q3.7.2.
If surveys were used, how was the sample size **decided**?

Q3.7.3.
If surveys were used, how did you **select** your sample:

Q3.7.4.
If surveys were used, what was the response rate?

Question 3C: Other Measures (external benchmarking, licensing exams, standardized tests, etc.)

Q3.8.
Were external benchmarking data, such as licensing exams or standardized tests, used to assess the PLO?

- ○ 1. Yes
- ◉ 2. No (skip to **Q3.8.2**)
- ○ 3. Don't Know (skip to **Q3.8.2**)

Q3.8.1.
Which of the following measures was used? [**Check all that apply**]

- ☐ 1. National disciplinary exams or state/professional licensure exams
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.)
- ☐ 4. Other, specify:

Q3.8.2.
Were other measures used to assess the PLO?

- ○ 1. Yes
- ◉ 2. No (skip to **Q4.1**)
- ○ 3. Don't know (skip to **Q4.1**)

Q3.8.3.
If other measures were used, please specify:

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(**Remember**: Save your progress)

Question 4: Data, Findings, and Conclusions

Q4.1.
Please provide simple tables and/or graphs to summarize the assessment data, findings, and conclusions for the selected PLO for **Q2.1**:

A summary of the VALUE rubric results is attached. Results for each part of the assessment are scored from 1 to 4 and plotted as cumulative frequency. The y axis on these plots shows the percentage of students who have reached a certain level of problem solving. The x axis on these plots shows the level of problem solving they have reached:

20 = level 1 (benchmark) understanding

50 = level 2 (milestone) understanding

70 = level 3 (milestone) understanding

Spring 2016 Geology 103 rubric histogram.pdf
72.24 KB

No file attached

Q4.2.
Are students doing well and meeting the program standard? If not, how will the program work to improve student performance of the selected PLO?

We expected 80% of our students to reach an overall problem solving rating of level 2 (milestone). We found that 65% of our students actually reached this level.

Results were generally good, although specific aspects of problem solving still need to be addressed and we plan to work on scientific problem solving in future years.

65% of our students were able to define a complex problem with basic level 2 (milestone) understanding.

80% of students were able to evaluate outcomes with level 2 (milestone) understanding.

65% of students were able to evaluate potential solutions with level 2 (milestone) understanding.

80% of students were able propose strategies with level 2 (milestone) understanding.

80% of students proposed to implement solutions with level 2 (milestone) understanding.

70% of students proposed hypotheses or solutions with level 2 (milestone) understanding.

Overall, 65% of the students met the problem solving standard at a level 2 (milestone) or higher, and 25% of our students met the problem solving standard at a level 3 (milestone) or higher. Less than 5% of our students had an overall problem solving ability of level 4 (capstone).

The largest areas for improvement are the student's abilty to define a complex problem and evaluate multiple solutions. We would also like to see improvement in the ability of students to propose multiple hypotheses. Many students were linear and focused on a single solution, and we will address these issues in future classes.

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Q4.3.
For the selected PLO, the student performance:

- ○ 1. **Exceeded** expectation/standard
- ○ 2. **Met** expectation/standard
- ◉ 3. **Partially** met expectation/standard
- ○ 4. Did not meet expectation/standard
- ○ 5. No expectation/standard has been specified
- ○ 6. Don't know

Question 4A: Alignment and Quality

Q4.4.
Did the data, including the direct measures, from all the different assessment tools/measures/methods directly align with the PLO?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q4.5.
Were **all** the assessment tools/measures/methods that were used good measures of the PLO?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Question 5: Use of Assessment Data (Closing the Loop)

Q5.1.
As a result of the assessment effort and based on prior feedback from OAPA, do you anticipate *making any changes* for your program (e.g. course structure, course content, or modification of PLOs)?

- ◉ 1. Yes
- ○ 2. No (skip to **Q5.2**)
- ○ 3. Don't know (skip to **Q5.2**)

Q5.1.1.
Please describe *what changes* you plan to make in your program as a result of your assessment of this PLO. Include a description of how you plan to assess the impact of these changes.

We will stress multiple working hypotheses and complex solutions to problems in future classes. Students will be required to reflect on scientific problems in a variety of classroom and field settings.

Our assessment method may also change as a result of this pilot study. A single exam question probably didn't capture the entire range of responses to problem solving, and we will consider longer projects or different formats for this assessment.

Q5.1.2.
Do you have a plan to assess the *impact of the changes* that you anticipate making?

- (●) 1. Yes
- ( ) 2. No
- ( ) 3. Don't know

Q5.2.
How have the assessment data from the last annual assessment been used so far? [**Check all that apply**]

	1. Very Much	2. Quite a Bit	3. Some	4. Not at All	5. N/A
1. Improving specific courses	●	○	○	○	○
2. Modifying curriculum	○	○	●	○	○
3. Improving advising and mentoring	○	○	●	○	○
4. Revising learning outcomes/goals	○	○	○	●	○
5. Revising rubrics and/or expectations	○	○	●	○	○
6. Developing/updating assessment plan	○	○	○	●	○
7. Annual assessment reports	●	○	○	○	○
8. Program review	●	○	○	○	○
9. Prospective student and family information	○	○	○	●	○
10. Alumni communication	○	○	○	●	○
11. WSCUC accreditation (regional accreditation)	○	○	○	○	●
12. Program accreditation	○	○	○	○	●
13. External accountability reporting requirement	○	○	○	○	●
14. Trustee/Governing Board deliberations	○	○	○	○	●
15. Strategic planning	○	○	○	●	○
16. Institutional benchmarking	○	○	○	○	●
17. Academic policy development or modifications	○	○	○	●	○
18. Institutional improvement	○	○	○	●	○
19. Resource allocation and budgeting	○	○	○	●	○
20. New faculty hiring	○	○	○	●	○
21. Professional development for faculty and staff	○	○	○	●	○
22. Recruitment of new students	○	○	○	●	○

23. Other, specify:

Q5.2.1.
Please provide a detailed example of how you used the assessment data above:

The instructors of our field courses have used the results to tighten up the curriculum across both the junior and senior field courses, and the prerequisite courses.

