TOI-6

TOI6 Learning Objective 1: Students will be able to explain and appropriately utilize basic scientific language and concepts.
TOI6 Learning Objective 2: Students will be able to design or conduct an experiment or analysis suitable to test a scientific hypothesis and be able to interpret the results.
TOI6 Learning Objective 3: Students will be able to solve problems described verbally, graphically, symbolically, or numerically.

Criteria	Exceeds Expectations	Meets Expectations	Working Towards Expectations	Did Not Meet Expectations	Not Applicable
Scientific Language & Concepts (Objective 1: Students will be able to explain and appropriately utilize basic scientific language and concepts.)	• Applies scientific vocabulary with precision and accuracy. • Accurately explains concepts. • Integrates terminology appropriately in both written and oral communication in multiple contexts.	• Uses scientific language correctly in most cases. • Explains concepts with only minor errors. • Applies terminology appropriately in familiar contexts.	• Uses some correct terms but with frequent errors or superficial explanations. • Partially explains concepts, failing to make connections between concepts. • Relies on vague or colloquial language.	• Demonstrates minimal recognition of scientific terms. • Misuses terminology or applies concepts incorrectly. • Cannot describe or use basic scientific principles.	Criterion not evaluated in this context.
Experimental Design & Analysis (Objective 2: Students will be able to design or conduct an experiment or analysis suitable to test a scientific hypothesis and be able to interpret the results.)	• Develops a well-structured, feasible experiment or analysis that directly tests a hypothesis. • Appropriate controls, variables, and methods are properly identified. • Interprets results thoughtfully, noting limitations and implications. • Connects findings to hypothesis, scientific concepts, or literature.	• Designs/conducts a mostly feasible experiment or analysis. • Identifies variables, controls, and methods with some accuracy. • Provides a clear interpretation of results, though depth may be limited. • Connects findings to the hypothesis.	• States a hypothesis and outlines a method, but with limited rigor or feasibility. • Incomplete identification of variables or procedures. • Interpretation of results is brief, vague, or partially inaccurate. • Minimal connection of findings to hypothesis.	• Cannot formulate a testable hypothesis or design a viable experiment or analysis. • Lacks recognition of variables or methods. • Does not interpret or misinterprets results. • Little to no connection made to hypothesis or scientific principles.	Criterion not evaluated in this context.
Problem Solving (Objective 3: Students will be able to solve problems described verbally, graphically, symbolically, or numerically.)	• Accurately solves problems presented verbally, graphically, symbolically, and/or numerically. • Constructs a clear definition of the problem, thoroughly evaluates potential solutions, and applies reasoning flexibly.	• Solves problems in at least two or more representations with accuracy. • Defines the problem adequately, proposes some solutions, and identifies some outcomes.	• Solves problems primarily in one representation. • Does not fully define the problem, one solution presented but not well-described, few outcomes identified.	• Struggles to approach or solve problems in any representation. • Does not define the problem, does not present viable solutions, no outcomes identified.	Criterion not evaluated in this context.

Problem Solving is the process of designing, evaluating, and implementing a strategy to answer an open-ended question or achieve a desired goal.

TOI-6L

TOI6 Laboratory Learning Objective: Through application-based experiences utilizing the scientific method, students will be able to identify problems, make observations, analyze data, interpret data, and develop models or explanations.

Criteria	Exceeds Expectations	Meets Expectations	Working Towards Expectations	Did Not Meet Expectations	Not Applicable
Scientific Language & Concepts (Objective 1: Students will be able to explain and appropriately utilize basic scientific language and concepts.)	• Applies scientific vocabulary with precision and accuracy. • Accurately explains concepts. • Integrates terminology appropriately in both written and oral communication in multiple contexts.	• Uses scientific language correctly in most cases. • Explains concepts with only minor errors. • Applies terminology appropriately in familiar contexts.	• Uses some correct terms but with frequent errors or superficial explanations. • Partially explains concepts, failing to make connections between concepts. • Relies on vague or colloquial language.	• Demonstrates minimal recognition of scientific terms. • Misuses terminology or applies concepts incorrectly. • Cannot describe or use basic scientific principles.	Criterion not evaluated in this context.
Experimental Design & Analysis (Objective 2: Students will be able to design or conduct an experiment or analysis suitable to test a scientific hypothesis and be able to interpret the results.)	• Develops a well-structured, feasible experiment or analysis that directly tests a hypothesis. • Appropriate controls, variables, and methods are properly identified. • Interprets results thoughtfully, noting limitations and implications. • Connects findings to hypothesis, scientific concepts, or literature.	• Designs/conducts a mostly feasible experiment or analysis. • Identifies variables, controls, and methods with some accuracy. • Provides a clear interpretation of results, though depth may be limited. • Connects findings to the hypothesis.	• States a hypothesis and outlines a method, but with limited rigor or feasibility. • Incomplete identification of variables or procedures. • Interpretation of results is brief, vague, or partially inaccurate. • Minimal connection of findings to hypothesis.	• Cannot formulate a testable hypothesis or design a viable experiment or analysis. • Lacks recognition of variables or methods. • Does not interpret or misinterprets results. • Little to no connection made to hypothesis or scientific principles.	Criterion not evaluated in this context.
Problem-Solving (Objective 3: Students will be able to solve problems described verbally, graphically, symbolically, or numerically.)	• Accurately solves problems presented verbally, graphically, symbolically, and/or numerically. • Constructs a clear definition of the problem, thoroughly evaluates potential	• Solves problems in at least two or more representations with accuracy. • Defines the problem adequately, proposes some solutions, and identifies some outcomes.	• Solves problems primarily in one representation. • Does not fully define the problem, one solution presented but not well-described, few outcomes identified.	• Struggles to approach or solve problems in any representation. • Does not define the problem, does not present viable solutions, no outcomes identified.	Criterion not evaluated in this context.

	solutions, and applies reasoning flexibly.				
Application of the Scientific Method (Laboratory Objective: Through application-based experiences utilizing the scientific method, students will be able to identify problems, make observations, analyze data, interpret data, and develop models or explanations.)	• Clearly identifies complex problems and researchable questions. • Makes systematic and accurate observations. • Analyzes and interprets data with depth, noting trends, limitations, and uncertainties. • Develops well-supported models, hypotheses, or explanations that extend understanding beyond the data. • Proposes well-designed experiments to test hypotheses. • Demonstrates ability to generalize findings or apply to new contexts.	• Identifies clear and relevant problems or questions in most cases. • Makes accurate observations in most cases. • Analyzes and interprets data adequately. • Develops models or explanations that are supported by evidence, though somewhat limited in scope. • Proposes reasonable experiments to test hypotheses.	• Identifies a problem/question with partial clarity. • Makes observations that are incomplete or lack accuracy. • Data analysis is superficial or partially incorrect. • Models or explanations are underdeveloped or weakly supported. • Proposes weak experiments to test hypotheses.	• Fails to identify a clear problem/question. • Observations are missing, irrelevant, or incorrect. • Data are not analyzed or are misinterpreted. • Little to no attempt at developing models or explanations, or explanations are unsupported. • Proposes experiments that fail to test hypotheses or fails to propose any feasible experiment.	Criterion not evaluated in this context.