

**College of Marin Common Rubric: Scientific & Quantitative Reasoning –
Physical Sciences & Mathematics (1/2011)**

	Advanced (4)	Proficient (3)	Satisfactory/ Basic (2)	Not satisfactory/ Below basic (1)
<u>Identify</u> relevant properties of the system/problem/ observation	<ul style="list-style-type: none"> Identifies the role of specific parts of relevant concepts and how they interact to create the outcome of the system/problem/ observation. 	<ul style="list-style-type: none"> Identifies what specific parts of relevant concepts contribute to the outcome of the system/problem/ observation, but does not distinguish the role of their contributions or how they interact. 	<ul style="list-style-type: none"> Identifies relevant concepts which contribute to outcome of system/problem/ observation. 	<ul style="list-style-type: none"> Needs to identify concepts of system/problem/ observation which contribute to outcome
<u>Measure/Assess</u> quantified observations in a reproducible manner in standard units of measurement	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Objective-quantified observations are made through reproducible measurements of the relevant quantities contributing to the system, using standard units of measurement. 	<ul style="list-style-type: none"> Objective-quantified observations are made of the relevant quantities contributing to the system, using standard units of measurement. 	<ul style="list-style-type: none"> Observations are made of the relevant quantities contributing to the system but are neither quantified nor objective.
<u>Organize</u> collected observations	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Neither quantitative nor qualitative data was collected or organized.
<u>Analyze</u> collected observations	<ul style="list-style-type: none"> Determines an accurate mathematical function or specific trend for quantified observations both quantitatively and qualitatively using mathematical tools such as mathematical fits, comparative ratios, statistical means and modeling, taking into account contributions due to measurement error. 	<ul style="list-style-type: none"> Determines a specific mathematical function or specific trend for quantified observations both quantitatively and qualitatively using mathematical tools such as mathematical fits, comparative ratios, and statistical means. 	<ul style="list-style-type: none"> Determines a mathematical relationship or trend for measured observations, but only qualitatively. 	<ul style="list-style-type: none"> A mathematical relationship or trend is not determined for measured observations.
<u>Apply</u> model based on results to predict future outcomes/ explain/interpret the initial system/problem/ observation	<ul style="list-style-type: none"> Summarizes and explains the results. Draws inferences that are consistent with the data and scientific reasoning. Explains expected results and offers explanations/ suggestions for further research of unexpected results. Distinguishes between raw data and inferences, avoids overgeneralization, and accepts/ rejects hypothesis (if appropriate). 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Results summarized but not interpreted or explained. 	<ul style="list-style-type: none"> Results need to be summarized.
<u>Communicate</u> results	<ul style="list-style-type: none"> Conveys detailed, specific information, orally, in writing, and visually describing results of investigation of system/problem/observation. 	<ul style="list-style-type: none"> Conveys specific information, orally and in writing, describing results of investigation of system/problem/observation. 	<ul style="list-style-type: none"> Conveys general information describing results of investigation in system/problem/observation 	<ul style="list-style-type: none"> Needs to describe results of investigation.