(**Remember**: Save your progress)

Additional Assessment Activities

Q6.
Many academic units have collected assessment data on aspect of their program *that are not related to the PLOs* (i.e. impacts of an advising center, etc.). **If** your program/academic unit has collected data on program *elements*, please briefly report your results here:

No file attached No file attached

Q7.
What PLO(s) do you plan to assess next year? [**Check all that apply**]

- [ ] 1. Critical Thinking
- [ ] 2. Information Literacy
- [ ] 3. Written Communication
- [ ] 4. Oral Communication
- [ ] 5. Quantitative Literacy
- [ ] 6. Inquiry and Analysis
- [ ] 7. Creative Thinking
- [ ] 8. Reading
- [ ] 9. Team Work
- [x] 10. Problem Solving
- [ ] 11. Civic Knowledge and Engagement
- [ ] 12. Intercultural Knowledge and Competency
- [ ] 13. Ethical Reasoning
- [ ] 14. Foundations and Skills for Lifelong Learning
- [ ] 15. Global Learning
- [ ] 16. Integrative and Applied Learning
- [ ] 17. Overall Competencies for GE Knowledge
- [x] 18. Overall Competencies in the Major/Discipline
- [ ] 19. Other, specify any PLOs not included above:

a.

b.

c.

Q8. Please attach any additional files here:

No file attached | No file attached | No file attached | No file attached

Q8.1.
Have you attached any files to this form? If yes, please list every attached file here:

Geology problem solving value rubric 2016

Geology 103 final exam Spring 2016

Spring 2016 Geology 103 rubric histogram

Program Information (**Required**)

P1.
Program/Concentration Name(s): [by degree]

BS Geology

P1.1.
Program/Concentration Name(s): [by department]

Geology BS

P2.
Report Author(s):

Judi Kusnick

P2.1.
Department Chair/Program Director:

Tim Horner

P2.2.
Assessment Coordinator:

Judi Kusnick/Amelia Paukert

P3.
Department/Division/Program of Academic Unit

Geology

P4.
College:

College of Natural Science & Mathematics

P5.
Total enrollment for Academic Unit during assessment semester (see Departmental Fact Book):

98

P6.
Program Type:

- (●) 1. Undergraduate baccalaureate major
- ( ) 2. Credential

○ 3. Master's Degree

○ 4. Doctorate (Ph.D./Ed.D./Ed.S./D.P.T./etc.)

○ 5. Other, specify:

P7. Number of **undergraduate degree programs** the academic unit has?

3

P7.1. List all the names:

BS Geology

BA Geology

BA Earth Science

P7.2. How many concentrations appear on the diploma for this undergraduate program?

0

P8. Number of **master's degree programs** the academic unit has?

1

P8.1. List all the names:

MS Geology

P8.2. How many concentrations appear on the diploma for this master's program?

0

P9. Number of **credential programs** the academic unit has?

0

P9.1. List all the names:

P10. Number of **doctorate degree programs** the academic unit has?

0

P10.1. List all the names:

When was your **assessment plan**...	1. Before 2010-11	2. 2011-12	3. 2012-13	4. 2013-14	5. 2014-15	6. No Plan	7. Don't know
P11. developed?	◉	○	○	○	○	○	○
P11.1. last updated?	○	○	○	◉	○	○	○

P11.3.
Please attach your latest **assessment plan**:

Appendix 1 2013-14 Assessment Plan.pdf
45.11 KB

P12.
Has your program developed a **curriculum map?**

◉ 1. Yes
○ 2. No
○ 3. Don't know

P12.1.
Please attach your latest **curriculum map**:

BS curriculum map.doc
286.5 KB

P13.
Has your program indicated in the curriculum map where assessment **of student learning** occurs?

◉ 1. Yes
○ 2. No
○ 3. Don't know

P14.
Does your program have a capstone class?

◉ 1. Yes, indicate: GEOL 188
○ 2. No
○ 3. Don't know

P14.1.
Does your program have **any** capstone project?

◉ 1. Yes
○ 2. No

○ 3. Don't know

(**Remember**: Save your progress)

PROBLEM SOLVING VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can by shared nationally through a common dialog and understanding of student success.

Definition

Problem solving is the process of designing, evaluating and implementing a strategy to answer an open-ended question or achieve a desired goal.

Framing Language

Problem-solving covers a wide range of activities that may vary significantly across disciplines. Activities that encompass problem-solving by students may involve problems that range from well-defined to ambiguous in a simulated or laboratory context, or in real-world settings. This rubric distills the common elements of most problem-solving contexts and is designed to function across all disciplines. It is broad-based enough to allow for individual differences among learners, yet is concise and descriptive in its scope to determine how well students have maximized their respective abilities to practice thinking through problems in order to reach solutions.

This rubric is designed to measure the quality of a **process**, rather than the quality of an **end-product**. As a result, work samples or collections of work will need to include some evidence of the individual's thinking about a problem-solving task (e.g., reflections on the process from problem to proposed solution; steps in a problem-based learning assignment; record of think-aloud protocol while solving a problem). The final product of an assignment that required problem resolution is insufficient without insight into the student's problem-solving process. Because the focus is on institutional level assessment, scoring team projects, such as those developed in capstone courses, may be appropriate as well.

Glossary

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

- Contextual Factors: Constraints (such as limits on cost), resources, attitudes (such as biases) and desired additional knowledge which affect how the problem can be best solved in the real world or simulated setting.
- Critique: Involves analysis and synthesis of a full range of perspectives.
- Feasible: Workable, in consideration of time-frame, functionality, available resources, necessary buy-in, and limits of the assignment or task.
- "Off the shelf"solution: A simplistic option that is familiar from everyday experience but not tailored to the problem at hand (e.g. holding a bake sale to "save" an underfunded public library).
- Solution: An appropriate response to a challenge or a problem.
- Strategy: A plan of action or an approach designed to arrive at a solution. (If the problem is a river that needs to be crossed, there could be a construction-oriented, cooperative (build a bridge with your community) approach and a personally oriented, physical (swim across alone) approach. An approach that partially applies would be a personal, physical approach for someone who doesn't know how to swim.
- Support: Specific rationale, evidence, etc. for solution or selection of solution.

