EMPIRICAL/QUANTITATIVE - CORE OBJECTIVES RUBRIC 2025-2026

Criteria	Guiding Question	Level 3	Level 2	Level 1
Calculation	Do the student's calculations successfully solve the problems or test the hypotheses?	3. Calculations attempted are successful and sufficiently comprehensive to solve the problem or test scientific hypotheses.	2. Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem or test hypotheses.	1. Does not meet level 2. For example: Calculations are attempted but are neither successful nor comprehensive.
Evidence Analysis	Does the student reveal meaningful patterns in the available evidence?	3. Effectively organizes evidence to reveal important patterns, differences, or similarities related to focus.	2. Organizes evidence, but the presentation is not effective in revealing important patterns, differences, or similarities.	1. Does not meet level 2. For example: Evidence is listed, but is not organized and/or is unrelated to focus.
Data Interpretation	Does the student accurately translate information from data, graphs, charts, and other quantitative formats?	3. Provides accurate explanations of information presented in empirical or mathematical formats. Makes reasonable inferences based on that information. For example, accurately explains trends in data, has a reasonable understanding of relationships among variables, and makes reasonable predictions regarding what the data suggest about future events.	2. Provides accurate explanations of information presented in empirical or mathematical formats. For instance, accurately explains trend data shown in a graph or accurately explains the outcomes of a study.	1. Does not meet level 2. For example: Attempts to explain the information presented in empirical or mathematical formats, but draws incorrect conclusions about what the information means. For example, misinterprets outcomes, trends, and relationships.
Data Representation	Does the student translate mathematical information to new modes that encourage insights and easier or deeper understanding?	3. Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	2. Converts relevant information into a mathematical portrayal that is appropriate or accurate.	1. Does not meet level 2. For example: Resulting mathematical portrayal may be inappropriate or inaccurate, or may focus on information irrelevant to the problem.
Textual Analysis	Does the student identify elements of a text to effectively support an assertion about the meaning of the text?	3. Identifies relations among ideas, text structure, or other textual features, to evaluate how they support an advanced understanding of the text as a whole.	2. Recognizes relations among parts or aspects of a text, such as effective or ineffective arguments or literary features, in considering how these contribute to a basic understanding of the text as a whole.	1. Does not meet level 2. For example: Identifies aspects of a text (e.g., content, structure, or relations among ideas) but does not effectively synthesize textual evidence in support of an understanding of the text as a whole.
Define Problem	Does the student formulate an effective problem statement?	3. Demonstrates the ability to construct a clear, adequately detailed problem statement with evidence of most relevant contextual factors. Statement may be insightful.	2. Develops a clear problem statement with evidence of some relevant contextual factors, but statement needs more revision or refinement. Example: Statement may be overlooking an important factor.	1. Does not meet level 2. For example: Problem statement is unclear about the problem or struggles to identify contextual factors.
Evaluate Outcomes of Attempted Solutions	After attempting a solution or observing an attempted solution, does the student effectively and explicitly evaluate the outcome? Additional Notes: Student must be asked to do this evaluation explicitly. We cannot assess steps left off a paper or activity.	3. Reviews results of an attempted solution according to criteria appropriate to the solution's goals, and identifies specific areas where further work is needed.	2. Reviews results of an attempted solution according to criteria appropriate to the solution's goals, though some of those criteria may be unconvincingly addressed. Considers the need for further work.	1. Does not meet level 2. For example: Reviews results of an attempted solution superficially. May not consider need for further work, or else may not have appropriate criteria for evaluating the outcomes.
Evaluate Potential Solutions	When the student evaluates a potential solution to a problem how well does the student take into account the history of the problem, the feasibility of the solution, and the impacts of the solution?	3. Evaluation of solutions effectively and insightfully covers history of problem, logic/reasoning, feasibility of solution, and impacts of solutions.	2. Evaluation of solutions at least briefly addresses the following: history of problem, logic/reasoning, feasibility of solution, and impacts of solution.	1. Does not meet level 2. For example: Evaluation of solutions is superficial and may neglect one or more of the following: history of problem, logic/reasoning, feasibility of solution, or impacts of solution.
Propose Solutions/Hypotheses	Does the student draw upon patterns of existing evidence to propose either a hypothesis or a solution that is sensitive to contextual factors such as ethical issues and cultural dimensions?	3. Proposes one or more solutions/hypotheses that indicate comprehension of the problem. Solutions/ hypotheses are sensitive to contextual factors, including ethical, logical, or cultural dimensions.	2. Proposes one solution/hypothesis that is "off the shelf" rather than individually designed to address the specific contextual factors of the problem.	1. Does not meet level 2. For example: Proposes a solution/ hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement.
Application / Analysis	Does the student reach judgments through a thoughtful consideration of empirical results or quantitative analysis?	3. Uses empirical results or quantitative analysis of data as the basis for competent, thoughtful judgments, drawing appropriately qualified, insightful, and reasonable conclusions from this work.	2. Uses empirical results or quantitative analysis of data as the basis for limited (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	1. Does not meet level 2. For example: Uses empirical results or quantitative analysis of data as the basis for conclusions, but conclusions are not plausible.
Assumptions	How effectively does the student address, communicate, and provide rationales for their assumptions?	3. Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	2. Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.	1. Does not meet level 2. For example: Explicitly describes assumptions but rationale for them is not compelling.