SCIENCE AND ENGINEERING PRACTICES RUBRIC

SCORING DOMAIN	EMERGING	DEVELOPING	PROFICIENT	ADVANCED
ASKING QUESTIONS AND DEFINING PROBLEMS	• Asks general questions that can be investigated.	• Asks specific questions that can be investigated.	• Asks questions that require sufficient and appropriate empirical evidence to answer.	• Asks questions that require sufficient and appropriate empirical evidence to answer and evaluates the testability of the questions.
	• Defines a problem (design) statement that is impractical or inadequate for the intent of the problem.	• Defines a problem (design) statement that is minimally aligned to the intent of the problem.	• Defines a problem (design) statement that is adequately aligned to the intent of the problem.	• Defines a problem (design) statement that is completely aligned to the intent of the problem.
DEVELOPING AND USING MODELS	• Model (labelled drawings, diagrams, etc) relevant to the investigation include major conceptual or factual errors, or are missing. • Discussion on limitations or precision of model as a representation of the system or process is flawed or missing.	• Constructs model (labelled drawings, diagrams, etc.) to represent the process or system to be investigated that include minor errors. • Makes note of limitations or precision of model as a representation of the system or process.	• Constructs accurate model (labelled drawings, diagrams, etc.) to represent the process or system to be investigated. • Explains limitations and precision of model as a representation of the system or process.	• Constructs accurate model (labelled, and precise drawings, diagrams, etc.) to represent the process or system to be investigated and provides an explanation of the representation. • Explains limitations and precision of model as a representation of the system or process and discusses how the model might be improved.
PLANNING THE INVESTIGATION OR DESIGN	• Proposes an investigation that will not produce relevant data to be used as evidence to answer the empirical question(s).	• Proposes an investigation that will minimally produce relevant data to be used as evidence to answer the empirical question(s).	• Proposes an investigation identifying dependent and independent variables that will adequately produce relevant data to be used as evidence to answer the empirical question(s).	• Proposes an investigation identifying dependent and independent variables that will completely produce relevant data to be used as evidence to answer the empirical question(s).
	• Proposes a design plan that does not address the criteria, constraints, and intent of the problem.	• Proposes a design plan and description that minimally addresses the criteria, constraints, and intent of the problem.	• Proposes a design plan and explanation that adequately addresses the criteria, constraints, and intent of the problem.	• Proposes a design plan and detailed explanation that completely addresses the criteria, constraints, and intent of the problem.
CONDUCTING INVESTIGATION OR TESTING DESIGN	• Provides procedures that are not replicable.	• Provides replicable procedures with descriptions of measurements, tools or instruments, but conducts insufficient number of trials.	• Provides replicable procedures with descriptions of measurements, tools or instruments, and conducts adequate number of trials.	• Provides replicable procedures with descriptions of measurements, tools or instruments, and conducts adequate number of trials with a rationale for data collection.

SCORING DOMAIN	EMERGING	DEVELOPING	PROFICIENT	ADVANCED
ANALYZING AND INTERPRETING DATA Accurately labeled includes title, column titles, description of units, proper intervals	• Constructs spreadsheets, data tables, charts, or graphs that are not accurately labelled or do not display all the data. • Analyzes data using inappropriate methods or with major errors or omissions.	• Constructs accurately labelled spreadsheets, data tables, charts, or graphs to accurately summarize and display data; but does not allow for examining the relationships between variables. • Accurately analyzes data using appropriate methods with minor omissions and/or mentions limitations of data analysis.	• Constructs accurately labelled spreadsheets, data tables, charts, or graphs to accurately summarize and display data to examine relationships between variables. • Accurately analyzes data using appropriate and systematic methods to identify patterns OR explain limitations of the data analysis (measurement error).	• Constructs accurately labeled spreadsheets, data tables, charts, and/or graphs and uses more than one of these methods to accurately summarize and display data to examine relationships between variables. • Accurately analyzes data using appropriate and systematic methods to identify patterns AND explain limitations of the data analysis (measurement error).
CONSTRUCTING EXPLANATIONS AND DESIGNING SOLUTIONS	• Uses inaccurate or inappropriate scientific ideas, principles, and/or evidence (experimental data) to construct, evaluate, or revise an explanation.	• Uses accurate but minimal scientific ideas, principles, and/or evidence (experimental data) to construct, evaluate, or revise an explanation.	• Uses accurate and adequate scientific ideas, principles, and/or evidence (experimental data) to construct, evaluate, or revise an explanation.	• Uses accurate and complete scientific ideas, principles, and/or evidence (experimental data) to construct, evaluate, or revise an explanation.
	• Uses no data to evaluate how well the design addresses the problem and the redesign of the original model or prototype is inappropriate or incomplete.	• Uses minimal data to evaluate how well the design addresses the problem and outlines an appropriate redesign of the original model or prototype.	• Uses adequate data to evaluate how well the design addresses the problem and explains an appropriate redesign of the original model or prototype.	• Uses complete data to evaluate how well the design addresses the problem and provides a detailed rationale for the appropriate redesign of the original model or prototype.
ENGAGING IN ARGUMENTS FROM EVIDENCE	• Constructs argument(s) with an inappropriate claim OR both evidence and reasoning are inadequate or unclear.	• Constructs and/or evaluates argument(s) consisting of minimal claims, limited sources of evidence, OR minimal reasoning.	• Constructs and evaluates argument(s) consisting of appropriate claims, multiple sources of evidence, and adequate reasoning.	• Constructs and evaluates argument(s) consisting of appropriate claims, multiple sources of evidence, and detailed reasoning.
COMMUNICAT-ING FINDINGS	• Findings are inaccurate and/or inconsistent with the evidence.	• Accurately communicates clear but minimal findings consistent with the evidence and mentions the implications OR limitations of the investigation or design.	• Accurately communicates clear and adequate findings consistent with the evidence and explains the implications and/or limitations of the investigation or design.	• Accurately communicates clear and complete findings consistent with the evidence and provides a rationale for the implications and limitations of the investigation or design.