PROBLEM SOLVING VALUE RUBRIC

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Define Problem	Demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant contextual factors.	Demonstrates the ability to construct a problem statement with evidence of most relevant contextual factors, and problem statement is adequately detailed.	Begins to demonstrate the ability to construct a problem statement with evidence of most relevant contextual factors, but problem statement is superficial.	Demonstrates a limited ability in identifying a problem statement or related contextual factors.
Identify Strategies	Identifies multiple approaches for solving the problem that apply within a specific context.	Identifies multiple approaches for solving the problem, only some of which apply within a specific context.	Identifies only a single approach for solving the problem that does apply within a specific context.	Identifies one or more approaches for solving the problem that do not apply within a specific context.
Propose Solutions/Hypotheses	Proposes one or more solutions/hypotheses that indicates a deep comprehension of the problem. Solution/hypotheses are sensitive to contextual factors as well as all of the following: ethical, logical, and cultural dimensions of the problem.	Proposes one or more solutions/hypotheses that indicates comprehension of the problem. Solutions/hypotheses are sensitive to contextual factors as well as the one of the following: ethical, logical, or cultural dimensions of the problem.	Proposes one solution/hypothesis that is "off the shelf" rather than individually designed to address the specific contextual factors of the problem.	Proposes a solution/hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement.
Evaluate Potential Solutions	Evaluation of solutions is deep and elegant (for example, contains thorough and insightful explanation) and includes, deeply and thoroughly, all of the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.	Evaluation of solutions is adequate (for example, contains thorough explanation) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.	Evaluation of solutions is brief (for example, explanation lacks depth) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.	Evaluation of solutions is superficial (for example, contains cursory, surface level explanation) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.
Implement Solution	Implements the solution in a manner that addresses thoroughly and deeply multiple contextual factors of the problem.	Implements the solution in a manner that addresses multiple contextual factors of the problem in a surface manner.	Implements the solution in a manner that addresses the problem statement but ignores relevant contextual factors.	Implements the solution in a manner that does not directly address the problem statement.
Evaluate Outcomes	Reviews results relative to the problem defined with thorough, specific considerations of need for further work.	Reviews results relative to the problem defined with some consideration of need for further work.	Reviews results in terms of the problem defined with little, if any, consideration of need for further work.	Reviews results superficially in terms of the problem defined with no consideration of need for further work

Name _____ Geology 103 Final Exam
Spring 2016

Short answer questions (5 points each): Answer all of the questions as completely as possible. Be sure to include a diagram or sketch if the question asks for it.

1) Distinguish between turbidity and turbulence

2) Describe the difference between cement and matrix in a sandstone.

3) Distinguish between Froude number and Reynold's number. Equations are not necessary, but give a general description of what each equation represents, and list significant "cut-off" values for each.

4) Describe the difference between a graded bed and a fining upward sequence. Draw a simple sketch of each.

5) What does planar tabular cross bedding look like in three dimensions? Draw a simple sketch.

6) What steps are required for a geologist to give a formal name to a formation?

7) Draw a simple sketch of a turbidity flow and label the parts. What drives a turbidity flow?

8) Name and briefly describe the processes that deliver sediment to the deep ocean.

9) Give a brief description of the *fossils* and *distinctive mineral(s)* that you would expect to find in a alluvial fan deposit.

10) Describe lateral trends in grain size, sedimentary structures and thickness in a crevasse splay deposit.

11) Name four methods that geologists use to measure grain size. Describe each.

12) Describe the series of reactions that buffer ocean water. Include sources and sinks of the ions or compounds that are involved. Show the complete reaction series in a simple sketch.

13) Name four grain types that are used in Folk's carbonate classification system. Draw a simple sketch of each.

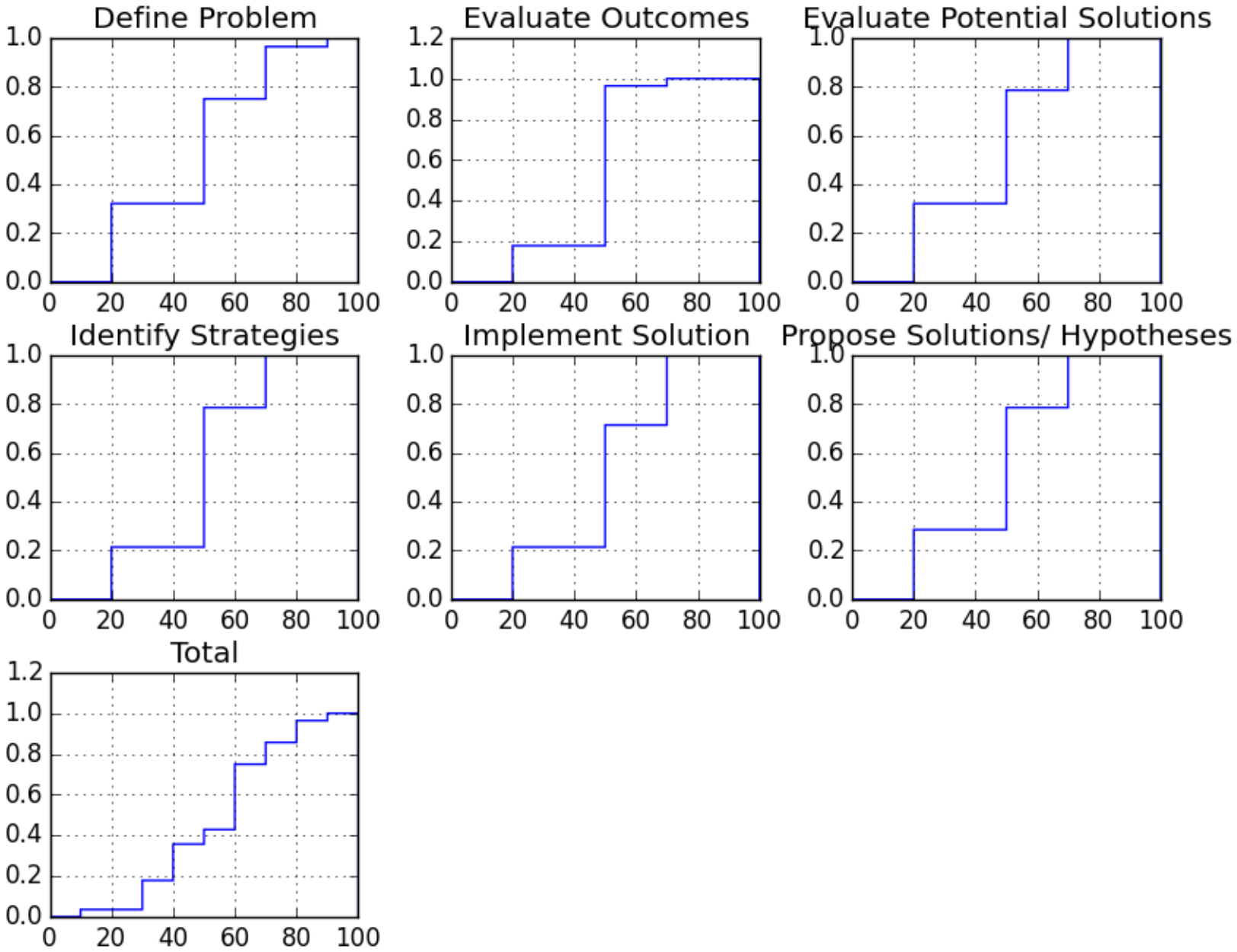
14) What minerals are common in an evaporite-dominated lacustrine deposit? List them in order of precipitation as a saline brine becomes more concentrated. Which has the greatest volume?

