College of Marin Common Rubric: Scientific & Quantitative Reasoning – Life/Earth/Social Sciences (1/2011)

	Advanced (4)	Proficient (3)	Satisfactory/ Basic (2)	Not satisfactory/ Below basic (1)
Identify relevant properties of the system/ problem/ observation	• Identifies the role of specific parts of relevant concepts and how they interact to create the outcome of the system/problem/ observation.	• Identifies what specific parts of relevant concepts contribute to the outcome of the system/problem/observation, but doesn't distinguish the role of their contributions or how they interact.	• Identifies relevant concepts which contribute to outcome of system/problem/ observation.	• Needs to identify concepts of system/problem/ observation which contribute to outcome.
Measure/Assess quantified observations in a reproducible manner in standard units of measurement	• Objective-quantified observations are made through reproducible measurements of the relevant quantities contributing to the system, while minimizing error and using standard units of measurement.	• Objective-quantified observations are made through reproducible measurements of the relevant quantities contributing to the system, using standard units of measurement.	• Objective-quantified observations are made of the relevant quantities contributing to the system, using standard units of measurement.	• Observations are made of the relevant quantities contributing to the system but are neither quantified nor objective.
Organize collected observations	• Selects **and** applies an appropriate method for organizing quantitative or qualitative data, including, when applicable: a database, graphs, tables or images. • Data are ranked, grouped or tabulated in a manner for clear interpretation. • Units are included.	• Selects **or** applies an appropriate method for organizing quantitative or qualitative data, including, when applicable: a database, graphs, tables or images. • Data need to be ranked, grouped or tabulated in a manner for clear interpretation. • Units are included.	• Quantitative or qualitative data is collected, but is not arranged in an organized manner. • Data need to be ranked, ordered or grouped according to variables of interest. • Units need to be included.	• Neither quantitative nor qualitative data was collected or organized.
Analyze collected observations	• Correctly selects **and** applies an appropriate method for analysis of observations, including, when applicable: pattern recognition, measures of central tendency (mean, median, and mode), standard deviation, and other statistical analysis (Chi-Squared, student T-test), and error analysis appropriate for the course, discipline and/or question. • Discusses the factors that contributed to the outcome, & any sources of error. • Strong, valid connections drawn between outcome & theoretical or conceptual understandings in the field.	• Selects **or** applies an appropriate method for analysis of observations, such as, including, when applicable: pattern recognition, measures of central tendency (mean, median, and mode), standard deviation, and other statistical analysis (Chi-Squared, student T-test), error analysis as is expected for the course, discipline and/or question. • Discusses the factors OR sources of error which have contributed to the outcome. • Connects the outcome to theoretical or conceptual understandings in the field.	• Selects **or** applies a method for analysis of observations. • Needs to discuss factors that may have contributed to the outcome. • Needs to connect the outcome to theoretical or conceptual understandings in the field.	• Needs to select **or** apply a method for analysis of observations. • Needs to discuss factors that may have contributed to the outcome. • Needs to connect the outcome to theoretical or conceptual understandings in the field.
Apply model based on results to predict future outcomes/ explain/ interpret the initial system/ problem/ observation	• Summarizes **and** explains results. • Draws inferences that are consistent with the data and scientific reasoning • Explains expected results & offers explanations/ suggestions for further research of unexpected results • Distinguishes between raw data & inferences, avoids overgeneralization, and accepts/rejects hypothesis (if appropriate).	• Summarizes **and** explains the results. • Draws inferences that are consistent with the data and scientific reasoning. • Explains expected results but needs to acknowledge unexpected results. • Distinguishes between raw data and inferences.	• Results summarized, but not interpreted or explained.	• Results need to be summarized.
Communicate results	• Conveys detailed, specific information, orally, in writing, and visually describing results of investigation of system/problem/observation.	• Conveys specific information, orally and in writing, describing results of investigation of system/problem/observation.	• Conveys general information describing results of investigation in system/problem/observation	• Needs to describe results of investigation.