

## G-PAC: Scientific Reasoning Rubric

Levels	1	2	3	4	Score/ Level
<b>Criteria</b>					
Understand the hypothetico-deductive method (develops a hypothesis on the basis of observations appropriate for the discipline)	Hypothesis is missing, OR the hypothesis proposed is unrelated to the scientific issue under study, is not plausible, or is not testable.	Proposed hypothesis may offer some connection or relevance to the scientific issue but the relationship is vague.	Hypothesis and scientific issue under study are clearly connected. Hypothesis refutes or defends established knowledge.	The connection between the hypothesis and the scientific issue is clear. Provides references that either defend or refute established knowledge.	
Test hypotheses using data and scientific reasoning (design experiment; controls variables experimentally; and collects data)	The method to test hypothesis is not described or documented. Does not distinguish between independent or dependent variables.	Description of method is general; some procedural steps are missing. Variables are not described completely; some variables are classified incorrectly.	Method is well documented, making it easy to reproduce using the steps provided. Data collection techniques are correctly identified, described, and/or performed.	Method is well documented, making it easy to reproduce using the steps provided. Data collection techniques are correctly identified, described, and/or performed. The applicability and limitations of the data collection techniques are discussed.	
Understand how probability theory affects interpretation of experimental results (Interprets data; draws conclusions)	Summarizes results incorrectly and provides no interpretation of findings.	Summarizes results correctly. Interpretation of findings is simplistic.	Summarizes results correctly. Acknowledges a range of possible interpretations.	Summarizes results correctly. Acknowledges a range of possible interpretations, and discusses the implications of the results.	
Understand the difference between causation and correlation (Interprets data; draws conclusions)	Provides no interpretation of data. Conclusions are not relevant to the hypothesis.	Conclusions are simplistic. Provides no clear relationship between hypothesis and conclusion. Assumes a causal relationship between the independent and dependent variable(s) being studied.	Conclusions are based on the data, and there is a clear relationship between hypothesis and conclusion. Does not assume causality; instead acknowledges a range of possible interpretations.	Conclusions are discussed in detail, are supported by the data, and directly address the hypothesis. Provides alternative interpretations of the findings or discusses limitations of the study.	