15) How would a coal petrologist determine the rank of a coal sample? List the variables or measurements that would be used in a laboratory setting.

16) What is the thalweg of a stream? Describe velocity patterns along a meander bend. Draw a cross section and/or map view to illustrate your discussion. Label the cut bank and point bar.

17) Describe the facies in a modern reef complex (Longman's classification). Draw a simple sketch that shows the location of each facies. *What types of coral or sediment* and *water depths* would you expect for each facies? (10 points)

18) Could a sedimentary deposit be compositionally immature *and* texturally mature? Explain your answer and give examples. Discuss grain types or mineral types, distance to source, transporting agents or depositional environments to support your answer. (10 points)


Define Problem
Evaluate Outcomes
Evaluate Potential Solutions
Identify Strategies
Implement Solution
Propose Solutions/ Hypotheses
Total

Appendix 1

Overall Program Goals for All Programs of the Geology Dept.

I. Students are prepared for professional and /or graduate study involving the geosciences;
II. Students develop a deep understanding of Earth systems: how Earth systems work and how they interact;
III. Students develop their ability to solve geologic problems through the use of scientific method;
IV. Students develop a deep curiosity about how the Earth works, and a lifelong appreciation of the Earth's place in space and time; and
V. Students develop their technical communication skills: seeking and processing technical information; and communicating technical information and conclusions in both oral and written form.

Summary of Assessment Data:

- Student Knowledge Inventory
- Geology 188 field maps and assignments
- Geology 111B field maps and assignments
- Embedded assignments from majors courses
- Writing rubrics from required assignments
- CSET scores

Summary of Assessment Tasks for 2014-2019

Year	Periodic Tasks	Yearly Tasks
2014-15	Geology 188 review	1. Administer SKI in Fall semester; compile results & review. 2. Collect Geology 188 rubrics, cross-sections and select maps 3. Collect Geology 111B rubrics, cross-sections and maps. 4. Collect writing rubrics 5. Collect embedded assignments from one course. 6. Collect CSET data from Earth Science majors.
2015-16	Geology 111B review	
2016-17	Embedded assessment review Geology 188 review	
2017-18	Writing review Geology 111B review	
2018-19	SKI longitudinal review	

Program Review Summary Tables

Table 2.1: Summary of Program Assessment in the Current Program Review Cycle[1]

List of all the degree programs for the Academic Unit	Developed an assessment plan	Updated the assessment plan	Developed PLOs	Developed/ adopted expectations/ standards/criterion for the PLOs	Explicitly Assessed PLOs	Collected **program** data	Used data for improvement	Previous Fall Enrollment[2]	External Accredited
I. Bachelor Degrees									
1 BS Geology	Pre-2009	2013	2013	2014	2013-15	2013-15	2013-15		No
2 BA Geology	Pre-2009	2013	2013	2014	2013-15	2013-15	2013-15		No
3 BA Earth Science	Pre-2009	2013	2013	2014	2013-15	2013-15	2013-15		No
II. Master Degrees									
1 MS Geology	2016	N/A	2015	In progress	N/A	N/A	N/A		No
2									
3									
III. Credential Programs									
1									
2									
3									
IV. Ph. D, Ed, d. and other high level degrees									
1									
2									

[1] Please use assessment feedback and reports from previous years to fill in the above table.
[2] Get the number from the **Departmental Fact Book**: http://www.csus.edu/oir/Data%20Center/Department%20Fact%20Book/Departmental%20Fact%20Book.html

Please list the names, email addresses, and phone numbers of the faculty who have filled out the table above:

Name: _____Judi Kusnick_____

Email: _____kusnickje@csus.edu_____ Assessment Coordinator: [X] Yes [ ] No

Phone No: _____278-4692_____ If not, who is: _____

Tips for answering: 1) yes, 2) no, 3) don't know

Table 2.2a. Inventory of Educational Effectiveness Indicators for Program Learning Outcomes

Name of the Program: _____BS Geology_____

Questions / **Year of Assessment**	What PLOs are **explicitly** assessed this year	Where are these PLOs published? (Please specify)	Other than GPA, what data/evidence[1] was used to determine that graduates have achieved stated outcomes for the degree?	What are the expectations and/or criterion for assessing these PLOs? Please attach the rubric as appendices if any?	What were the findings? What percentages of students met the expectations[2] (both aggregated and disaggregated)?	Who interpreted the evidence? What was the process?	How were the findings used? By whom?	Date of the last program review?
2014-15	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems. 2. Students will be proficient in solving geologic problems 3. Students will be proficient in understanding and producing geologic maps**.**	**In assessment plan** **In assessment report**	**1. Performance on knowledge inventory** **2 & 3. Performance on mapping task**	**1. 70% of seniors answer questions in each domain correctly** **2. & 3. 70% of students should be scoring 70% or above in each skill area**.	**1. Students met expectations in some areas and not others** **2 & 3. Students met expectations in some areas and not others** **See Appendix for data tables and discussion**	**1. Whole faculty** **2 & 3. Committee of field instructor**	**1. Changed instruction in courses** **2 & 3. Changed instruction and curriculum in field courses** **See Appendix for details**	
2013-14	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan** **In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not in others.** **See Appendix for longitudinal data.**	**Whole faculty**	**Instructional and curricular changes**	
2012-13	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems. 2. Students will be proficient in solving geologic problems 3. Students will be	**In assessment plan** **In assessment report**	**1. Performance on knowledge inventory** **2 & 3. Performance on mapping task**	**No expectations established yet. No rubric.**	**1. Students met expectations in some areas and not others** **2. & 3. Students below expectations in cross-section drawing.**	**Whole faculty**	**Instructional and curricular changes. Adopted mandatory advising every semester.**	

	proficient in understanding and producing geologic maps**.**							
2011-12	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan** **In assessment report**	**Performance on knowledge inventory**	**No expectations established yet.** **No rubric.**	**1. Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes**	
2010-11	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan** **In assessment report**	**Performance on knowledge inventory**	**No expectations established yet.** **No rubric.**	**1. Students met expectations in some areas and not others**	**Whole faculty**	**Revised assessment plan**	
2009-10	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems. 2. Students will be proficient in solving geologic problems 3. Students will be proficient in understanding and producing geologic maps**.**	**In assessment plan** **In assessment report**	**1. Performance on knowledge inventory** **2. & 3. Field camp grades (from other institutions)**	**No expectations established yet.** **No rubric.**	**1. Students met expectations in some areas and not others** **2. & 3. Average field camp grade of 3.5**	**Whole faculty**	**Instructional and curricular changes**	

[1] Examples of data and evidence: student work, exams, surveys, portfolios, e-portfolios, research projects, student reflections, quiz, final exam, presentation, project, performance, observations, classroom response systems, computer simulated tasks, analytical paper, case study, portfolio, critique, policy paper, qualifying or comprehensive examination, thesis, dissertation and many others.

