### Rubric for Quantitative and Scientific Reasoning

<table>
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<tr>
<th>Analysis</th>
<th>Calculations</th>
<th>Visual Representations of Data and Information</th>
<th>Scientific Methodology</th>
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| **4 (Advanced)** | • Demonstrates advanced reasoning based on quantifiable information; judgments and conclusions are exceptionally insightful | • Accurately completes calculations for the assignment and presents results clearly and concisely  
• Chooses appropriate formulas or symbolic models to solve problems and justify choices | • Produces highly effective visual representations of data (e.g. tables) or concepts (e.g. graphs) | • Skillfully and precisely engages in the 6 steps needed in undertaking a science-based approach to gathering and interpreting evidence  
1. Identify problem  
2. Formulate a hypothesis  
3. Design a project to test hypothesis  
4. Collect data  
5. Analyze data  
6. Draw conclusions based on data  
• Exhibits highly accurate and exhaustive analysis of data  
• Produces work that contributes to the field |
| **3 (Competent)** | • Demonstrates competent reasoning based on quantifiable information; judgments and conclusions are adequate and reasonable | • Calculations are completed and largely successful  
• Chooses appropriate formulas or symbolic models to solve problems and justify choices | • Produces competent visual representations of data | • Engages in all 6 steps needed in undertaking a science-based approach to gathering and interpreting data  
• Produces an analysis of data  
• Produces work that meets the requirements of the assignments/course |
| **2 (Emerging)** | • Demonstrates emerging reasoning based on quantifiable information as exhibited by difficulty in formulating judgments or drawing conclusions | • Calculations contain multiple errors  
• May not choose the most appropriate or effective formula  
• May exhibit some problems justifying choices | • Visual representations may reflect minor flaws or inaccuracies | • Engages in the 6 steps but may exhibit problems with a few  
• Analysis of data may reflect minor inaccuracies of observation  
• Work may not fully satisfy the requirements of the assignment/course |
| **1 (Beginning)** | • Demonstrates beginning reasoning based on quantifiable information as exhibited by difficulty understanding what constitutes quantifiable information, inability to formulate reasonable judgments and/or drawing reasonable conclusions. | • Calculations may be unsuccessful or incomplete  
• Does not appear to understand the parameters of the appropriate formula  
• Is unable to select the right formula for the problem (decision-making unclear) | • The method for visually presenting information or concepts is highly inaccurate or imprecise | • Exhibits problems in many if not most of the steps required for the scientific process  
• Analysis of data is incomplete, inaccurate, or absent  
• Work does not satisfy the requirements of the assignment/course |