

**Appendix C**  
**Colorado Mesa University**  
**Assessment**  
**Quantitative Literacy Pilot**

**First session, October 27, 2016**

In Attendance: Dave Weinberg, Tim D'Andrea, Susan Longest, Shawn Robinson, Suzanne Lay, Kelly O'Connell, Bette Schans

Faculty from the Natural Sciences and Math met with the DASL, the FAC and Kelly O'Connell from the Assessment Committee to discuss assessment in quantitative literacy (QL). The discussion centered on the commonalities and differences in assessment for Biology, Physical and Environmental Sciences and Math in Essential learning courses.

The following questions were posed to the group:

- What do we want the students to get out of it? Do the performance indicators on the rubric fit what we are trying to accomplish in assessing student learning?

The group questioned the usability of the VALUE rubric for quantitative literacy. There are many phrases or descriptors that could be considered confusing to a reviewer who is from a different discipline. Do all of the performance indicators need to be used in a review of artifacts from the natural sciences? Should quantitative literacy be assessed outside disciplines that specifically measure mathematical formulas or numerical representations of information?

**Second session, November 17, 2016**

In Attendance: Dave Weinberg, Tim D'Andrea, Susan Longest, Kelly Craig, Shawn Robinson, Suzanne Lay, Kelly O'Connell, Bette Schans

Tim presented information from the CDHE regarding the use of the AAC&U VALUE rubric. Apparently the state has approved two performance indicators (Interpretation and Representation) for assessing the Natural Sciences and requires assessment of 5/6 indicators for Mathematics (the sixth indicator is used for statistics). The group recommended starting with the two that are approved for the Biology lab assignment that Susan and the other instructors are doing for assessment. We will start the pilot assessment with the first two indicators on the rubric.

The group suggested that instructors from other disciplines be included in the pilot assessment.

**Pilot session, December 14, 2016**

In attendance: Dave Weinberg, Tim D'Andrea, Susan Longest, Shawn Robinson, Olga Grisak, Robin Calland, Kelly O'Connell, Bette Schans

Olga Grisak from Radiologic Technology and Robin Calland from English joined the group for the assessment. The assignment used for assessment was a Biology 101 lab report. The group used the AAC&U VALUE rubric as well as a revised rubric from The National Science Foundation (Quantitative

Reasoning in the Contemporary World 3: Assessing Student Learning

<http://services.bepress.com/numeracy/>. The first two performance indicators (Interpretation and Representation) were assessed for this session. The session began with a calibration of two artifacts. Two observations were made during the calibration:

1. It is necessary to have the assignment and any results such as data tables or correct answers. Without that information, it is difficult to determine if the students are interpreting and/or representing the information correctly.
2. Some of the wording in both rubrics was unclear. The group will meet again to combine the wording of each into a CMU VALUE rubric.

**AAC&U Value Rubric.**

	Capstone 4	Milestones		1
		3	2	
<b>Interpretation</b> <i>Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. <i>For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.</i>	Provides accurate explanations of information presented in mathematical forms. <i>For instance, accurately explains the trend data shown in a graph.</i>	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. <i>For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of the trend line.</i>	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. <i>For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.</i>
<b>Representation</b> <i>Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.

Revised Rubric	Achievement Level			
	3	2	1	0
<b>Quantitative Literacy Core Competency</b> <i>Ability to glean and explain mathematical information presented in various forms (e.g. equations, graphs, diagrams, tables, words)</i>	Correctly identifies all relevant information.	Correctly identifies some, but not all, relevant information.	Some relevant information is identified, but none is correct.	No relevant information identified.
<b>Representation</b> <i>Ability to convert information from one mathematical form (e.g. equations, graphs, diagrams, tables, words) into another.</i>	All relevant conversions are present and correct.	Some correct and relevant conversions are present but some conversions are incorrect or not present.	Some information is converted, but it is irrelevant or incorrect.	No conversion is attempted.

The average of the scores of the AAC&U VALUE Rubric in Interpretation was 2.31/4.

The average of the scores for the revised rubric in Interpretation was 1.99/3.

The average of the scores of the AAC&U VALUE Rubric in Representation was 2.13/4.

The average of the scores for the revised rubric in Representation was 1.86/3.

The group determined that a revision would be in order using both of the rubrics and then we would ask for artifacts from the Physical and Environmental Sciences in the spring semester to review the end of spring semester, 2017.

A revision combining both rubrics was presented in December:

Quantitative Literacy Core Competency	Achievement Level				
	4	3	2	1	0
<b>Interpretation</b> <i>Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Accurately and completely explains relevant information presented in mathematical forms. Makes appropriate inferences based on that information.	Accurately and completely explains relevant information presented in mathematical forms	For the most part, accurately explains relevant information presented in mathematical forms.	Accurately explains some relevant information presented in mathematical forms.	No relevant information was explained and/or no explanations were correct.

<b>Representation</b> <i>Ability to convert relevant information into mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Skillfully, accurately, and completely converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Accurately and completely converts relevant information into an appropriate and desirable mathematical portrayal.	For the most part, accurately converts relevant information into an appropriate mathematical portrayal.	Accurately converts some relevant information into a mathematical portrayal that is at least somewhat appropriate.	No relevant information was correctly converted into an even somewhat appropriate mathematical portrayal.
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The group determined that the revised rubric should be used for the next review session to be held at the end of the spring semester 2017. Artifacts will be collected from BIOL 101 lab and, perhaps, from Essential Learning math courses.

Artifacts were collected but the group could not find a time to meet at the end of the semester. This assessment will be rescheduled for early fall, 2017.