[2] Examples of ways to express expectation(s)/standard(s) of performance: Percentages of all who "passed" at the 70% level; Number/Percentage of those scoring a 4.5/5.0 on an assignment assessment rubric; Number/percentage who scored at a designated level according to a standard rubric.

Table 2.2b. Inventory of Educational Effectiveness Indicators for Program Learning Outcomes

Name of the Program: ___BA Geology_____

Questions / **Year of Assessment**	What PLOs are **explicitly** assessed this year	Where are these PLOs published? (Please specify)	Other than GPA, what data/evidence[1] was used to determine that graduates have achieved stated outcomes for the degree?	What are the expectations and/or criterion for assessing these PLOs? Please attach the rubric as appendices if any?	What were the findings? What percentages of students met the expectations[2] (both aggregated and disaggregated)?	Who interpreted the evidence? What was the process?	How were the findings used? By whom?	Date of the last program review?
2014-15	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**70% of seniors answer questions in each domain correctly**	**Students met expectations in some areas and not others** **See Appendix for longitudinal data.**	**Whole faculty**	**Instructional and curricular changes**	
2013-14	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not in others.**	**Whole faculty**	**Instructional and curricular changes**	
2012-13	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes. Adopted mandatory advising every semester.**	
2011-12	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes**	
2010-11	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Revised assessment plan**	

2009-10	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes**	

[1] Examples of data and evidence: student work, exams, surveys, portfolios, e-portfolios, research projects, student reflections, quiz, final exam, presentation, project, performance, observations, classroom response systems, computer simulated tasks, analytical paper, case study, portfolio, critique, policy paper, qualifying or comprehensive examination, thesis, dissertation and many others.

[2] Examples of ways to express expectation(s)/standard(s) of performance: Percentages of all who "passed" at the 70% level; Number/Percentage of those scoring a 4.5/5.0 on an assignment assessment rubric; Number/percentage who scored at a designated level according to a standard rubric.

Table 2.2c. Inventory of Educational Effectiveness Indicators for Program Learning Outcomes

Name of the Program: ___BA Earth Science_____

Questions / **Year of Assessment**	What PLOs are **explicitly** assessed this year	Where are these PLOs published? (Please specify)	Other than GPA, what data/evidence[1] was used to determine that graduates have achieved stated outcomes for the degree?	What are the expectations and/or criterion for assessing these PLOs? Please attach the rubric as appendices if any?	What were the findings? What percentages of students met the expectations[2] (both aggregated and disaggregated)?	Who interpreted the evidence? What was the process?	How were the findings used? By whom?	Date of the last program review?
2014-15	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**70% of seniors answer questions in each domain correctly**	**Students met expectations in some areas and not others See Appendix for longitudinal data.**	**Whole faculty**	**Instructional and curricular changes**	
2013-14	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not in others.**	**Whole faculty**	**Instructional and curricular changes**	
2012-13	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes. Adopted mandatory advising every semester.**	
2011-12	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes**	
2010-11	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Revised assessment plan**	

2009-10	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.	**In assessment plan In assessment report**	**Performance on knowledge inventory**	**No expectations established yet. No rubric.**	**Students met expectations in some areas and not others**	**Whole faculty**	**Instructional and curricular changes**	

[1] Examples of data and evidence: student work, exams, surveys, portfolios, e-portfolios, research projects, student reflections, quiz, final exam, presentation, project, performance, observations, classroom response systems, computer simulated tasks, analytical paper, case study, portfolio, critique, policy paper, qualifying or comprehensive examination, thesis, dissertation and many others.

[2] Examples of ways to express expectation(s)/standard(s) of performance: Percentages of all who "passed" at the 70% level; Number/Percentage of those scoring a 4.5/5.0 on an assignment assessment rubric; Number/percentage who scored at a designated level according to a standard rubric.

Table 2.2d. Inventory of Educational Effectiveness Indicators for Program Learning Outcomes

Name of the Program: __MS Geology_____

Questions / Year of Assessment	What PLOs are **explicitly** assessed this year	Where are these PLOs published? (Please specify)	Other than GPA, what data/evidence[1] was used to determine that graduates have achieved stated outcomes for the degree?	What are the expectations and/or criterion for assessing these PLOs? Please attach the rubric as appendices if any?	What were the findings? What percentages of students met the expectations[2] (both aggregated and disaggregated)?	Who interpreted the evidence? What was the process?	How were the findings used? By whom?	Date of the last program review?
2015-16	Non - developed assessment plan this year	PLOs are published in our assessment plan	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2014-15	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2013-14	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2012-13	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2011-12	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2010-11	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	
2009-10	None – assessment plan not yet developed	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	

[1] Examples of data and evidence: student work, exams, surveys, portfolios, e-portfolios, research projects, student reflections, quiz, final exam, presentation, project, performance, observations, classroom response systems, computer simulated tasks, analytical paper, case study, portfolio, critique, policy paper, qualifying or comprehensive examination, thesis, dissertation and many others.

[2] Examples of ways to express expectation(s)/standard(s) of performance: Percentages of all who "passed" at the 70% level; Number/Percentage of those scoring a 4.5/5.0 on an assignment assessment rubric; Number/percentage who scored at a designated level according to a standard rubric.

Table 2.3a: A Comprehensive Assessment Plan for All the Programs in the Next Program Review Cycle

FOCUS: Student Learning

Connecting Program Goals, Program Learning Outcomes (PLOs), and Assessments

(Adopted from the CSU Chancellor's Office)

Name of the Program: ___BS Geology_____

Overarching Program Learning Goals	Corresponding Program Learning Outcomes (PLOs). (Each must directly relate to one or more Program Goals)	In which course(s) will the PLO(s) be assessed?	In which year will the PLO(s) be assessed and how often?	What types of assessment activities[1] will be used to collect the data?	What types of tools[2] will be used to score/evaluate the activity? Who will develop/modify the tool and/or evaluated the activities?	How will the data be collected? By whom?	How will the data be reported[3] (both aggregated and disaggregated), and by whom? What will be the standard of performance?	Who will analyze the data?	How will the data be used? By whom?
I. Students are prepared for professional and /or graduate study involving the geosciences; II. Students develop a deep understanding of Earth systems: how Earth systems work and how they interact; III. Students develop their ability to solve geologic problems through the use of scientific method; IV. Students develop a deep curiosity about how the Earth works, and a lifelong appreciation of the Earth's place in space and time; and V. Students develop their technical communication skills: seeking and	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems	GEOL 100 GEOL 110	Yearly, longitudinal review every 5 years (2018-19)	Student knowledge inventory (SKI), embedded assessments	SKI yields score, requires no rubric. Embedded assessment rubric developed by faculty	Data collected by course instructors. SKI: short test administered in one junior, one senior course. Embedded assessments: copies made of student work.	SKI: Scores disaggregated by topic and by junior/senior. 70% of seniors answer questions in each domain correctly	SKI: full faculty Enbedded assessments: subcommittee of faculty with relevant specialty	SKI: used by full faculty for instructional/curricular change. Embedded assessments: used by full faculty to track development of specific knowledge.
	2. Students will be proficient in solving geologic problems	GEOL 188	2014-15, every five years thereafter	Field reports from GEOL 188	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.

processing technical information; and communicating technical information and conclusions in both oral and written form.	3. Students will be proficient in understanding and producing geologic maps.	GEOL 188	2014-15, every five years thereafter	Field reports from GEOL 188	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.
	4. Students will be proficient writers, skilled in the genres of scientific and technical writing	GEOL 111B electives	2017-18, every five years thereafter	Field reports from GEOL 111B, Literature reviews from electives	Adapted VALUE Written Communication rubric	Data collected by course instructors. Copies of scoring rubrics kept, examples of different levels of writing.	70% of students should be scoring Milestone 2 or above in each skill area.	Data analyzed by writing subcommittee	Design and inclusion of writing supports for students into curriculum

Table 2.3b: A Comprehensive Assessment Plan for All the Programs in the Next Program Review Cycle
FOCUS: Student Learning
Connecting Program Goals, Program Learning Outcomes (PLOs), and Assessments
(Adopted from the CSU Chancellor's Office)
Name of the Program: ___BA Geology_____

Overarching Program Learning Goals	Corresponding Program Learning Outcomes (PLOs). (Each must directly relate to one or more Program Goals)	In which course(s) will the PLO(s) be assessed?	In which year will the PLO(s) be assessed and how often?	What types of assessment activities[1] will be used to collect the data?	What types of tools[2] will be used to score/evaluate the activity? Who will develop/modify the tool and/or evaluated the activities?	How will the data be collected? By whom?	How will the data be reported[3] (both aggregated and disaggregated), and by whom? What will be the standard of performance?	Who will analyze the data?	How will the data be used? By whom?
I. Students are prepared for professional and /or graduate study involving the geosciences; II. Students develop a deep understanding of Earth systems: how Earth systems work and how they interact; III. Students develop their ability to solve geologic problems through the use of scientific method; IV. Students develop a deep curiosity about how the Earth works, and a lifelong appreciation of the Earth's place in space and time; and V. Students develop their technical communication skills: seeking and	1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems	GEOL 100 GEOL 110	Yearly, longitudinal review every 5 years (2018-19)	Student knowledge inventory (SKI), embedded assessments	SKI yields score, requires no rubric. Embedded assessment rubric developed by faculty	Data collected by course instructors. SKI: short test administered in one junior, one senior course. Embedded assessments: copies made of student work.	SKI: Scores disaggregated by topic and by junior/senior. 70% of seniors answer questions in each domain correctly	SKI: full faculty Enbedded assessments: subcommittee of faculty with relevant specialty	SKI: used by full faculty for instructional/curricular change. Embedded assessments: used by full faculty to track development of specific knowledge.
	2. Students will be proficient in solving geologic problems	GEOL 111B	2015-16, every five years thereafter	Field reports from GEOL 111B	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.

processing technical information; and communicating technical information and conclusions in both oral and written form.	3. Students will be proficient in introductory skills of understanding and producing geologic maps.	GEOL 11B	2015-16, every five years thereafter	Field reports from GEOL 111B	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.
	4. Students will be proficient writers, skilled in the genres of scientific and technical writing	GEOL 111B electives	2017-18, every five years thereafter	Field reports from GEOL 111B, Literature reviews from electives	Adapted VALUE Written Communication rubric	Data collected by course instructors. Copies of scoring rubrics kept, examples of different levels of writing.	70% of students should be scoring Milestone 2 or above in each skill area.	Data analyzed by writing subcommittee	Design and inclusion of writing supports for students into curriculum

Table 2.3c: A Comprehensive Assessment Plan for All the Programs in the Next Program Review Cycle

FOCUS: Student Learning

Connecting Program Goals, Program Learning Outcomes (PLOs), and Assessments

(Adopted from the CSU Chancellor's Office)

Name of the Program: ___BA Earth Science_____

Overarching Program Learning Goals	Corresponding Program Learning Outcomes (PLOs). (Each must directly relate to one or more Program Goals)	In which course(s) will the PLO(s) be assessed?	In which year will the PLO(s) be assessed and how often?	What types of assessment activities[1] will be used to collect the data?	What types of tools[2] will be used to score/evaluate the activity? Who will develop/modify the tool and/or evaluated the activities?	How will the data be collected? By whom?	How will the data be reported[3] (both aggregated and disaggregated), and by whom? What will be the standard of performance?	Who will analyze the data?	How will the data be used? By whom?
I. Students are prepared for professional and /or graduate study involving the geosciences; II. Students develop a deep understanding of Earth systems: how Earth systems work and how they interact; III. Students develop their ability to solve geologic problems through the use of scientific method; IV. Students develop a deep curiosity about how the Earth works, and a lifelong appreciation of the Earth's place in space and time; and V. Students develop their technical	1. Students will master a set of fundamental earth science concepts essential to understanding and solving geologic problems	GEOL 100 CSET scores (exam for teacher certification)	Yearly, longitudinal review every 5 years (2018-19)	Student knowledge inventory (SKI), CSET scores	SKI yields score, requires no rubric. CSET scores require no rubric.	Data collected by course instructors. SKI: short test administered in one junior course. CSET scores collected from students as they take the exam	SKI: Scores disaggregated by topic and by junior/senior. 70% of seniors answer questions in each domain correctly	Full faculty	Data used by full faculty for instructional & curricular change.
	2. Students will be proficient in solving geologic problems	GEOL 111B	2015-16, every five years thereafter	Field reports from GEOL 111B	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.

communication skills: seeking and processing technical information; and communicating technical information and conclusions in both oral and written form.	3. Students will be proficient in introductory skills of understanding and producing geologic maps.	GEOL 11B	2015-16, every five years thereafter	Field reports from GEOL 111B	Field report rubric, developed by field faculty	Data collected by field instructors. Copies of scoring rubrics kept.	70% of students should be scoring 70% or above in each skill area.	Data analyzed by field faculty subcommittee	Improvement of field course, alignments of prereqs.
	4. Students will be proficient writers, skilled in the genres of scientific and technical writing	GEOL 111B electives	2017-18, every five years thereafter	Field reports from GEOL 111B, Literature reviews from electives	Adapted VALUE Written Communication rubric	Data collected by course instructors. Copies of scoring rubrics kept, examples of different levels of writing.	70% of students should be scoring Milestone 2 or above in each skill area.	Data analyzed by writing subcommittee	Design and inclusion of writing supports for students into curriculum

Table 2.3d: A Comprehensive Assessment Plan for All the Programs in the Next Program Review Cycle

FOCUS: Student Learning

Connecting Program Goals, Program Learning Outcomes (PLOs), and Assessments

(Adopted from the CSU Chancellor's Office)

Name of the Program: ___MS Geology_____

Overarching Program Learning Goals	Corresponding Program Learning Outcomes (PLOs). (Each must directly relate to one or more Program Goals)	In which course(s) will the PLO(s) be assessed?	In which year will the PLO(s) be assessed and how often?	What types of assessment activities[1] will be used to collect the data?	What types of tools[2] will be used to score/evaluate the activity? Who will develop/modify the tool and/or evaluated the activities?	How will the data be collected? By whom?	How will the data be reported[3] (both aggregated and disaggregated), and by whom? What will be the standard of performance?	Who will analyze the data?	How will the data be used? By whom?
I. Students will be able to read and digest complex scientific papers in the discipline, assess competing hypotheses and reach rational and logical conclusions. II. Students will be able to evaluate and interpret real-world data sets and use discipline-specific analytical tools to generate insight into discipline specific geologic problems. III. Students will develop presentation skills and the ability to relay technical data and scientific concepts to diverse audiences.	1a) Evaluates the scholarly significance and relevance within and beyond the discipline 1b) Recognizes possible implications of the text for contexts, perspectives, or issues beyond the assigned task 1c) Compares and evaluates multiple and diverse sources and viewpoints according to specific criteria appropriate for the discipline. 1d) Articulates an understanding of the multiple interpretive possibilities particular to a text.	TBD	TBD	In-class presentations and discussions, written responses from students, cumulative exit exam (GEOL 596)	Faculty will use reading, writing and oral rubrics	Instructor of course	Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements
IV. Students will demonstrate the ability to obtain, assess, and analyze information from a variety of sources V. Students will demonstrate an understanding of professional integrity	2a) Uses specific inductive or deductive reasoning to make inferences regarding premises. 2b) Thoroughly identifies and addresses key aspects of the problem, 2c) Insightfully uses facts and	TBD	TBD	Technical reports	Analysis rubric	Instructor of course	Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements.

VI. Students will demonstrate relevant knowledge and application of intercultural and / or global perspectives.	relevant evidence from analysis to support and defend potentially valid solutions.								
	3a) Main points are clear and organized effectively and support a clear purpose. 3b) Language is familiar to the audience and appropriate for the setting. 3c) The delivery is natural, confident, and enhances the message - posture, eye contact, smooth gestures, facial expressions, volume, and pace.	TBD	TBD	Classroom presentations, thesis	Writing and oral rubrics	Instructor of course, thesis advisor	Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements.
	4a) Students compare and evaluate multiple and diverse sources and viewpoints according to specific criteria appropriate to the discipline. 4b) Effectively synthesizes and integrates information from a variety of sources.	TBD	TBD	Classroom presentations, written reports, thesis	Writing Rubric	Instructor of course, thesis advisor	Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements.
	5a) Students consistently and accurately cite ideas and information of others correctly in written and oral exercises. 5b) Students are properly attired and present clear and cogent presentations to audience in oral exercises.	TBD	TBD	Classroom presentations, written reports, thesis	Writing and oral rubrics	Instructor of course, thesis advisor	Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements.
	6a) Insightfully relates concepts and ideas from multiple sources and across geographic regions relative to geologic processes and hazards. 6b) Evaluates the scholarly significance and relevance within and	TBD	TBD	Classroom presentations, written reports, thesis	Reading and analysis rubrics		Data will be disaggregated by rubric item. Standard of performance TBD	Graduate committee	Used by committee and individual instructors for instructional and curricular improvements.

	beyond the discipline and geographic region.								

Table 2.4a: Linking Program Learning Outcomes to the University Baccalaureate Learning Goals (BALGs)[1]

(Refer to Appendix 1)

Program Learning Outcomes (PLOs)	University Baccalaureate Learning Goals (BALGs)
1. Students will master a set of fundamental earth science concepts essential to understanding and solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World
2. Students will be proficient in solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Integrative Learning,
3. Students will be proficient in introductory skills of understanding and producing geologic maps	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Personal and Social Responsibility Integrative Learning
4. Students will be proficient writers, skilled in the genres of scientific and technical writing	Intellectual and Practical Skills Personal and Social Responsibility Integrative Learning,

[1] Currently this is only for the undergraduate program.

Table 2.4b: Linking Program Learning Outcomes to the University Office of Graduate Studies Graduate Learning Goals

Program Learning Outcomes (PLOs)	Office of Graduate Studies Graduate Learning Goals
1. Students will be able to read and digest complex scientific papers in the discipline, assess competing hypotheses and reach rational and logical conclusions.	Disciplinary knowledge
2. Students will be able to evaluate and interpret real-world data sets and use discipline-specific analytical tools to generate insight into discipline specific geologic problems.	Critical thinking / analysis
3. Students will develop presentation skills and the ability to relay technical data and scientific concepts to diverse audiences.	Communication
4. Students will demonstrate the ability to obtain, assess, and analyze information from a variety of sources	Information literacy
5. Students will demonstrate an understanding of professional integrity	Professionalism
6. Students will demonstrate relevant knowledge and application of intercultural and / or global perspectives.	Intercultural / global perspectives

Table 2.5a: Curriculum Map: Geology BS and BA

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / **Courses**	**Outcome 1:** Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems	**Outcome 2:** Students will be proficient in solving geologic problems	**Outcome 3:** Students will be proficient in (BA: introductory) skills of understanding and producing geologic maps	**Outcome 4:** Students will be proficient writers, skilled in the genres of scientific and technical writing	**Outcome 5:**	**Outcome 6:**	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 10	I	I						
GEOL 10L	I	I	I					
GEOL 12	I	I		I				
GEOL 12L	I	I	I					
GEOL 100	D	D						
GEOL 102	D	D						
GEOL 103	D	D	D	D				
GEOL 110A	D	D	D					
GEOL 110B	D	D	D	D				
GEOL 111A	D	D	D					
GEOL 111B	M	M	M	M				
(GEOL 188 – only in BS)	M	M	M	M				
Elective Courses								
GEOL 105	M	M		D				
GEOL 112	M	M						
GEOL 114	M	M		D				
GEOL 120	M	M						
GEOL 123	M	M						
GEOL 125	M	M						
GEOL 127	M	M						
GEOL 150	M	M	M					

GEOL 171	M	M						
GEOL 190A	M	M						
GEOL 190C	M	M						
GEOL 198A	M	M		M				
GEOL 198B	M	M		M				

[1] use “I” for “Introduced”, “D” for “Developed”, and “M” for “Mastered”.

Table 2.5b: Curriculum Map: Earth Science BA

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / **Courses**	**Outcome 1:** Students will master a set of fundamental earth science concepts essential to understanding and solving geologic problems	**Outcome 2:** Students will be proficient in solving geologic problems	**Outcome 3:** Students will be proficient in introductory skills of understanding and producing geologic maps	**Outcome 4:** Students will be proficient writers, skilled in the genres of scientific and technical writing	**Outcome 5:**	**Outcome 6:**	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 5, GEOL 7, GEOL 8 or GEOL 10	I	I						
GEOL 8L or 10L	I	I	I					
ASTR 4B & ASTR 6								
BIO 1 & BIO 2; OR BIO 7								
CHEM 1A OR CHEM 6A								
GEOL 12	I	I		I				
GEOL 12L	I	I	I					
GEOL 17 (currently being changed to GEOL)	D	D						
MATH 26A	I							
PHYS 5A & PHYS 5B	I, D							
GEOG 111	D							
GEOL 103	D	D	D	D				
GEOL 111A	D	D	D					
GEOL 111B	M	M	M	M				
GEOL 130	D	D		M				
Elective Courses								
GEOL 105	M	M		D				
GEOL 110A	M	M	M					
GEOL 114	M	M		D				
GEOL 120	M	M						

GEOL 140	M	M		M				
GEOL 184	I	M	I					
ANTH 124	D							
ANTH 151	D		M					
ENGL 120P				M				
GEOG 113	D							
GEOG 116	D							
GEOG 117	D			M				
GEOG 161	D			M				
JOUR 131				M				
PHIL 125	D							
RPTA 153	D							

[1] use “I” for “Introduced”, “D” for “Developed”, and “M” for “Mastered”.

Table 2.5c: Curriculum Map: Geology MS

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / Courses	**Outcome 1:** Students will be able to read and digest complex scientific papers in the discipline, assess competing hypotheses and reach rational and logical conclusions.	**Outcome 2:** Students will be able to evaluate and interpret real-world data sets and use discipline-specific analytical tools to generate insight into discipline specific geologic problems.	**Outcome 3:** Students will develop presentation skills and the ability to relay technical data and scientific concepts to diverse audiences.	**Outcome 4:** Students will demonstrate the ability to obtain, assess, and analyze information from a variety of sources.	**Outcome 5:** Students will demonstrate an understanding of professional integrity.	**Outcome 6:** Students will demonstrate relevant knowledge and application of intercultural and/or global perspectives.	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 200	X	X	X		X	X		
GEOL 275	X	X	X	X				
GEOL 290	X	X	X	X	X			
Elective Courses								
GEOL 202	X	X	X	X	X			
GEOL 208	X	X	X	X	X			
GEOL 212	X		X	X	X	X		
GEOL 213	X	X	X	X	X	X		
GEOL 218	X	X	X	X				
GEOL 220	X	X	X	X	X	X		
GEOL 227	X	X	X	X	X			
GEOL 240C	X		X	X	X	X		
GEOL 500	X	X	X	X	X	X		
GEOL 596	X	X	X	X				

[1] Note: currently courses are marked with an "X" to indicate which ones contain PLOs. Eventually course map will include "I" for "Introduced", "D" for "Developed", and "M" for "Mastered", but those determinations are still in progress.

Appendix I: Sacramento State Baccalaureate Learning Goals (BALGs) for the 21st Century & AAC&U's 16 VALUE Rubrics
http://www.aacu.org/value/rubrics/index_p.cfm?CFID=38420924&CFTOKEN=68367906

1. **Competence in the Disciplines**: The ability to demonstrate the competencies and values listed below in *at least one major field of study* and to demonstrate informed understandings of other fields, drawing on the knowledge and skills of disciplines outside the major.

2. **Knowledge of Human Cultures and the Physical and Natural World** through study in the *sciences and mathematics, social sciences, humanities, histories, languages, and the arts.* Focused by engagement with big questions, contemporary and enduring.

3. **Intellectual and Practical Skills, Including:** *inquiry and analysis, critical, philosophical, and creative thinking, written and oral communication, quantitative literacy, information literacy, teamwork and problem solving,* practiced extensively, across the curriculum, in the context of progressively more challenging problems, projects, and standards for performance.
   3.1 Critical thinking (Second VALUE rubric)
   3.2 Written communication (Fourth VALUE rubric)
   3.3 Oral communication (Fifth VALUE rubric)
   3.4 Quantitative literacy (Seventh VALUE rubric)
   3.5 Information literacy (Eighth VALUE rubric)
   3.6 Inquiry and analysis (First VALUE rubric)
   3.7 Creative thinking (Third VALUE rubric)
   3.8 Reading (Sixth VALUE rubric)
   3.9 Teamwork (Ninth VALUE rubric)
   3.10 Problem solving (Tenth VALUE rubric)

4. **Personal and Social Responsibility (Values), including:** *civic knowledge and engagement—local and global, intercultural knowledge and competence, ethical reasoning and action, foundations and skills for lifelong learning* anchored through active involvement with diverse communities and real-world challenges.
   4.1 Civic knowledge and engagement—local and global (Eleventh VALUE rubric)
   4.2 Intercultural knowledge and competence (Twelfth VALUE rubric)
   4.3 Ethical reasoning (Thirteenth VALUE rubric)
   4.4 Foundations and skills for lifelong learning (Fourteenth VALUE rubric)
   4.5 Global Learning (The Fifteenth VALUE Rubric)

5. **Integrative Learning, including:** *synthesis and advanced accomplishment* across general and specialized studies.
   5.1 Integrative and applied learning (Sixteenth VALUE rubric)